



FEMA

**MONTANA DEPARTMENT OF
NATURAL RESOURCES & CONSERVATION
COOPERATING TECHNICAL PARTNERS
MAPPING ACTIVITY STATEMENT**

**Mapping Activity Statement No. 2007-01 – Digital Flood Insurance
Rate Map Production and Development of Updated Flood Data**

In accordance with the Cooperating Technical Partners (CTP) Partnership Agreement dated March 18, 2005 between Montana Department of Natural Resources & Conservation and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement (MAS) No. 2007-01 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 Cascade County. The DFIRM and FIS report will be produced in the FEMA Countywide format using vertical datum NAVD 88. (Refer to Procedure Memorandum 41.)

Existing Geographic Information System (GIS) data and study needs for the community will be researched, obtained, organized, and provided in accordance with the Scoping Activity and data coordination procedures set forth in FEMA’s Geospatial Data Coordination Policy and Geospatial Data Coordination Implementation Guide. Although Cascade County was Scoped May 25, 2006 some additional Scoping may 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 Table 1.1, Flooding Sources to be Studied.

Maintain an archive of all data submitted for hydrologic modeling review. (All supporting data must be retained for three years from the date a funding recipient submits its final expenditure report to FEMA, and once the study is effective all associated data should be submitted to the FEMA library).

Table 1.1 Flooding Source(s) to be Studied

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Detailed Coastal					Limited Detail Study	Redelineation of SFHAs Using Effective Profiles and New Topography	Refine/Establish Zone A
			Hydrology	Hydraulics	Stillwater	Setup	Wave Height	Wave Runup	Erosion			
Belt Creek	Within corporate limits of Town of Belt	1 mile	X	X								

This Flood Map Project will be completed by the following Mapping Partner:

- Montana DNRC;
- CTP Contractor PBS&J;
- Michael Baker, Jr., Inc., the FEMA National Service Provider (NSP); and
- FEMA Region VIII

The Mapping Partner shall notify FEMA and/or 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.

The activities for this Flood Map Project, including any required Quality Assurance/Quality Control (QA/QC) reviews, and the Mapping Partners that will complete them are summarized in Table 1.2, Flood Mapping Project Activities. The sections of this MAS that follow the table below describe the specific mapping activities, responsible Mapping Partner(s), FEMA standards that must be met, and resultant map components.

Table 1.2 Flood Mapping Project Activities

Activities	CTP	FEMA
Scoping	X	X
Outreach	X	
Field Survey	X	
Topographic Data Development	X	
Independent QA/QC Review of Topographic Data		X
Base Map Acquisition and Preparation	X	
Independent QA/QC Review of Base Map		X
Hydrologic Analyses	X	
Independent QA/QC Review of Hydrologic Analyses		X
Hydraulic Analyses	X	
Independent QA/QC Review of Hydraulic Analyses		X
Floodplain Mapping (Detailed Riverine or Coastal Analysis, Redelineation Using Effective Flood Profiles and Updated Topographic Data ¹ , Refinement or Creation of Zone A, Redelineation (digitization) of Non-Revised Areas ¹ , Merge Revised and Non-Revised Information)	X	
Independent QA/QC Review of Floodplain Mapping		X
Redelineation (Redelineation Using Effective Flood Profiles and Updated Topographic Data ¹ , Refinement and Redelineation (digitization) of Non-Revised Areas ¹)	X	
Independent QA/QC Review of Redelineation		X
Develop DFIRM Database (including Graphic Specifications)	X	
Independent QA/QC Review of DFIRM Database and Graphics		X
Produce Preliminary Map Products	X	
Independent QA/QC of Preliminary Products		X
Post-Preliminary Processing	X	X
¹ These sub-tasks can be performed and reported in the Management Information Portal (MIP) Work Flow as part of Floodplain Mapping activity or Redelineation activity.		

FEMA has developed tools to assist in the development of the flood hazard data studies and DFIRMs if the CTP wishes to use them. FEMA will 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 Flood Map Modernization and efficiency of all mapping partners.

QA/QC review activities may be performed by the CTPs or FEMA's contractor at the discretion of FEMA. If the CTP will be utilizing its contractors to do the QA/QC review, this should be identified during scoping. The CTP will need to submit its QA/QC plan with checklist to the Regional Project Officer for approval. Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality.

FEMA will be providing download/upload capability for intermediate data submittals through the MIP. Data submittals uploaded via the MIP will include the same data required prior to the existence of the MIP, with the addition of Metadata profiles required for search and retrieve capabilities. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded digital data. The NFIP Metadata Profiles follow the Federal Geographic Data Committee Content Standard for Digital Geospatial Metadata, but define some specific domains and business rules to make the metadata more useful to FEMA and its mapping partners.

Scoping

Responsible Mapping Partner: DNRC and FEMA/NSP

Scope: This task involves collecting data from a variety of sources including community surveys, other Federal and State agencies, National Flood Insurance Program (NFIP) State Coordinators, Community Assistance Visits (CAVs), and FEMA archives. DNRC will evaluate the effective FIS report and Flood Insurance Rate Maps (FIRMs) to see if it needs to be updated. Lists of mapping needs will be obtained from the WISE Scoping Tool, MNUSS database, community surveys, and CAVs, if available.

Data collection will include obtaining the best readily available base map materials (corporate limits, roads, orthophotos, etc) along with stream centerline files.

