Utah State Department of Public Safety Division of Emergency Services COOPERATING TECHNICAL PARTNERS MAPPING ACTIVITY STATEMENT

Mapping Activity Statement No. 2 – Digital Flood Insurance Rate Map Production and Development of Updated Flood Data

In accordance with the Cooperating Technical Partners (CTP) Partnership Agreement dated December 1, 2004 between Utah State Department of Public Safety Division of Emergency Services (DES) and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement (MAS) No. 2 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 Tooele County, Utah, and Incorporated Areas. The DFIRM and FIS report will be produced in the FEMA Countywide Format.

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.

Table 1-1

Flooding Source	Reach Limits	Hydrologic Analyses	Hydraulic Analyses	Floodplain Mapping	Redelineation Using Effective Flood Profiles and Updated Topographic Data	Refinement or Creation of Zone A
Settlement Creek[1]	8.7 miles	-	X	X	-	-
Unnamed[1] (Tooele City)	2.3 miles	-	X	X	-	-
Middle Creek[1] (Tooele City)	5.8 miles	-	X	X	-	-
Middle Creek[1] (Tooele County N. of Tooele City)	3.0 miles	-	X	X	-	-
Unnamed 2[1] (Tooele City)	3.1 miles	-	X	X	-	-

Middle Creek (Tooele County E. of Tooele City)	0.6 miles	-	-	-	-	X
Bates Creek (Tooele County)	3.4 miles	-	-	-	-	X

[1]Limited Detail Study (100-year floodplain analysis only).

Within 30 days of this agreement, the CTP, in coordination with the National Service Provider (NSP), shall input the scope of work into the FEMA Scoping tool. This includes information concerning community ordinance data, local GIS data availability, and the flood reach data for existing and proposed conditions. The FEMA Scoping tool documentation can be found at http://www.hazards.gov/resources/scoping.htm.

The CTP/IDIQ shall notify FEMA and the NSP by e-mail of all meetings with community officials at least one week prior to the meeting. FEMA and/or the NSP may or may not attend the community meetings.

The following will complete this Flood Map Project:

- Utah State Department of Public Safety Division of Emergency Services (DES);
- Stantec; and
- Michael Baker Jr., Inc., FEMA National Service Provider (NSP).

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 Table 1-1. All activities that are to be accomplished by DES or contractors to DES, including contractors that may be selected after the project startup, are included in the "CTP" column. The sections of this MAS that follow Table 1-1 describe the specific activities, responsible Mapping Partner(s), FEMA standards that must be met, and resultant map components.

Compliance with Floodplain Boundary Data Quality Standards: The data quality standards documented in Section 7 of the Multi-Year Flood Hazard Identification Plan (MHIP) for Fiscal Year 2004-2008 (Version 1, November 2004) should be used as the basis for producing DFIRMs. It has been determined that DFIRMs that do not meet the quality standards stated above may not be considered toward meeting the Map Mod metrics. The MIP utilities available at the time of study submittals should be run to verify compliance with these data quality standards. Compliance with these standards will help FEMA achieve a Map Modernization goal of providing a reliable, web-based national flood layer in digital GIS format.

The floodplain boundary data quality standards outlined in Table 7-1 of the MHIP should be followed in addition to existing standards specified for floodplain mapping in the Guidelines, including Volume I, Section 1.4 and Appendices C, D, E, F, G, H, K, L, M, and N. Table 7-1 shall be applied to all approximate, existing detailed and new detailed studies for riverine and coastal flooding sources.

Table 1-1. Summary of Project Activities and Assignments

Activities	CTP	FEMA (NSP)
Activity 1: Pre-Scoping		X
Activity 2: Scoping	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
Activity 6: Hydrologic Analyses	N/A	N/A
Activity 6A: Coastal Flood Hazard Analyses	N/A	N/A
Activity 7: Independent QA/QC Review of Hydrologic Analyses		X
Activity 7A: Independent QA/QC Review of Coastal Hazard Analyses	N/A	N/A
Activity 8: Hydraulic Analyses	X	
Activity 9: Independent QA/QC Review of Hydraulic Analyses		X
Activity 10: Floodplain Mapping (Detailed Riverine or Coastal Analysis)	X	
Activity 10A: Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data)	N/A	N/A
Activity 10B: Floodplain Mapping (Refinement or Creation of Zone A)	X	
Activity 11: Independent QA/QC Review of Floodplain Mapping (Revised Areas)		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
Activity 14: DFIRM Production (Merging Revised and Non-Revised Information)	X	
Activity 14A: DFIRM Production (Application of FEMA Graphics and Database Specifications)	X	
Activity 14B: Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications		X
Activity 15: Preliminary DFIRM and FIS Report Distribution	X	X

