



Clark County, Washington Cooperating Technical Partners Mapping Activity Statement

Mapping Activity Statement No. 4—Digital Flood Insurance Rate Map Production and Development of Updated Flood Hazard Data

In accordance with the Cooperating Technical Partners (CTP) Partnership Agreement dated May 23, 2002, between the Clark County Department of Community Development (hereinafter referred to as Clark County) and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement (MAS) No. 4 is as summarized below.

Section 1—Objective and Scope

The objective of the Flood Map Project documented in this MAS is to develop a new or updated Digital Flood Insurance Rate Map (DFIRM) and Flood Insurance Study (FIS) report for the unincorporated areas of Clark County. The DFIRM and FIS report shall be produced in the FEMA Countywide Format. In addition, the Mapping Partners involved in this Flood Map Project shall develop new and/or updated flood hazard data for China Ditch, from its mouth to just south of NE 159th Street (a distance of 3.11 miles) using detailed-study methods.

The following Mapping Partners shall complete this Flood Map Project:

- Clark County Department of Community Development;
- Merrick, a contractor to Clark County;
- Michael Baker Jr., Inc., the FEMA Flood Map Production Coordination Contractor (MCC) for this Flood Map Project; and
- WEST Consultants, Inc., the FEMA Study Contractor (SC) for this Flood Map Project.

The activities for this Flood Map Project, including required Quality Assurance/Quality Control (QA/QC) reviews, and the Mapping Partners that will complete them are summarized in Table 1-1. In Table 1-1, Clark County is identified as “CTP.” All activities that are to be accomplished by Clark County or contractors to Clark County, including contractors that may be selected after the project startup, are included in the “CTP” column. The sections of this MAS that follow Table 1-1 describe the specific activities, responsible Mapping Partner(s), FEMA standards that must be met, and resultant component(s).

Table 1-1. Planned Mapping Activities and Project Team Assignments

Activity	CTP	FEMA (MCC)	FEMA (SC)
Activity 1 – Field Surveys and Reconnaissance			X
Activity 2 – Topographic Data Development	X		
Activity 3 – Independent QA/QC Review of Topographic Data		X	
Activity 4 –Hydrologic Analyses			X
Activity 5–Independent QA/QC Review of Hydrologic Analyses		X	
Activity 6 – Hydraulic Analyses			X
Activity 7 – Independent QA/QC Review of Hydraulic Analyses		X	
Activity 8 – Floodplain Mapping (Detailed Riverine Analysis)			X
Activity 9 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)		X	
Activity 10 – Base Map Acquisition and Preparation	X		
Activity 11 – DFIRM Production (Non-Revised Areas)		X	
Activity 12 – DFIRM Production (Merging Revised and Non-Revised Information)		X	
Activity 12A – DFIRM Production (Application of DFIRM Graphics and Database Specifications)		X	
Activity 13 – Preliminary DFIRM and FIS Report Distribution		X	
Activity 14 – Post-Preliminary Processing	X	X	X

Activity 1 - Field Surveys and Reconnaissance

Responsible Mapping Partner: FEMA (SC)

Scope: To supplement any field reconnaissance conducted during the Project Scoping phase of this Flood Map Project, the SC shall conduct a detailed field reconnaissance of the specified study areas. The purpose of this reconnaissance is to determine conditions along the floodplain(s), types and numbers of hydraulic and/or flood-control structures, apparent maintenance status of existing hydraulic structures, locations of cross sections to be surveyed, and other parameters needed for the hydrologic and hydraulic analyses. In addition to the initial field reconnaissance, the SC shall conduct field surveys of China Ditch 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 SC also shall coordinate with the Mapping Partners that are collecting topographic data under Activity 2.

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

Deliverables: In accordance with the Technical Support Data Notebook (TSDN) format requirements described in Appendix M of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, the SC shall make the following products available to FEMA:

- A report summarizing the findings of the field reconnaissance;
- Maps and drawings that provide the detailed survey results; and
- A survey notebook containing cross-sections and structural data.