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

In order for a levee to be shown as providing protection on a new FIRM, the requirements of 44 CFR 65.10 must be provided to FEMA regardless if the flooding source is proposed to be restudied or not. All levee systems impacting existing and proposed SFHAs shall be identified during this task and relevant information on the levee's ownership. The effective FIRM and FIS, FEMA's Flood Levee Inventory System (FLIS) and effective LOMRs should all be used to identify certification status for all identified levees. For all levees proposed to be shown on the new FIRM as providing protection from the 1-percent-annual-chance flood (i.e., those known to have adequate freeboard, available as-built plans, adequate maintenance, and operation plans, etc.) that do not have certification documentation available, the levee owner and/or community(s) protected shall be contacted by FEMA/NSP via letter requesting certification in accordance with 44 CFR 65.10. During this step, the time frame for providing the requested data shall be established in coordination with the FEMA Regional Office. If certification, plans, etc. are not provided within the established timeframe, then the need for new flood hazard analysis/mapping shall be documented. Mapping will be done in accordance with Appendix H of the *Guidelines and Specifications*

for Flood Hazard Mapping Partners. At the end of this task, the FLIS must be updated for all levees identified by FEMA/NSP. The FLIS can be found at <http://flis.pbsjdfirm.com> and information should be provided via the FLIS according to Procedure Memorandum 30 and 34. A summary report must be generated from the database to provide the results of this activity.

In cooperation with the FEMA Region, a Project Management Team (PMT) will be established consisting of the DNRC, PBS&J, FEMA, FEMA's regional engineer, officials from communities being studied, and other appropriate stakeholders. The PMT will be responsible for coordinating the activities of this project and completing all tasks identified in this MAS. The FEMA Region will be provided with documentation identifying the established PMT as well as identifying the PMT on the Scoping Report. The MIP shall be updated with Scoping status as appropriate.

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, Flood Boundary Floodway Map (FBFM) panels, FIS reports, and other flood hazard data or existing study data; summarize the information in the WISE Scoping Tool and/or MNUSS database; summarize contiguous community agreement checks; review CAV and Community Assistance Contact files; and develop a “scoping map” and an overview of the results of the research.

For researching of available data for the Flood Map Project, the DNRC should follow the FEMA Geospatial Data Coordination Policy and Implementation Guide.

The DNRC will coordinate, setup, and hold the Scoping Meeting. This includes identifying a time, place, and participants. The purpose of this meeting is to present the current information to the local officials (State, county, and municipal) and coordinate on prioritization and identification of study areas. The DNRC shall be responsible for compiling the necessary information for the meeting. These items may include: the FIS and FIRM for affected communities; United States Geological Survey 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 (Base Flood Elevations (BFEs), floodplains, and regulatory floodways) are likely to be changed the most by a restudy.

Based on the discussion of mapping needs, the DNRC and the FEMA Project Officer will finalize the areas to be included in the project (based on recommendations provided by the Project Management Team). Areas to be studied by detailed, limited detail, 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 FEMA Project Officer will be acting as the Consultation Coordination Officer for this flood study as identified in 44 CFR Part 66. At this point, the CTP will prepare and setup the Community Case File and Flood Elevation Docket for the maintenance of all communication and coordination throughout the project as outlined in 44CFR Parts 66 and 67.

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

Deliverables:

- The Final Scoping with all of the components as laid out in the attached “Partner Flood Map Modernization Program Scoping Report” template in Appendix A, or an approved alternate, will be delivered in accordance with the schedule outlined in Section 6 - Schedule to the Regional Project Officer for approval.
- QA/QC Plan for the review of the mapping project outlined in this MAS. This will include the checklists developed for that review in accordance with the schedule included in Section 6 - Schedule.
- MNUSS and the WISE Scoping Tool (optional) population. (The MIP Scoping Tool is strongly recommended to be used during the scoping process, populated with data, and uploaded to the MIP. See Procedure Memorandum 35)
- National Digital Orthophoto Program and National Digital Elevation Program Tracking System Documentation. Where non-Federal orthoimagery or topographic data sets are discovered during scoping or when the planned scope for the project includes production of new orthoimagery or topographic data, information about the data sets must be entered into the appropriate tracking system consistent with the FEMA Geospatial Data Coordination Policy.

OUTREACH

(NOTE: The performance of outreach takes place throughout the life of the flood study project. Therefore, we recommend tracking the outreach budget, in the MIP Workflow, equally between Produce Preliminary Map Products and Post Preliminary Processing. An alternate tracking method is acceptable with approval from the project management team.)

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 Management Team in responding to congressional inquiries.

The DNRC 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 to many outreach tools that have been developed for this process that can be utilized or customized. Volume 1 of the *Guidelines and Specifications for Flood Hazard Mapping Partners* provides specific outreach goals that can be considered.

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

Deliverables:

- Upon determination of an Outreach and Coordination Approach, the DNRC shall deliver the following to the FEMA Regional Project Officer in accordance with the schedule outlined in Section 6 - Schedule:
 - A report detailing outreach and coordination activities
 - Backup or supplemental information used in writing this report

Field Survey

Responsible Mapping Partner: DNRC

Scope: To supplement any field reconnaissance conducted during the Project Scoping phase of this project, the DNRC 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, the DNRC 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. The DNRC also shall coordinate with other Mapping Partners that are involved in the Topographic Data Development process.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this activity

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

Deliverables: In accordance with the Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, the DNRC shall make the following products available to FEMA by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded Appendix N compliant digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete. 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. The MIP should also be populated with appropriate leverage information regarding who paid for the data and the amount of data used by the Flood Map Project.

- 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;
- Documentation of the Datum, (Refer to Procedure Memorandum 41);
- Digital versions of draft text for inclusion in the FIS report;
- Format Survey Database or Data Delivery consistent with the Data Capture Standards—Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan.