Activities	CTP	FEMA (NSP)
Activity 16: Post-Preliminary Processing	X	X
Activity 17: Outreach	X	

FEMA has developed tools to assist in the development of the flood hazard data studies and the Digital Flood Insurance Rate Maps (DFIRMs). FEMA will, through the NSP, provide all CTPs access to and training in these tools. The use of these tools will assist in the Map Modernization effort and the efficiency of mapping partners.

If the CTP chooses not to use these production tools, then the CTP will be required to submit project data at major milestones in each Mapping Project in accordance with data capture standards. Submitting data in these standards will aid in more efficient quality control reviews, data storage, archiving, and for future study updates.

The Data Capture Specifications submittals will be required at the following study milestones:

- Project Scoping (as specified);
- Terrain Data Processing Completed;
- Field Survey Completed;
- Hydrology Completed (draft and final);
- Hydraulics Completed (draft and final);
- Coastal Analysis Completed (draft and final); and
- DFIRM Mapping (draft and preliminary).

Although the scoping activity is not specifically included in this table, CTPs performing scoping activities will be required to submit scoping-related data in accordance with the data capture standards.

QA/QC review activities may be performed by CTPs or the NSP at the discretion of FEMA. Please note the NSP will also be performing periodic audits and overall study/project management to monitor study quality.

FEMA will be providing download/upload capability for data capture submittals through the MIP. Data submittals uploaded via the MIP will include the same data required prior to the existence of the MIP.

Activity 1 – Pre-Scoping

Responsible Mapping Partner: FEMA (NSP)

Scope: Pre-Scoping or Mapping Needs Assessment forms the building block for the Scoping Phase. This task involves collecting data from a variety of sources including community surveys, other Federal and

State Agencies, NFIP State Coordinators, Community Assistance Visits (CAVs) and FEMA archives. FEMA (NSP) will evaluate the effective FIS report and FIRM maps to see if they need to be updated. Lists of mapping needs will be obtained from the MNUSS database, community surveys and CAVs if available.

Data collection will include obtaining nationally available base map materials (e.g., corporate limits, roads, orthophotos) 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.

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

Deliverables: FEMA (NSP) shall make the following products available to FEMA:

- Copies of all digital files obtained and lists of files that may be available at a later date;
- Summary of the Community's needs; and
- Scoping Tool project files, as detailed above.

Information on the Scoping Tool can be downloaded from http://www.hazards.gov/resources/scoping.htm.

Activity 2 – Scoping

{The Scoping Task has been broken down into 17 sub-tasks to approximately correspond with the *Guidelines and Specifications for Flood Hazard Mapping Partners*. Each sub-task will not be necessary for every study, especially for studies that involve mostly digital conversions and few new detailed studies. Please delete sub-tasks that are not being conducted for this study}.

Task 2-1 Project Management Team Participation

Responsible Mapping Partner: DES

Scope: In cooperation with the FEMA Region, a Project Management Team will be established consisting of the DES, FEMA's Regional Engineer, Tooele County and Incorporated Areas, 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.

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

Deliverables:

- A document listing the project management team along with their full contact information.
- Update of the Scoping Tool files to include the project management team and contact information.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-2 Initial Community Contact

Responsible Mapping Partner: DES

Scope: Coordinate with the FEMA Regional Project Officer to contact Tooele County, and Incorporated Areas and notify them that FEMA and DES have selected them for a map update, and they will be working with the communities to develop the project scope. Topics to be reviewed with the communities include:

- Purpose of the Flood Map Project (i.e., the update needs that have prompted the map update);
- The community's perception of its mapping needs;
- Target schedule for completing the project;
- Possibility of the community participating as a CTP (if it isn't already); and
- The community's engineering, planning, and Geographic Information System (GIS) capabilities.