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

Activity 2 - Topographic Data Development

Responsible Mapping Partner: Clark County

Scope: To supplement the field surveys conducted under Activity 1, Clark County shall obtain additional topographic data of the overbank areas of flooding sources to delineate floodplain boundaries. Specifically, Clark County shall generate new topographic data for China Ditch using airborne Light Detection and Ranging (LIDAR) system technology. Contour interval and/or accuracy for the topographic data shall be selected based on the current FEMA requirements as documented in *Guidelines and Specifications for Flood Hazard Mapping Partners*.

For this activity, Clark County also shall develop topographic maps and/or Digital Elevation Models (DEMs) for the subject flooding sources using the data collected under Activity 1. Unless directed to do otherwise by FEMA, all new topographic data must be developed and submitted in digital format. Upon completion of topographic data collection and processing for China Ditch, Clark County shall submit these data to the MCC for an independent QA/QC review under Activity 3. Clark County shall address all concerns or questions regarding Activity 2 that are raised by the MCC during the independent QA/QC review under Activity 3.

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

Deliverables: In accordance with the TSDN format requirements described in Appendix M of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, Clark County shall make the following products available to FEMA:

- Hardcopy topographic maps;
- Report summarizing methodology and results;
- Mass points and breaklines data on CD-ROM;
- Digital work map with contours;
- Checkpoint analyses to assess the accuracy of data including Root Mean Square Error (RMSE) calculations to support vertical accuracy;

- Identification of remote-sensing data voids and methods used to supplement data voids;
- National Geodetic Survey (NGS) data sheets for Network Control Points used to control remote sensing and ground surveys; and
- Metadata compliant with Federal Geographic Data Committee standards.

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

Activity 3 - Independent QA/QC Review of Topographic Data

Responsible Mapping Partner: FEMA (MCC)

Scope: The MCC shall review the mapping data generated by Clark County under Activity 2 to ensure that these data are consistent with FEMA standards as well as standard engineering practice and are sufficient to prepare or revise the FIRM.

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

Deliverables: In accordance with the TSDN format requirements described in Appendix M of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MCC shall make the following products available to FEMA:

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

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

Activity 4 – Hydrologic Analyses

Responsible Mapping Partner: FEMA (SC)

Scope: The SC shall perform a hydrologic analysis for approximately 10 square miles of drainage area for China Ditch. Regional regression equations will be used to develop the hydrology.

The SC shall calculate peak flood discharges for the 10-, 2-, 1- and 0.2-percent-annual-chance storm events for China Ditch. These flood discharges shall be the basis for subsequent hydraulic analyses of China Ditch under Activity 6. In addition, the SC shall address all concerns or questions regarding Activity 4 that are raised by the MCC during the independent QA/QC review performed under Activity 5.

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

Deliverables: Upon completion of hydrologic modeling for China Ditch, the SC shall submit the results to the MCC for an independent QA/QC review as described in Activity 5. In accordance with the TSDN format requirements described in Appendix M of FEMA's *Guidelines and Specifications for Flood*

Hazard Mapping Partners, the SC shall make the following products available to FEMA for the flooding sources studied by detailed methods:

- Digital copies of all hydrologic modeling (input and output) files for the 10-, 2-, 1-, and 0.2-percent-annual-chance storm events;
- Digital and hardcopy versions of the Summary of Discharges Table presenting discharge data for the flooding sources for which hydrologic analyses were performed;
- Digital and hardcopy versions of draft text describing the hydrologic analyses for inclusion the FIS report; and
- Digital and hardcopy versions of all backup data used in the analysis, including work maps.

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

Activity 5 - Independent QA/QC Review of Hydrologic Analyses

Responsible Mapping Partner: FEMA (MCC)

Scope: The MCC shall review the technical, scientific, and other information submitted by the SC under Activity 4 to ensure that the data and modeling are consistent with FEMA standards and standard engineering practices and are sufficient to prepare the DFIRM. This work shall include, at a minimum, the activities summarized below.