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Topographic Data Development

Responsible Mapping Partner: DNRC

Scope: To supplement the field surveys conducted under this MAS, the DNRC shall obtain additional topographic data of the overbank areas of the flooding sources studied to delineate floodplain boundaries and extend surveyed channel cross sections. The DNRC shall gather information on what topographic data is available for the given community and what accuracy and currency it meets. The DNRC shall use this topographic data that is better than that of the original study. In coordination with the partner who performed scoping, insure that the FEMA Geospatial Data Coordination Policy and Implementation Guide is followed. {If necessary, describe additional steps that may need to be taken to use the available data.}

If there is no new topographic data available that can be used and it is demonstrated that there is a need during the Scoping phase, with approval from the Regional Project Officer, the DNRC shall generate new topographic data for flooding source as identified in Table 1.1. The DNRC also shall coordinate with other team members conducting field surveys. 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*. No FEMA funds shall be expended on new topographic data unless prior approval is given by the Regional Project Officer after analyzing the request submitted at the end of the scoping period.

If appropriate, the DNRC also shall develop topographic maps and/or Digital Elevation Models for the subject flooding sources using the data collected under this Topographic Data Development process and via field surveys. In addition, the DNRC shall address all concerns or questions regarding the topographic data development that are raised by FEMA/NSP during the independent QA/QC review. The

DNRC should confirm with the appropriate FEMA Regional Engineer the automated H&H software proposed to be used.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this activity.

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

Deliverables: In accordance with Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, the DNRC shall make the following products available to FEMA by uploading the digital data to the MIP so that FEMA/NSP can access it for an independent QA/QC review in accordance with the schedule outlined in Section 6 - Schedule. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded Appendix N compliant digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete. The MIP should also be populated with appropriate leverage information regarding who paid for the topographic data and the amount of data used by the Flood Map Project. 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;
- Terrain Database or Data Delivery consistent with the Data Capture Standards–Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan.

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Independent QA/QC Review of Topographic Data

Responsible Mapping Partner: FEMA/NSP

Scope: FEMA/NSP shall review the mapping data generated by the DNRC under Topographic Data Development to ensure that these data are consistent with FEMA standards and standard engineering practice, and are sufficient to prepare the DFIRM. If FEMA/NSP utilizes a contractor to perform the QA/QC, the contractor must be a different contractor than who performed the original analyses. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer.

This review shall be done in a timely manner to eliminate impact to the project schedule.

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

Deliverables: In accordance with the Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, FEMA/NSP shall make the following products available to FEMA and DNRC by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded Appendix N compliant digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete.

- 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.

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Base Map Acquisition

Responsible Mapping Partner: DNRC

Scope: Base Map Acquisition consists of obtaining the digital base map for the project and as necessary, preparing the base map for use. The DNRC shall provide the digital base map. The required activities are as follows:

- Obtain digital files (raster or vector) of the base map. In coordination with the partner who performed scoping, insure that the FEMA Geospatial Data Coordination Policy and Implementation Guide is followed.
- Secure necessary permissions from the map source to allow FEMA's use and distribution of hardcopy and digital map products using the digital base map, free of charge.

- Certify that the digital data meets the minimum standards and specifications that FEMA requires for DFIRM production.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this activity.

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

Deliverables: In accordance with the *Guidelines and Specifications for Flood Hazard Mapping Partners*, (Volume 1, Appendix K and Appendix L), the DNRC shall make the following products available to FEMA by uploading the digital data to the MIP so that FEMA/NSP can access it for an independent QA/QC review in accordance with the schedule outlined in Section 6 - Schedule. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete. The MIP should also be populated with appropriate leverage information regarding who paid for the base map and the amount of data used by the Flood Map Project.

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

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Independent QA/QC Review of Base Map

Responsible Mapping Partner: FEMA/NSP

Scope: FEMA/NSP shall review the base map acquired by the DNRC to ensure it includes data consistent with FEMA standards and sufficient to include on the DFIRM.

This review shall be done in a timely manner to eliminate impact to the project schedule

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

Deliverables: In accordance with the *Guidelines and Specifications for Flood Hazard Mapping Partners* (Volume 1, Appendix K, and Appendix L), the FEMA-NSP shall make the following products available to FEMA and DNRC by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete.

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

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Hydrologic Analyses

Responsible Mapping Partner: DNRC

Scope: Where hydrologic analyses are required for the flooding source(s) listed earlier in Table 1.1, the methods and discharge values shall be identified in Appendix B. These flood discharges will be the basis for subsequent Hydraulic Analyses performed under this MAS. In addition, the DNRC shall address all concerns or questions regarding the hydrologic analyses that are raised during the independent QA/QC review performed by FEMA/NSP during the QA/QC review.

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

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

Deliverables: In accordance with Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, the DNRC shall make the following products available to FEMA by uploading the digital data to the MIP so that FEMA/NSP can access it for an independent QA/QC review in accordance with the schedule outlined in Section 6 - Schedule. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete. 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. The MIP should also be populated with appropriate leverage information regarding who paid for the hydrologic data and the amount of data used by the Flood Map Project.

- Digital copies of all hydrologic modeling (input and output) files for the 10-, 2-, 1-, and 0.2-percent-annual-chance storm events;
- Digital Summary of Discharges Tables presenting discharge data for the flooding sources for which hydrologic analyses were performed;
- Digital versions of draft text for inclusion in the FIS report;
- Digital versions of all backup data used in the analysis including work maps;
- Format Hydrology Database or Data Delivery consistent with the Data Capture Standards– Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan.
- For GIS-based modeling, deliverables shall include all input and output data, intermediate data processing products, and GIS data layers.

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Independent QA/QC Review of Hydrologic Analyses

Responsible Mapping Partner: FEMA/NSP

Scope: FEMA/NSP shall review the technical, scientific, and other information submitted by the DNRC specific to the hydrologic analyses to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice, and are sufficient to prepare the DFIRM. If FEMA/NSP utilizes a contractor to perform the QA/QC, the contractor must be a different contractor than 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 the data readily available to FEMA; and

- If data changed during review, then updated deliverables for previous tasks will be submitted at this time.