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

Deliverables: A digital document reporting the results of the contact.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-3 Preliminary Project Management Plan

Responsible Partner: DES

Scope: The coordination protocol and general management objectives of the entire project will be addressed in the preliminary Project Management Plan. The plan will identify the overall Project, Project Team, the lines and protocols of communication between the communities and the Team members, protocols for internal flow of information among the members of the Team, the project objectives, general milestones of the Flood Map Project, QA/QC review requirements, record keeping, and project completion goals.

The Project Management Plan shall follow the template provided in Appendix I, Subsection I.1.2 of the *Guidelines and Specifications for Flood Hazard Mapping Partners* and will constitute the living document for the operation of the project. Copies of the document will be distributed to all members of the Project Team. As the project advances, revisions deemed necessary for improving the Project Management Plan will be incorporated into the plan and distributed to all Team members as well.

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

Deliverable: The Project Management Plan in digital format.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-4 Initial Project Team Conference Call

Responsible Partner: DES

Scope: Following the completion of the Project Management Plan, a conference call will be arranged including all of the Project Management Team members and the appropriate representatives of Tooele County, and Incorporated Areas. The communities will be asked to provide input for its assessment of the flood mapping needs, available data for base maps, any existing studies or ongoing projects that may have an influence on flood mapping, the community's potential as a CTP, and the involvement of other regional or state agencies that may have an input for the map development process.

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

Deliverable: A digital document documenting discussions during the conference call.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-5 Project Team Formation

Responsible Partner: DES

Scope: The composition of the Project Team will be based on the needs of the project. The selected Project Team members will consist of the Project Management Team plus other mapping partners and NFIP stakeholders whose collective capabilities will provide all the necessary resources to successfully complete the Flood Map Project.

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

Deliverables: A document listing the project team along with their full contact information. Update of the Scoping Tool files to include the project team and contact information.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-6 Distribution of Background Information

Responsible Partner: DES and NSP

Scope: In preparation for the Scoping Meeting (Task 12), a detailed meeting agenda will be prepared in accordance with the template provided in Appendix I, Subsection I.2.4 of the *Guidelines and Specifications for Flood Hazard Mapping Partners*. The DES, with assistance from the NSP, will distribute the Scoping Meeting agenda, revised draft Project Scope and the preliminary Project Management Plan to all meeting attendees before the Scoping Meeting.

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

Deliverables: Copies of the Scoping Meeting Agenda to be distributed before the Scoping Meeting.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-7 Scoping Meeting Activities

Responsible Partner: DES/NSP

Scope: DES, with assistance from the NSP, will coordinate, set up, and conduct the Scoping Meeting. This includes identifying a time, location, and all participants. The purpose of this meeting is to present the draft Scope of Project to the local officials (state, county and municipal) and coordinate the prioritization of proposed study areas. DES, with assistance from the NSP, shall be responsible for compiling the necessary information for the meeting as contained on the Scoping Meeting Item Checklist. These items may include: FIS and FIRM for affected communities; USGS quads for the study area(s); best available community base map(s); effective FIRM summary; Available Data Inventory; Scoping Map; Draft Scope of Project; Scoping Meeting Agenda/Minutes form; Aerial photos/topographic mapping if available; existing drainage studies or other Hydrology & Hydraulics (H&H) data; Community master plan(s)/Drainage Master Plan(s); Zoning Maps; Street Maps; As-built plans; and Floodplain Ordinance(s).

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

Deliverables: A completed Scoping Meeting Package with all necessary forms will be submitted to the DES, the FEMA Regional Project Officer, and the NSP one week after the Scoping Meeting.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-8 Mapping Needs List Prioritization and Finalization

Responsible Partner: DES

Scope: The Project Management Team shall review the 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 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 subject to 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.