- Review the submittal for technical and regulatory adequacy, completeness of required information, and supporting data and documentation. The technical review shall focus on the following:
 - Use of acceptable models;
 - Use of appropriate methodology(ies);
 - Correctly applied methodology(ies)/model(s), including QC of input parameters;
 - Comparison with gage data and/or regression equations, if appropriate; and
 - Comparison with discharges for contiguous reaches or flooding sources.
- Maintain records of all contacts, reviews, recommendations, and actions and make them readily available to FEMA.
- Maintain an archive of all data submitted for hydrologic modeling review. All supporting data should be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.

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

Deliverables: In accordance with the TSDN format requirements described in Appendix M of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MCC shall make the following products available to FEMA:

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

- Recommendations to resolve any problems that arise as a result of the QA/QC review.

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

Activity 6 – Hydraulic Analyses

Responsible Mapping Partner: FEMA (SC)

Scope: The SC shall perform hydraulic analyses for approximately 3.11 miles of China Ditch. For this flooding source, studied by detailed methods, the hydraulic modeling shall include the 10-, 2-, 1- and 0.2-percent-annual-chance storm events based on peak discharges computed under Activity 4. The SC shall perform the hydraulic analyses using the HEC-RAS standard step-backwater model.

The SC shall use cross-section and field data collected under Activity 1 to perform the hydraulic analyses. The hydraulic analyses shall be used to establish flood elevations and a regulatory floodway for China Ditch. The SC shall use the FEMA HEC-RAS checking program to check the reasonableness of the hydraulic analyses. To facilitate the independent QA/QC review under Activity 7, the SC shall provide explanations for unresolved messages from the CHECK-RAS program, as appropriate. In addition, the SC shall address all concerns or questions regarding Activity 6 that are raised by the MCC during the independent QA/QC review under Activity 7.

Important note for GIS-based (automated) modeling: If pre- and post- processing tools are used with a FEMA approved model, no review of these “tools” is necessary. Pre- and post-processing software tools, when used in conjunction with hydraulic models that are not currently on FEMA’s accepted model list, must be reviewed and approved by FEMA before performing work under this Activity. Similarly, if software tools were used to perform modeling routines that emulate a model on FEMA’s accepted model list, however, this source code has been rewritten to perform these tasks, these models also must be submitted to FEMA for review and approval in accordance with the conditions outlined in Subparagraph 65.6(a)(6)(i), (ii), and (iii) of the NFIP regulations.

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

Deliverables: Upon completion of hydraulic modeling for China Ditch, the SC shall submit the results to the MCC for an independent QA/QC review under Activity 7. In accordance with the TSDN format requirements described in Appendix M of FEMA’s *Guidelines and Specifications for Flood Hazard Mapping Partners*, the SC shall make the following products available to FEMA:

- Digital profiles of the 10-, 2-, 1- and 0.2-percent-annual-chance water-surface elevations representing existing conditions using FEMA’s RASPLOT program or similar software;
- Digital and hardcopy versions of the Floodway Data Table for each subject flooding source that is in a format compatible with the DFIRM database;
- Digital and hardcopy versions of all hydraulic modeling (input and output) files;
- Digital and hardcopy versions of a table showing the range of Manning’s “n” values used;
- Explanations for unresolved messages from the CHECK-RAS program, as appropriate;
- Digital and hardcopy versions of all backup data used in the analyses; and
- Digital and hardcopy versions of draft text describing the hydraulic analyses for inclusion in the FIS report.

For GIS-based modeling, products include all input and output data, intermediate data processing products, GIS data layers, and final products.

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

Activity 7 - Independent QA/QC Review of Hydraulic Analyses

Responsible Mapping Partner: FEMA (MCC)

Scope: The MCC shall review the technical, scientific, and other information submitted by the SC under Activity 6 to ensure that the data and modeling are consistent with FEMA standards and standard engineering practices and are sufficient to prepare the DFIRM. This independent QA/QC review of the hydraulic analyses shall include, at a minimum, the activities summarized below.