This review shall be done in a timely manner to eliminate impact to the project schedule.

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

Deliverables: In accordance with Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, the FEMA-NSP shall make the following products available to FEMA and DNRC by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded Appendix compliant digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete.

- 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.

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Hydraulic Analyses

Responsible Mapping Partner: DNRC

Scope: The DNRC shall perform hydraulic analyses for approximately 1 mile of the flooding sources listed earlier in Table 1.1. The modeling will include the 10-, 2-, 1-, and 0.2-percent-annual-chance events based on peak discharges computed under Hydrologic Analyses. The hydraulic methods used for this analysis are detailed in Appendix B.

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

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

The DNRC shall document automated data processing and modeling algorithms for GIS-based modeling and provide the data to FEMA for review to ensure these are consistent with the standards outlined above.

Digital datasets are to be documented and provided to FEMA for approval before performing the hydraulic analyses to ensure the datasets meet minimum requirements. If non-commercial (i.e., custom-developed) software is used for the analyses, then the DNRC shall provide full user documentation, technical algorithm documentation, and software to FEMA for review before performing the hydraulic analyses

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Any flooding sources associated with a levee that are mapped as providing protection on effective FIRMs, but will not meet certification requirements for the new FIRMs, will require revised hydraulic analysis. This revised analysis should be done in accordance with Appendix H of the *Guidelines and Specifications for Flood Hazard Mapping Partners*.

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

Deliverables: In accordance with Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, the DNRC shall make the following products available to FEMA by uploading the digital data to the MIP so that FEMA/NSP can access it for an independent QA/QC review in accordance with the schedule outlined in Section 6 - Schedule. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded Appendix N compliant digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete. 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. The MIP should also be populated with appropriate leverage information regarding who paid for the hydraulic data and the amount of data used by the Flood Map Project.

- 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;
- Format Hydraulic Database or Data Delivery consistent with the Data Capture Standards– Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan.

- For GIS-based modeling, deliverables include all input and output data, intermediate data processing products, GIS data layers, and final products in the format of the DFIRM database structure;

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Independent QA/QC Review of Hydraulic Analyses

Responsible Mapping Partner: FEMA/NSP

Scope: FEMA/NSP shall review the technical, scientific, and other information submitted by the DNRC under Hydraulic Analysis to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice, and are sufficient to revise the FIRM. If FEMA utilizes a contractor to perform the QA/QC, the contractor must be a different contractor than 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 the data readily available to FEMA.
- Maintain an archive of all data submitted for hydrologic modeling review. (All supporting data must be retained for three years from the date a funding recipient submits its final expenditure report to FEMA, and once the study is effective all associated data should be submitted to the FEMA library); and

- If data changed during review, then updated deliverables for previous tasks will be submitted at this time.

This review shall be done in a timely manner to eliminate impact to the project schedule.

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

Deliverables: In accordance with Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, the FEMA-NSP shall make the following products available to DNRC by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete.

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

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Floodplain Mapping

Responsible Mapping Partner: DNRC

Scope for Detailed Riverine: The DNRC 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, hydraulic, and/or coastal analyses were performed. The DNRC shall incorporate all new or revised hydrologic, hydraulic, and/or coastal modeling and shall use the topographic data acquired under Topographic Data Development to delineate the floodplain and regulatory floodway boundaries on a digital work map.

Scope of Redelineation of Detailed Floodplain Boundaries Using Updated Topographic Data:

(NOTE: This specific task can be tracked in the MIP Workflow separately in the Data Development Task: Perform Redelineation, if preferred – indicate in subsequent reporting where this task will be tracking in the MIP Workflow)

The DNRC shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries, regulatory floodway boundaries, and coastal high hazard zones (if required) for the flooding sources listed earlier in Table 1.1. The DNRC shall use the topographic data acquired under Topographic Data Development 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 the effective study, the DNRC shall evaluate the topographic data to determine if changes are significant enough to invalidate the floodplain boundary and regulatory floodway boundary redelineations. If so, the DNRC shall contact the FEMA Regional Project Officer, identified in Section 12 – Points of Contact, with a recommendation.

Scope for Refinement or Creation of Zone A: The DNRC shall delineate the 1-percent-annual-chance floodplain boundaries for the flooding sources listed earlier in Table 1.1 or in the subsequent Scoping Report. The DNRC shall use existing topographic data or the topographic data acquired under Topographic Data Development to delineate the floodplain boundaries on a digital work map. The DNRC 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 and approved by the FEMA Regional Project Officer identified in Section 12 – Points of Contact, before analysis and mapping begin.

Scope for Non-revised Areas:

(NOTE: This specific task can be tracked in the MIP Workflow separately in the Data Development Task: Perform Redelineation, if preferred – indicate in subsequent reporting where this task will be tracking in the MIP Workflow)

Since there is no new or updated topo available, for all flooding sources except those segments for which updated flood data will be developed, the DNRC shall convert the information shown on the effective FIRM and FBFM panels for all incorporated and unincorporated areas of Cascade County to digital format in conformance with FEMA DFIRM specifications. The DNRC shall use the acquired base map for the conversion. The DNRC shall digitize 50 FIRM panels. The DNRC shall not digitize the flood theme for those segments of flooding sources for which updated flood data will be developed. It is estimated that 78 (including index page) printed and 68 non-printed (146 total) county-wide DFIRM panels will be produced by the DNRC.

Scope for Merging Revised and Non-Revised Information: Upon completion of the floodplain mapping activities for the revised and non-revised areas, the DNRC 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. The DNRC 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. The DNRC shall coordinate with FEMA and any additional Mapping Partners responsible for other components of Floodplain Mapping, as necessary, to resolve any potential tie-in issues.