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

Deliverables: The final mapping needs list along with priorities

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-9 Refinement of Draft Scope of Project

Responsible Partner: DES

Scope: Based on the discussion of mapping needs, DES 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:

The Project Team shall discuss the extent of riverine or coastal modeling required for the project. The research completed during the pre-Scoping Meeting phase shall be reviewed to determine the extent and applicability of previous modeling. Issues to be discussed include the following: models to be used from FEMA's approved models list; requirements for tie-ins to adjacent NFIP maps; areas where complex models might be required; and coordination on Coastal Issues.

Review of Proposed Paneling Scheme:

The scoping map shall be used to review the proposed paneling and scale scheme.

Review and Refinement of Base and Topographic Map Sources:
FEMA's base map specifications will be discussed. The discussion shall include the following topics: Base map source (i.e., locally developed data or DOQs meeting FEMA's minimum specifications) to be used for the project; Topographic and planimetric data sources; Coordination of countywide issues, if necessary; horizontal and vertical datums; and acquisition of the base map, if digital files are not available.

Finalization of Map Production and Database Options:

The proposed DFIRM format and optional features and data for the enhanced DFIRM Database (e.g., GIS data for watershed boundaries, stream reach hydrologic network structure, land use data, soil data, digital elevation certificates, photographs of structures) from the draft Scope of Project shall be reviewed, refined, and finalized.

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

Deliverables: A digital Draft Project Scope document and update of the Scoping Tool files.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-10 Assignment of Project Team Member Tasks

Responsible Partner: DES

Scope: The objective is for each Project Team member to have a clear understanding of his or her role and responsibilities for the project. The Task Assignment and Scheduling Worksheet in *Guidelines and Specifications for Flood Hazard Mapping* Partners, Appendix I, Subsection I.2.5 can be used to make assignments and develop a schedule for the project. The Flood Mapping Project Process Flowchart, which is included in Appendix I, Subsection I.2.6 may also be useful.

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

Deliverable: A report documenting the assignments of the Project Team members in accordance with the delivery dates specified in task orders.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-11 Community Partnership Agreements (If Applicable)

Responsible Partner: DES

Scope: Communities will be contacted and given the opportunity to sign a Memorandum of Agreement (MOA). MOAs will be obtained from as many affected communities as possible, within the Period of Performance of this Task Order. MOAs document the good faith efforts to collaboratively assess the community's needs, develop an appropriate Project Scope, and develop and adopt the resulting maps.

If these agreements cannot be signed at the Scoping meeting (for example, if they require city council approval), they are to be processed as soon as possible after the Scoping Meeting. MOA templates are provided in Appendix I, Subsections I.2.7 and I.2.8.

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

Deliverables: Signed Community Partner MOAs.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-12 Scoping Meeting Documentation

Responsible Partner: DES

Scope: DES shall prepare and distribute the meeting minutes, which shall include a list of all the participants and their respective assignments for the project, as well as the overall schedule for the project as discussed at the Scoping Meeting. The overall project schedule shall establish the basis for each Project Team member's assignment(s). Project Team members shall review their task assignments and provide feedback or comments. All changes to the proposed scope, schedule, and task assignments shall be coordinated with the NSP, FEMA, and the other team members.

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

Deliverables: A report documenting the Scoping Meeting including attendees sign-in list, scoping meeting minutes, and the project schedule summarizing prioritized needs within the community. Priorities are established in accordance with the criteria listed in Task 2-13 so that areas of greatest need can be addressed with the available funding. Backup or supplemental information used in writing this report should also be included.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-13 Statement of Work Revision

Responsible Partner: DES

Scope: DES shall work closely with BCA to develop or revise the Statement of Work (SOW) based on task assignments made during the Scoping Meeting and any subsequent changes. FEMA Regional Project Officer, FEMA Regional Contracting Officer, and FEMA HQ Program Manager shall review and approve the SOW before it is distributed to the Project Team members.

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

Deliverables: The deliverable shall be the revised Statement of Work.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-14 Time and Cost Estimate Preparation

Responsible Partner: DES

Scope: DES shall be responsible for preparing time and cost estimates for all assigned tasks as well as coordinating and compiling time and cost estimates from other mapping partners. Based on the SOW or MAS, each mapping partner participating in the flood map project shall develop a time and cost estimate for assigned tasks. As part of these estimates, Project Team members also shall establish a schedule for their portion of the work within the schedule from the Scoping Meeting.