- Review the submittal for technical and regulatory adequacy, completeness of required information, and supporting data and documentation. The technical review shall focus on the following:
 - Use of acceptable models;
 - Starting water-surface elevations;
 - Cross section geometry;
 - Manning's "n" values and expansion/contraction coefficients;
 - Bridge and culvert modeling;
 - Discharges;
 - Regulatory floodway computation methods; and
 - Tie-in to upstream and downstream non-revised profiles.
- Use the CHECK-RAS program to flag potential problems and focus review efforts.
- Maintain records of all contacts, reviews, recommendations, and actions and make them readily available to FEMA.
- Maintain an archive of all data submitted for hydraulic modeling review. (All supporting data must be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.)

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

Deliverables: In accordance with the TSDN format requirements described in Appendix M of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MCC shall make the following products available to FEMA:

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

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

Activity 8 – Floodplain Mapping (Detailed Riverine Analysis)

Responsible Mapping Partner: FEMA (SC)

Scope: The SC shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries for the reach of China Ditch identified in Table 1-1. The SC shall incorporate all revised hydraulic modeling and shall use the newly acquired topographic data developed under Activity 2 to delineate the floodplain and regulatory floodway boundaries on a digital work map. The SC shall incorporate the results of all effective Letters of Map Change (LOMCs) within the revised areas as appropriate. In addition, the SC shall address all concerns or questions regarding Activity 8 that are raised by the MCC during the independent QA/QC review under Activity 9.

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

Deliverables: Upon completion of floodplain mapping for China Ditch, the SC shall submit the results to the MCC for an independent QA/QC review under Activity 9. In accordance with the TSDN format requirements described in Appendix M of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, the SC shall make the following products available to FEMA:

- Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, Base Flood Elevations (BFEs), flood insurance risk zone labels, and all applicable base map features;
- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale;
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM; and
- Any backup or supplemental information used in the mapping required for the independent QA/QC review under Activity 9.

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

Activity 9 - Independent QA/QC Review of Floodplain Mapping (Revised Areas)

Responsible Mapping Partner: FEMA (MCC)

Scope: The MCC shall review the floodplain work maps submitted by the SC under Activity 8 to ensure that the results of the analyses performed are accurately represented, the work maps are consistent with current FEMA standards, and the work maps are sufficient to prepare the DFIRM. This work shall include, at a minimum, the following activities:

- Review the cross sections for proper location and orientation on the work maps and agreement with the Floodway Data Table.
- Review the BFEs shown on the work maps for proper location and agreement with the results of the hydraulic modeling.
- Review the regulatory floodway widths shown on the work maps for agreement with the widths shown in the Floodway Data Table and the results of the hydraulic modeling.
- Review the floodplain boundaries shown on the work maps for agreement with the flood elevations shown in the Floodway Data Table and the contour lines and other topographic information shown on the work maps.
- Review the floodplain widths at cross sections as shown on the work maps to ensure they match the widths shown on the Floodway Data Table.
- Review the floodplain boundaries as shown on the work maps to ensure they match the Flood Profiles.
- Review the flood insurance risk zone designations as shown on the work maps to ensure they are properly labeled.
- Review the DFIRM mapping files to ensure they were prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- Review the metadata files describing the DFIRM data to ensure they include all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*.

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

Deliverables: In accordance with the TSDN format requirements described in Appendix M of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MCC shall make the following products available to FEMA:

- A Summary Report that describes the findings of the QA/QC review, noting any deficiencies in or agreeing with the mapping results;
- Recommendations to resolve any problems that are identified during the independent QA/QC review; and
- An annotated work map with all questions and/or concerns indicated if necessary.