The DNRC shall incorporate the results of all effective LOMCs for all affected communities on the DFIRM. Also, the DNRC shall address all concerns or questions regarding Floodplain Mapping that are raised by FEMA/NSP during the independent QA/QC review.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Standards: All Floodplain Mapping work shall be performed in accordance with the standards specified in Section 5 - Standards. Mapping quality standards must be consistent with Procedure Memorandum No. 38, dated September 2, 2005. {Insert responsible Mapping Partner} 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 and approved by the FEMA Regional Project Officer before analysis and mapping begin.

Deliverables: In accordance with Appendix L of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, and upon completion of floodplain mapping for those flood areas documented in Appendix B, the DNRC shall make the following products available to FEMA by uploading the digital data to the MIP so that FEMA/NSP can access it for the independent QA/QC review in accordance with the schedule outlined in Section 6 – Schedule. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the Appendix L compliant digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal. The mapping for the remaining flooding sources including any non-revised digital panels and all merged revised and non-revised floodplain mapping data is to be submitted for a final QA/QC review at the completion of this activity.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete. 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. The MIP should also be populated with appropriate leverage information regarding who paid for the data and the amount of data used by the Flood Map Project.

- Digital work map showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone designation labels, and all applicable base map features;
- DFIRM mapping files prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan;
- Any backup or supplemental information including supporting calculations and assumptions used in the mapping required for the independent QA/QC review of Hydrologic, Coastal and /or Hydraulic Analyses and Floodplain Mapping;
- An explanation for the use of existing topography for the studied reaches, if appropriate.
- Written summary of the analysis methodologies;
- Digital versions of draft text for inclusion in the FIS report;
- Digital versions of input and output for any computer programs that were used;
- Format Mapping Database or Data Delivery consistent with the Data Capture Standards– Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- If automated GIS-based models are applied, all input data, output data, intermediate data processing products, and GIS data layers shall be submitted.

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Independent QA/QC Review of Floodplain Mapping

Responsible Mapping Partner: FEMA/NSP

Scope: FEMA/NSP shall review the floodplain mapping submitted by the DNRC under Floodplain Mapping to ensure that the results of the analyses performed are accurately represented, the redelineation of existing data on new, updated topography is appropriate, and to ensure that the new DFIRM panels accurately represent the information shown on the effective FIRMs and FBFMs for the unrevised areas that are mapped.. If FEMA utilizes a contractor to perform the QA/QC, the contractor must be a different contractor than who performed the original floodplain mapping. 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 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, 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 the data matches the Floodway Data Table.
- Review the floodplain boundaries as shown on the work maps to ensure the data matches the Flood Profiles.
- For non-revised floodplain areas, the 1- and 0.2-percent-annual-chance floodplain boundaries agree with the floodplain boundaries shown on the FIRM, the contour lines, other topographic information, and planimetric information shown on the DFIRM base.
- Road and floodplain relationships are maintained for all unrevised areas.
- Review the flood insurance risk zones as shown on the work maps to ensure the data are labeled properly.
- Review the DFIRM mapping files to ensure the data were prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- Review the metadata files to ensure the data includes all required information shown in the NFIP Metadata Profiles Specifications.

This review shall be done in a timely manner to eliminate impact to the project schedule.

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

Deliverables: In accordance with Appendix L of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the FEMA-NSP shall make the following products available to DNRC by uploading the digital data to MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must

accompany the Appendix L compliant digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete.

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

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

DFIRM Map and Database

Responsible Mapping Partner: DNRC

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

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

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

Deliverables: In accordance with Appendix K and L of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, the DNRC shall make the following products available to FEMA by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the Appendix K and L compliant digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete. 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. The MIP should also be populated with appropriate leverage information regarding who paid for the data and the amount of data used by the Flood Map Project.

- DFIRM mapping files prepared in accordance with the requirements 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 as outlined in approved QA/QC Plan; and

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Independent QA/QC Review of DFIRM Map and Database

Responsible Mapping Partner: FEMA/NSP

Scope: Upon completion of the floodplain mapping and redelineation activities, FEMA/NSP shall review the DFIRM spatial database to determine if it meets current FEMA database specifications. In addition, FEMA/NSP shall review the DFIRM to ensure it meets current FEMA graphic specifications. The DNRC shall coordinate with other Mapping Partners, as necessary, to resolve any problems identified during this QA/QC review. If FEMA utilizes a contractor to perform the QA/QC, the contractor must be a different contractor than 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 a GIS file and database format as 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.

This review shall be done in a timely manner to eliminate impact to the project schedule.

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

Deliverables: In accordance with Appendix K and L of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, the DNRC shall make the following products available to FEMA by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the Appendix K and L compliant digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 – Schedule. The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete.

- 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 Floodplain Mapping and Redelineation will be resubmitted at this time.

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Produce Preliminary Map Products

Responsible Mapping Partners: DNRC

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

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

Distribution of Preliminary DFIRM and FIS Report: The DNRC 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 DNRC 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 DNRC shall file the notifications for later submittal to FEMA for review.

Preliminary Summary of Map Actions (SOMA) Preparation: The DNRC 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).

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Standards: All Preliminary Map Products work shall be performed in accordance with the standards specified in Section 5 - Standards. Mapping quality standards must be consistent with Procedure Memorandum No. 38, dated September 2, 2005. The Data Capture Standards must be met for this deliverable to be acceptable.

Deliverables: In accordance with Appendix L of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, the DNRC shall make the following products available to FEMA by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the Appendix L compliant digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete. The MIP should also be populated with appropriate leverage information regarding who paid for the data and the amount of data used by the Flood Map Project.