The time and cost estimates shall be prepared in accordance with the template for preparing time and cost estimates is provided in Appendix I, Subsection I.3.2 of the *Guidelines and Specifications for Flood Hazard Mapping Partners.*

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

Deliverables: A report containing time and cost estimates for all tasks. Any backup or supplemental information used in writing this report will also be included.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-15 Finalization of Project Management Plan

Responsible Partner: DES

Scope: DES, in consultation with the NSP, FEMA Regional Project Officer and FEMA Regional Contract Officer, shall incorporate the final SOW or MAS into the Project Management Plan and establish intermediate project reporting and project close-out requirements. The Plan shall then be ready for finalization.

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

Deliverables: A Final Project Management Plan report and the backup or supplemental information used in writing this plan.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-16 Updates to Mapping Needs Update Support System (MNUSS) Database or its successor

Responsible Partner: DES

Scope: Once the SOW or MAS is finalized, DES shall update the MNUSS database to indicate that the needs included in the SOW or MAS are being addressed in an ongoing Flood Map Project. They shall also update the MNUSS database to add any new needs or revise existing needs identified during the scoping activities that will not be addressed by the current project. Additionally, they shall flag the needs that could not be verified during the research and community coordination activities as "not verified."

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

Deliverables: Email from the MNUSS administrator stating that the MNUSS update was successful.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Task 2-17 Outreach, Coordination & Consultation

Responsible Partner: DES

Scope: By proactively reaching out to all key stakeholders as early in the Flood Map Project as possible, the maps can be used to their full potential. The likelihood of appeals may also be reduced or eliminated. DES shall develop on Outreach plan to accomplish the following: establishing two-way communication to address the needs of, inform and obtain feedback from, the stakeholders; ensuring compliance with due process requirements; interacting with technical representatives to ensure production of accurate and up-to-date maps; enhancing ownership by communities; tracking, monitoring, and evaluating outreach activities and adjusting efforts according to ongoing feedback and evolving project needs.

DES shall also assist FEMA's Consultation Coordination Officer (CCO) in consultation and coordination efforts to address outreach activities to educate stakeholders about this Flood Map Project.

DES shall also assist FEMA in the coordination and outreach with local officials by helping them contact the local officials and the State NFIP Coordinator and inform them that their community has been selected for a possible study. They shall also work with FEMA and local officials to inform the community and request information through meetings and other consultation activities.

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

Deliverables: An Outreach plan document along with documentation of Outreach, Consultation and Coordination activities that have already occurred.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsai.pdf.

Activity 3 - Field Surveys and Reconnaissance

Responsible Mapping Partner: DES

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

Local government officials 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. DES shall coordinate with local officials collecting the field survey data.

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*, DES 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;
- Survey notebook containing cross sections and structural data; and
- FEMA Format Survey Database or Intermediate Data Delivery consistent with the FEMA Data Capture Standards.

Data Capture Standards can be downloaded from http://www.fema.gov/pdf/fhm/frm_gsana.pdf. The effective Data Capture Standards applicable to this MAS are dated Preliminary Draft, April 2004

Appendix N may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsana.pdf.

Activity 4 - Topographic Data Development

Responsible Mapping Partner: DES

Scope: To supplement the field surveys conducted under Activity 3, DES shall obtain additional topographic data of the overbank areas of the flooding sources studied to delineate floodplain boundaries. Specifically, DES shall generate new topographic data for the streams in Table 1-1 to be studied by limited detailed methods using topographic data generated from the survey information collected in Activity 3. DES shall coordinate with other team members conducting field surveys under Activity 3. The contour interval and/or accuracy for the topographic data shall be selected based on the current FEMA requirements as documented in *Guidelines and Specifications for Flood Hazard Mapping Partners*.

For this activity, DES also may develop topographic maps and/or Digital Elevation Models for the subject flooding sources using the data collected under Activities 3 and 4. In addition, DES shall address all concerns or questions regarding Activity 4 that are identified by NSP during the independent QA/QC review under Activity 5.