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

Activity 10 - Base Map Acquisition and Preparation

Responsible Mapping Partner: Clark County

Scope: This activity consists of obtaining the digital aerial photographic base map for the project. Clark County shall:

- Obtain digital files (raster or vector) of the base map;
- Secure necessary permissions from the map source to allow FEMA’s use and distribution of hardcopy and digital map products using the digital base map, free of charge;
- Certify that the digital data meet the minimum standards and specifications that FEMA requires for DFIRM production; and
- Populate the DFIRM database for base map features and applicable data.

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

Deliverables: In accordance with the TSDN format requirements described in Appendix M of FEMA’s *Guidelines and Specifications for Flood Hazard Mapping Partners*, Clark County shall make the following products available to FEMA:

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

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

Activity 11 - DFIRM Production (Non-Revised Areas)

Responsible Mapping Partner: FEMA (MCC)

Scope: For all flooding sources except the reach of China Ditch that will have updated flood hazard data developed under Activities 1 through 9, the MCC shall convert the effective FIRM/FBFM panels to digital format in accordance with the FEMA DFIRM specifications. The MCC shall use the base map acquired under Activity 10 for the conversion. The scope of Activity 11 covers the digitization of 12 FIRM panels and 12 FBFM panels. The MCC also shall incorporate LOMCs issued by FEMA since the current effective FIRM for each affected community.

The digital flood theme for China Ditch shall not be digitized as part of Activity 11. Rather, the MCC shall leave this as a “hole” in the digital flood theme that will be filled in as part of Activity 12 using digital flood data developed under Activity 8.

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

Deliverables: In accordance with the TSDN format requirements described in Appendix M of FEMA’s *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MCC shall make the following products available to FEMA:

- Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone labels, and all applicable base map features;
- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM.

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

Activity 12 – DFIRM Production (Merging Revised and Non-Revised Information)

Responsible Mapping Partner: FEMA (MCC)

Scope: Upon completion of the floodplain mapping activities for the revised area (Activity 8) and the DFIRM production for non-revised areas (Activity 11), the MCC shall merge the digital floodplain data into a single, updated DFIRM. This work is to include tie-in of flood hazard information with contiguous communities that were not studied as part of the Flood Map Project documented in this MAS. Also, the MCC shall tie in the revised and non-revised Flood Profiles, floodplain boundaries, and regulatory floodway boundaries. The MCC shall coordinate with FEMA, Clark County, and the SC, as necessary, to resolve any potential tie-in issues.

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

Deliverables: In accordance with the TSDN format requirements described in Appendix M of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MCC shall make the following products available to FEMA:

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

- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM

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

Activity 12A – DFIRM Production (Application of DFIRM Graphics and Database Specifications)

Responsible Mapping Partner: FEMA (MCC)

Scope: The MCC shall apply the final FEMA DFIRM graphics and database specifications to the DFIRM files produced under Activity 12. This work shall include adding all required annotation, line patterns, area shading, and map collar information (e.g., map borders, title blocks, legends, notes to user). The MCC also shall apply the current FEMA DFIRM specifications to the database files. The MCC shall coordinate with FEMA, Clark County, and the SC, as necessary, to resolve any problems that are identified during Activity 12A.

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

Deliverables: In accordance with the TSDN format requirements described in Appendix M of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MCC shall make the following products available to FEMA:

- DFIRM panels showing 1- and 0.2-percent-annual-chance floodplain 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*;
- DFIRM database files, as appropriate, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Complete set of plots of DFIRM panels showing all effective and revised flood hazard information at a suitable scale; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM.

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

Activity 13 – Preliminary DFIRM and FIS Report Distribution

Responsible Mapping Partner: FEMA (MCC)

Scope: Activity 13 consists of the final preparation, review, and distribution of the Preliminary copies of the DFIRM and FIS report for community official and general public review and comment. The activities to be performed are summarized below.

FIS Report Preparation: The MCC shall prepare the FIS report in the FEMA Countywide Format following the FEMA requirements specified in Appendix J of *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Preliminary Transmittal Letter Preparation. The MCC shall prepare letters to 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.