- Preliminary transmittal letters shall be prepared and transmitted. These letters and any additional letters requested by FEMA shall be prepared in accordance with the current version of the FEMA *Document Control Procedures Manual* and in conjunction with Guidance provided by the Region and/or its contractor.
- The FIS report is prepared in the FEMA Countywide Format as documented in Appendix J of *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- 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.
- If appropriate, revised DFIRM mapping and 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.

- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the final preparation of the preliminary DFIRM shall be provided as outlined in the approved QA/QC Plan.
- The DNRC will submit a summary of outreach activities and any changes made in the outreach approach based on the actual implementation.

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Independent QA/QC of Preliminary Map Products

Responsible Mapping Partners: FEMA/NSP

Scope: *Final QA/QC Review of Preliminary DFIRM and FIS Report:* The FEMA/NSP 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* and the QA/QC report submitted for approval at the end of scoping.

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

Deliverables: In accordance with Appendix L of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, FEMA-NSP shall make the following products available to FEMA and DNRC by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the Appendix L compliant digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete.

- 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 data changed during review, then updated deliverables for previous tasks will be submitted at this time.

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Post-Preliminary Processing

Responsible Mapping Partners: DNRC and FEMA

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

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

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

Initiation of Statutory 90-Day Appeal Period: When required, upon completion of a 30-day community comment period and/or final coordination meeting with the affected communities, the DNRC 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 DNRC shall prepare the appropriate notices (Proposed Rules) that are to be published in the *Federal Register*. The DNRC shall then deliver those notices to FEMA for publication.
- When the DNRC 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.

Resolution of Appeals and Protests: FEMA, supported by the DNRC, 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 the DNRC and revised DFIRM and FIS report materials for FEMA review.

The DNRC shall mail all associated correspondence upon authorization by FEMA.

Preparation of Special Correspondence: The DNRC 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. The DNRC 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, the DNRC 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: The DNRC shall prepare Final SOMAs for the affected communities with assistance from FEMA, as appropriate.

Processing of Letter of Final Determination: The DNRC shall work with FEMA to establish the effective date for the DFIRM and FIS report, and shall prepare Letters of Final Determination (LFDs) for each affected community for FEMA review in coordination with the Region and its contractor, and in accordance with the FEMA *Document Control Procedures Manual*. FEMA or its designated contractor shall mail the final signed LFDs and enclosures and distribute appropriate copies of the signed LFDs.

Processing of Final DFIRM and FIS Report for Printing: The DNRC shall prepare final reproduction materials for the DFIRM and FIS report and provide these materials to the MSC for printing by the United States Government Printing Office. The DNRC shall also prepare the appropriate paperwork to accompany the DFIRM and FIS report (including Print Processing Worksheet, Printing Requisition Forms, and Community Map Actions Form) and transmittal letters to the community CEOs.

Revalidation Letter Processing: The DNRC 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: FEMA/NSP shall ensure that technical and administrative support data are packaged in the FEMA required format and stored properly in the library archives until transmitted to the FEMA Engineering Study Data Package Facility. In addition, the FEMA/NSP will maintain copies of all data for a period of no less than three years.

Refer to Appendix B, CTP Contractor Scope of Work, for details on this Activity.

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

Deliverables: In accordance with Appendix L of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, the DNRC shall make the following products available to FEMA by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the Appendix L compliant digital data. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping*

Partners must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. The MIP shall be updated for status reporting not less than prescribed monthly periods and when the activity is complete.

- 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;
- Completed, organized, and archived technical and administrative support data; and
- Completed, organized, and archived case files and flood elevation dockets.

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

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 MAS 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 may be downloaded from the FEMA Flood Hazard Mapping

website at 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													
	Scoping	Field Survey	Topo Data	QA/QC of Topo	Base Map	Hydrology/Coastal	QA/QC of Hydrology/Coastal	Hydraulic Analysis	QA/QC of Hydraulics	Flood-plain Mapping (and Re-delineation)	QA/QC of FP Mapping	DFIRM Database	Preliminary Map Products	Post-Preliminary
General Documentation														
Special Problem Reports	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
Meeting Minutes/ Reports	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
Engineering Analyses														
Hydrologic Analyses		X			X	X	X	X	X	X	X			
Hydraulic Analyses		X			X	X	X	X	X	X	X			
Key to Cross-Section Labeling		X			X	X	X	X	X	X	X			
Key to Transect Labeling		X			X	X	X	X	X	X	X			
Draft FIS Report					X	X	X	X	X					
Mapping Information	X		X	X	X					X	X	X	X	X
Miscellaneous Reference Information	X	X	X	X	X	X	X	X	X	X	X	X	X	X

SECTION 3—PERIOD OF PERFORMANCE (for CTPs)

The mapping activities outlined in this MAS will begin on June 1, 2007, and will be completed no later than October 30, 2009. The mapping activities may be terminated at the option of FEMA or the DNRC in accordance with the provisions of the Partnership Agreement dated March 18, 2005. If these mapping activities are terminated, all products produced to date and the remaining funds from uncompleted activities, provided by FEMA for this MAS, will be returned to FEMA.

SECTION 4—FUNDING/LEVERAGE (FOR CTP, OFA and/or COMMUNITY)

FEMA is providing funding, in the amount of \$390,737.52 (this includes a 6.41% indirect charge), to the DNRC for the completion of this Flood Map Project. The DNRC 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 leverage listed below includes in-kind services and blue book values for acquired information (i.e. base map data, hydrologic and hydraulic analyses, etc.). These values should also be reported in the MIP by the appropriate task owner. The current Blue Book is dated November 2006. More detailed leverage information will be determined during the detailed scoping process and reported back to FEMA at that time.