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

Deliverable: Upon completion of topographic data collection and processing for all of the streams identified in Table 1-1, DES shall submit these data to NSP for an independent QA/QC review under Activity 5. DES shall submit the data 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*, DES shall make the following products available to FEMA:

- Hardcopy topographic maps;
- Report summarizing methodology and results;
- Mass points and breaklines data on CD-ROM;
- 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 (NGS) data sheets for Network Control Points used to control remote- sensing and ground surveys; and
- Metadata compliant with Federal Geographic Data Committee standards; and
- NSP Format Terrain Database or Intermediate Data Delivery consistent with the NSP Data Capture Standards.

Appendix N may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsana.pdf.

Activity 5 - Independent QA/QC Review of Topographic Data

Responsible Mapping Partner: NSP

Scope: NSP shall review the mapping data generated by DES under Activity 4 to ensure that these data are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM.

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*, NSP 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 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.

Activity 6 – Hydrologic Analyses

N/A

Activity 6A – Coastal Flood Hazard Analyses

N/A

Activity 7 - Independent QA/QC Review of Hydrologic Analyses

N/A

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

N/A

Activity 8 – Hydraulic Analyses

Responsible Mapping Partner: DES

Scope: DES shall perform hydraulic analyses for approximately 22.9 miles of the flooding sources identified at the beginning of this MAS. The modeling will include the 1-percent-annual-chance event based on peak discharges from the effective FIS. The hydraulic analysis methods used for this analysis will include primarily HEC-RAS, although the use of an undsteady model such as FLO-2D may be required in some areas. Approximate hydraulic analysis will also be performed for 4.0 miles of stream.

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

DES 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, DES shall provide explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate. In addition, DES shall address all concerns or questions regarding Activity 8 that are identified by NSP during the independent QA/QC review under Activity 9.

DES 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. DES shall document the digital datasets and provide them to FEMA for approval before performing the hydraulic analyses to ensure that the datasets meet minimum requirements. If non-commercial (i.e., custom-developed) software is used for the analyses, then DES 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 the streams identified in Table 1-1, DES shall submit the results to NSP for an independent QA/QC review under Activity 9. DES 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*, DES shall make the following products available to FEMA:

- Digital profiles of the 1-percent-annual-chance water-surface elevations representing existing conditions using the FEMA RASPLOT program or similar software;
- Digital and hardcopy versions of the Floodway Data Table for each flooding source that is compatible with the DFIRM database;
- Digital and hardcopy versions of all hydraulic modeling (input and output) files;
- Digital and hardcopy versions of a table showing ranges of Manning's "n" values;
- Explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate;
- Digital and hardcopy versions of all backup data used in the analyses; and
- Digital and hardcopy 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 Intermediate Data Delivery consistent with the NSP Data Capture Standards.

Appendix N may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsana.pdf

Activity 9 - Independent QA/QC Review of Hydraulic Analyses

Responsible Mapping Partner: NSP

Scope: NSP shall review the technical, scientific, and other information submitted by DES under Activity 8 to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM. 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-ins 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 Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, NSP 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 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.

Activity 10 - Floodplain Mapping (Detailed Riverine)

Responsible Mapping Partner: DES

Scope: DES 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 analyses were performed. DES shall incorporate all new or revised 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, DES shall incorporate the results of all effective Letters of Map Change (LOMCs) within the revised areas as appropriate. Also, DES shall address all concerns or questions regarding Activity 10 that are identified by NSP during the independent QA/QC review under Activity 11.

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

Deliverables: Upon completion of floodplain mapping for the limited detail flooding sources identified in Table 1-1, DES shall submit the mapping to NSP for an independent QA/QC review under Activity 11. DES shall submit the mapping 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*, DES shall make the following products available to FEMA:

- 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 11;
- An explanation for the use of existing topography for the studied reaches, if appropriate; and
- Intermediate Format Mapping Database or Intermediate Data Delivery consistent with the FEMA Data Capture Standards.

Appendix N may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsana.pdf.