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

Discrepancy Resolution: The MCC shall work with FEMA, the SC, and Clark County to resolve discrepancies identified during the final QA/QC review.

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

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

Standards: All work under Activity 13 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format requirements described in Appendix M of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MCC shall make the following products available when requested by FEMA:

- Preliminary transmittal letters shall be prepared. 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*.

- Preliminary copies of the DFIRM and FIS report, including all updated data tables and Flood Profiles, shall be mailed to the community Chief Executive Officer (CEO) and floodplain administrator of each community in Clark County, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.
- Preliminary SOMAs, prepared in accordance with FEMA requirements, shall be mailed with the Preliminary copies of the DFIRM and FIS report when appropriate.
- Revised DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM;
- Revised DFIRM database files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM.
- Revised metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM.
- 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.

Activity 14 - Post-Preliminary Processing

Responsible Mapping Partners: Clark County, FEMA (SC), and FEMA (MCC)

Scope: Activity 14 consists of finalizing the DFIRM and FIS report after the Preliminary copies of the DFIRM and FIS report have been issued for public review and comment. The activities to be performed are summarized below.

Initiation of Statutory 90-Day Appeal Period: When required, upon completion of a 30-day community comment period and/or final coordination meeting with the community, the MCC 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; and
- The appropriate notices (Proposed Rules) are published in the *Federal Register*.

Resolution of Appeals and Protests: Clark County, the SC, and the MCC shall support FEMA in reviewing and resolving 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 the submittal;
- Technical review of the submittal;
- Preparation of letters requesting additional supporting data;
- Performance of revised analyses; and
- Preparation of the draft resolution letter and revised DFIRM and FIS report materials for FEMA review.

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

Preparation of Special Correspondence: Clark County, the SC, and the MCC 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. The MCC 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 DFIRM and FIS Report: If necessary, Clark County, the SC, and the MCC shall work together to revise the DFIRM and FIS report at the direction of the FEMA Regional Project Officer and 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 MCC shall prepare Final SOMAs for the affected communities as appropriate.

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

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

Revalidation Letter Processing: The MCC, when appropriate, shall prepare and distribute letters 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: The MCC shall ensure that technical and administrative support data are packaged in the FEMA-required TSDN format and stored properly in the library archives.

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

Deliverables: In accordance with the requirements provided in the current versions of the *FEMA Guidelines and Specifications for Flood Hazard Mapping Partners* and *Document Control Procedures Manual*, Clark County, the SC, and/or the MCC shall make the following products available to FEMA:

- 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;
- Final SOMAs, as appropriate;
- 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, as appropriate; and
- Complete, organized archived technical and administrative support data.

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 February 2002. Appendix M is available for viewing or download on the FEMA Web site 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.

Table 2-1. Mapping Activities and Applicable TSDN Sections

Section of TSDN	Activities													
	1	2	3	4	5	6	7	8	9	10	11, 11A	12, 12A	13	14
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 and Hydraulic Analyses	X	X		X	X	X	X							
Key to Cross-Section Labeling	X	X				X	X	X	X					
Draft FIS Report				X		X							X	X
Mapping Information		X	X					X	X	X	X	X	X	X
Miscellaneous Reference Materials	X	X	X	X	X	X	X	X	X	X	X	X	X	X

If any issues arise that could affect the completion of an activity within the proposed scope or budget, the 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*.)

Additionally, the MCC shall collect and maintain a set of products for all Activities and shall compile a comprehensive TSDN for the entire project.

Section 3—Period of Performance

The mapping activities documented in this MAS will begin on _____ and will be completed no later than _____. The mapping activities may be terminated at the option of FEMA or Clark County in accordance with the provisions of the Partnership Agreement dated May 23, 2002.

Section 4—Funding/Cost-Sharing

FEMA is providing funding, _____ to fund the activities to be completed by the SC and MCC for this Flood Map Project. Clark County is providing digital topographic and elevation data for this Flood Map Project.