Funding for Project/Partner Name	FEMA Contribution	Partner Contribution	% Leverage	Total Project Cost
TOTAL FUNDING AMOUNTS	\$390,737.52	\$	%	\$390,737.52

The FEMA funds identified above are available to be used for the activities included in Table 4.1.

Table 4.1 FEMA funds identified above are available to be used for the following activities*:

Activities	FUNDABLE?
Scoping	Yes, up to 10 percent of total cost
Outreach	Yes
Field Surveys and Reconnaissance	Yes
Topographic Data Development	No, unless approval given during scoping phase by Regional Project Officer
Independent QA/QC Review of Topographic Data	No, unless approval given during scoping phase by Regional Project Officer
Base Map Acquisition	No, unless approval is given by the Regional Project Officer for base map preparation tasks only.
Hydrologic Analyses	Yes
Independent QA/QC Review of Hydrologic Analyses	Yes
Hydraulic Analyses	Yes
Independent QA/QC Review of Hydraulic Analyses	Yes
Coastal Flood Hazard Analyses	Yes
Independent QA/QC Review of Coastal Hazard Analyses	Yes
Floodplain Mapping (Detailed Riverine or Coastal Analysis; Redelineation Using Effective Flood Profiles and Updated Topographic Data; Refinement or Creation of Zone A; Redelineation/digitization of Non-Revised Areas; and Merging Revised and Non-Revised Areas)	Yes
Independent QA/QC of Floodplain Mapping	Yes
Optional: Redelineation (Redelineation Using Effective Flood Profiles and Updated Topographic Data; Refinement; and Redelineation (digitization) Non-Revised Areas)	Yes
Independent QA/QC of Redelineation	Yes
DFIRM Database and Graphic Specifications	Yes
Independent QA/QC Review of DFIRM Database and Graphic Specifications	Yes
Produce Preliminary Map Products	Yes
Post-Preliminary Processing	Yes

*This table is for information purposes only.

SECTION 5—STANDARDS

The standards relevant to this MAS 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 for convenience. Please see Appendix A for the DCS requirements determined by Region VIII for FY07 projects. However, all mapping partners working on a Flood Map Project are responsible for complying with all appropriate requirements in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* and related Procedure Memoranda published by FEMA as of the date of this agreement.

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

Table 5-1. Applicable Standards for Project Activities

Applicable Standards	Activities														
	Scoping	Field Survey	Topo Data	QA/QC Topo Data	Base Map	Hydrology/Coastal	QA/QC Hydrology/Coastal	Hydraulic Analysis	QA/QC of Hydraulic Analysis	Floodplain Mapping (inc. Redelineation)	QA/Qc Flood-plain Mapping	DFIRM Dbase	QA/QC DFIRM Database	Preliminary Map Products	Post-Preliminary Processing
<i>Guidelines and Specifications for Flood Hazard Mapping Partners</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
FEMA’s Geospatial Data Coordination Policy	X		X		X										
FEMA’s Geospatial Data Coordination Implementation Guide	X		X		X										
Global Positioning System (GPS) Surveys: National Geodetic Survey (NGS-558), “Guidelines for Establishing GPS-Derived Ellipsoid Heights,” November 1997	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					
NFIP Metadata Profile Specifications	X		X	X							X	X	X	X	X
<i>Document Control Procedures Manual</i>	X													X	X
<i>44 Code of Federal Regulations Parts 65, 66 and 67</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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

Activity Description	Applicable Volume, Section/Subsection, and Appendix
Scoping	Volume 1, Section 1.3, Appendix I, Scoping Report document; 44 Code of Federal Regulations Part 66 and 67
Field Survey	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1)
	Appendix A
	Appendix F, Section F.3
	Appendices B, C, M, and N
Topographic Data Development	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1)
	Appendix A
	Appendices M and N
Independent QA/QC Review of Topographic Data	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.1)
	Appendix A
	Appendices M and N
Base Map Acquisition and Preparation	Volume 1, Sections 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); Appendices K, L, and M
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, M and N

Activity Description	Applicable Volume, Section/Subsection, and Appendix
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, M and N
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, M and N
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, M and N
Coastal Hazard Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.2.2) ----- Appendix A, Section A.4 (specifically Subsection A.4.7) ----- Appendix C, Section C.5 ----- Appendices B, D, and M
Independent QA/QC Review 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 Description	Applicable Volume, Section/Subsection, and Appendix
Floodplain Mapping	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2, 1.4.2.3, and 1.4.3.2) ----- Appendix C, Sections C. 4 and C.6 (specifically Subsection C.6.1.3) ----- 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
Perform Redelineation	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2, 1.4.2.3, and 1.4.3.2) ----- Appendix C, Section C.6 (specifically Subsection C.6.1.3) ----- Appendices K, L, and M
Independent QA/QC Floodplain Mapping (including Redelineation/Digitization)	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 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
DFIRM Map and Database	Volume 1, Section 1.4 ----- Appendices K, L, and M
Independent QA/QC Review of DFIRM Map and Database	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
Production of Preliminary Map Products	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
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. Please also identify to whom the products associated with each task are to be submitted to (i.e. the MIP, FEMA Regional Office, etc.).

Table 6.1 Mapping Activities Schedule

Activities	RESPONSIBLE PARTNER(S)	START DATE	END DATE
Scoping	DNRC, FEMA/NSP	6/1/07	6/30/07
Field Surveys	DNRC	6/1/07	10/15/07
Topographic Data Development	DNRC	6/1/07	11/15/07
Independent QA/QC Review of Topographic Data	FEMA/NSP	11/16/07	12/17/07
Base Map Acquisition	DNRC	6/1/07	10/15/07
Independent QA/QC Review of Base Map	FEMA/NSP	10/16/07	11/30/07
Hydrologic Analyses	DNRC	11/15/07	12/14/07
Independent QA/QC Review of Hydrologic Analyses	FEMA/NSP	12/15/07	2/1/08
Hydraulic Analyses	DNRC	12/18/07	2/29/08
Independent QA/QC Review of Hydraulic Analyses	FEMA/NSP	3/1/08	4/15/08
Floodplain Mapping: <ul style="list-style-type: none"> • Detailed Riverine or Coastal Analysis • Refinement or Creation of Zone A • Merging Revised and Unrevised Areas <Floodplain Mapping or Redelineation> <ul style="list-style-type: none"> • Redelineation Using Effective Flood Profiles and Updated Topographic Data • Redelineation/Digitization of Non-Revised Areas 	DNRC	10/15/07	5/15/08
Independent QA/QC Review of Floodplain Mapping	FEMA/NSP	5/16/08	6/30/08

Activities	RESPONSIBLE PARTNER(S)	START DATE	END DATE
DFIRM Database (including Graphic Specifications)	DNRC	10/15/07	7/15/08
Independent QA/QC Review of DFIRM Database	FEMA/NSP	7/16/08	8/29/08
Produce Preliminary Map Products (including 1/3 Outreach)	DNRC	9/1/08	9/30/08
Independent QA/QC of Preliminary Map Products	FEMA/NSP	10/1/08	10/30/08
Post-Preliminary Processing (including 1/3 Outreach)	DNRC, FEMA/NSP	10/1/08	10/30/09

Manage Flood Study Project	Baseline Data		
	Begin Date	End Date	Cost
Pre-Scoping	NA	NA	\$ -
Scoping	06/01/07	06/30/07	\$ -
Acquire Base Map	06/01/07	10/15/07	\$ 28,100.00
Develop Topographic Data	11/01/07	11/15/07	\$ 6,000.00
Perform Field Survey	06/01/07	10/15/07	\$ 4,700.00
Develop Hydrologic Data	11/15/07	12/15/07	\$ 1,000.00
Develop Hydraulic Data	12/15/07	2/30/08	\$ 12,000.00
Perform Floodplain Mapping	10/15/07	07/15/08	\$ 64,500.00
Develop DFIRM Database	10/15/07	05/15/08	\$ 124,400.00
Perform Redelineation	NA	NA	\$ -
QC of Develop Topographic Data			
QC of Develop Hydrologic Data			
QC of Develop Hydraulic Data			
QC of Perform Field Survey			
QC of Perform Floodplain Mapping			
QC of Develop DFIRM Database			
QC of Perform Redelineation			
QC of Perform Coastal Analysis			
QC of Perform Alluvial Fan Analysis			
Manage Flood Study Subtotal			\$ 240,700.00
Manage Preliminary Map Production	Baseline Data		
	Begin Date	End Date	Cost
Perform Preliminary Map Production	08/15/08	09/30/08	\$ 29,400.00
QC of Perform Preliminary Map Production			
Manage Prelim Map Prod. Subtotal			\$ 29,400.00
Manage Post Preliminary Processing (Including Outreach)	Baseline Data		
	Begin Date	End Date	Cost
Perform Post Preliminary Processing	10/01/08	10/30/09	\$ 97,100.00
Manage Post Prelim Map Prod. Subtotal			\$ 97,100.00
TOTAL			

SECTION 7—CERTIFICATIONS

Field Surveys and Topographic Data Development

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

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 is 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.

Hydrologic Analyses, Hydraulic Analyses, and Floodplain Mapping

- A Registered Professional Engineer shall certify hydrologic and hydraulic analyses and data in accordance with 44 CFR 65.6(f).
- Any levee systems to be accredited will be certified in accordance with 44 CFR 65.10(e).

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

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

SECTION 9—CONTRACTORS (CTP)

The DNRC intends to use the services of PBS&J as a contractor for this Flood Map Project. The DNRC 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 United States Government Printing Office website at http://www.access.gpo.gov/nara/cfr/waisidx_04/44cfr13_04.html.

SECTION 10—REPORTING (CTP)

FINANCIAL REPORTING:

Because funding has been provided to the DNRC by FEMA, financial reporting requirements for the DNRC will be in accordance with Cooperative Agreement Articles V and VI.

DNRC shall provide financial reports to the FEMA Regional Project Officer and Assistance Officer in accordance with the terms of the signed Cooperative Agreement for this MAS.

STATUS REPORTING:

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

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

EARNED VALUE REPORTING:

The MIP was developed in part to track the Earned Value of mapping projects. This information is automatically calculated by the MIP, using the Actual cost and schedule of work performed, or "actuals" and comparing them to the expected cost and schedule of work performed, or "baseline".

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

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

Earned Value reporting involves the reporting of cost, schedule and performance (physical percent complete) in the MIP by the DNRC.

Once the baseline has been established in the MIP, the DNRC shall input the performance and actual cost to date for each contracted task for each project. This must be completed monthly. When a task is completed, the DNRC shall enter 100% complete, enter the actual completion cost, and the actual completion date of each task appearing on their workbench.

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 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 (CTP)

The points of contact for this Flood Map Project are Nancy Steinberger and/or Shandi Teltschik, the FEMA Regional Project Officers Millie Bowman, the Project Manager for the DNRC; or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities. When necessary, any additional FEMA assistance should be requested through the FEMA Regional Project Officer.

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

Mary Sexton
Director
Montana Department of Natural Resources and Conservation

Date

Millie Heffner
Project Manager
Montana Department of Natural Resources and Conservation

Date

Shandi Teltschik or Nancy Steinberger
Regional Project Officer
Federal Emergency Management Agency, Region VIII

Date