Section 5—Standards

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

These Guidelines are available for viewing or download from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/fhm/dl_cgs.shtm.

Table 5-1. Applicable Standards for Project Activities

Applicable Standards	Activities													
	1	2	3	4	5	6	7	8	9	10	11	12, 12A	13	14
<i>Guidelines and Specifications for Flood Hazard Mapping Partners</i> , April 2003	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American Congress on Surveying and Mapping Procedures	X	X	X											
Global Positioning System (GPS) Surveys: National Geodetic Survey (NGS-58), "Guidelines for Establishing GPS-Derived Ellipsoid Heights," November 1997	X	X	X											
Engineer Manual 1110-1-1000, <i>Photogrammetric Mapping</i> (USACE), July 1, 2002	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							
<i>Content Standard for Digital Geospatial Metadata</i> (Federal Geographic Data Committee), 1998		X	X					X	X	X	X	X	X	X
<i>Document Control Procedures Manual</i> , December 2000													X	X

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

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
1	Field Surveys and Reconnaissance	Volume 1, Sections 1.2, 1.3, 1.4 (specifically Subsection 1.4.2.1) Appendix A, Sections A.4, A.5, A.6, A.7, and A.8 Appendices B, C, and M
2	Topographic Data Development	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1) Appendix A, Sections A.2, A.3, A.7 and A.8 Appendix M
3	Independent QA/QC Review of Topographic Data	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.1) Appendix A, Sections A.2, A.3, A.7 (specifically Subsection A.7.5), and A.8 (specifically Subsection A.8.6) Appendix M
4	Hydrologic Analyses	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) Appendix A, Section A.4 Appendix C, Sections C.1 and C.7 Appendices E, F, G, H, and M
5	Independent QA/QC Review of Hydrologic Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 Appendix C, Section C.2 Appendices E, F, G, H, and M
6	Hydraulic Analyses	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) Appendix A, Section A.4 (specifically Subsection A.4.7) Appendix C, Sections C.3 and C.7 Appendices B, E, F, G, H, and M
7	Independent QA/QC Review of Hydraulic Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 (specifically Subsection A.4.7) Appendix C, Section C.5 Appendices B, E, F, G, H, and M

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

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
8	Floodplain Mapping (Detailed Riverine Analysis)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C. 4 and C.6 Appendices K, L, and M
9	Independent QA/QC Review of Floodplain Mapping (Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.3) Appendix C, Sections C.4 and C.6 Appendices K, L, and M
10	Base Map Acquisition and Preparation	Volume 1, Sections 1.3 (specifically Subsection 1.3.1.1.8) and 1.4 (specifically Subsections 1.4.3.1 and 1.4.3.2) Appendix A, Section A.1 (specifically Subsection A.1.1)
11	DFIRM Production (Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2, 1.4.2.3, and 1.4.3.2) Appendices K, L, and M
12	DFIRM Production (Merging Revised and Non-Revised Information)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.3) Appendices K and L
12A	DFIRM Production (Application of DFIRM Graphics and Database Specifications)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3, 1.4.3.3, 1.4.3.9, and 1.4.3.10) Appendices K and L
13	Preliminary DFIRM and FIS Report Distribution	Volume 1, Sections 1.4 (specifically Subsections 1.4.2 and 1.4.3) and 1.5 (specifically Subsection 1.5.1) Appendices J, K, L, and M
14	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 shown in Table 6-1. If changes to this schedule are required, the responsible Mapping Partner shall coordinate with FEMA and the other Mapping Partners in a timely manner.

Table 6-1. Project Schedule

ACTIVITY	RESPONSIBLE MAPPING PARTNER(S)	DUE DATE
Activity 1 – Field Surveys and Reconnaissance	FEMA (SC)	02/01/04
Activity 2 – Topographic Data Development	Clark County	02/01/04
Activity 3 – Independent QA/QC Review of Topographic Data	FEMA (MCC)	03/01/04
Activity 4 – Hydrologic Analyses	FEMA (SC)	02/01/04
Activity 5– Independent QA/QC Review of Hydrologic Analyses	FEMA (MCC)	03/01/04
Activity 6 – Hydraulic Analyses	FEMA (SC)	07/01/04
Activity 7 – Independent QA/QC Review of Hydraulic Analyses	FEMA (MCC)	08/01/04
Activity 8 – Floodplain Mapping (Detailed Riverine Analysis)	FEMA (SC)	09/01/04
Activity 9 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)	FEMA (MCC)	10/01/04
Activity 10 – Base Map Acquisition and Preparation	Clark County	02/01/04
Activity 11 – DFIRM Production (Non-Revised Areas)	FEMA (MCC)	????????
Activity 12 – DFIRM Production (Merging Revised and Non-Revised Information)	FEMA (MCC)	????????
Activity 12A – DFIRM Production (Application of DFIRM Graphics and Database Specifications)	FEMA (MCC)	????????
Activity 13 – Preliminary DFIRM and FIS Report Distribution	FEMA (MCC)	????????
Activity 14 – Post-Preliminary Processing	Clark County, FEMA (SC), and FEMA (MCC)	????????

Section 7—Certification

The following certifications apply to this MAS (as appropriate):

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

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

Activity 4 (Hydrologic Analyses), Activity 6 (Hydraulic Analyses), and Activity 8 (Floodplain Mapping)

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

Activity 10 (Base Map Acquisition and Preparation)

- A community official or responsible party shall provide written certification that the digital data meet the FEMA minimum standards and specifications.
- The responsible Mapping Partner shall provide documentation that the digital base map can be used by FEMA.

Activities 8 (Floodplain Mapping—Detailed Riverine Analysis), Activity 9 (Independent QA/QC Review of Floodplain Mapping {Revised Areas}), Activity 11 (DFIRM Production {Non-Revised Areas}), Activity 12 (DFIRM Production {Merging Revised and Non-Revised Information}), and Activity 12A (DFIRM Production {Application of DFIRM Graphics and Database Specifications})

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

Section 8—Technical Assistance and Resources

Clark County and the SC may obtain copies of FEMA-issued LOMCs, archived engineering backup data, and data collected as part of the Mapping Needs Assessment Process from the MCC. The MCC may be contacted by telephone at (703) 317-6531 or by facsimile at (703) 329-3023.

General technical and programmatic information, such as FEMA 265 and the Quick-2 computer program, can be downloaded from the FEMA Web site (<http://www.fema.gov/fhm/>). Specific technical and programmatic support may be provided through the MCC; such assistance should be requested through the FEMA MCC Project Officer specified in Section 11 of this MAS.

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

Section 9—Contractors

Clark County plans to retain the services of Merrick as a contractor for the Flood Map Project documented in this MAS. Clark County shall ensure that procurement of contractors for work on this Flood Map Project complies with the requirements of 44 CFR 13.36. FEMA plans to retain the services of WEST Consultants, Inc., for this Flood Map Project.

Part 13 may be downloaded in PDF or text format from the U.S. Government Printing Office Web site at http://www.access.gpo.gov/nara/cfr/waisidx_02/44cfr13_02.html.

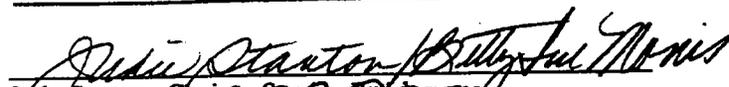
Section 10—Financial Reporting

No funding has been provided to Clark County for this Flood Map Project. Therefore, Clark County is not required to submit financial reports to FEMA for the work assigned under this MAS.

Section 11—Points of Contact

The points of contact for this Flood Map Project are Dave Carlton, the FEMA Regional Project Officer; Steve Hale, the CTP Project Manager; or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities. When necessary, the assistance of the MCC should be requested through the FEMA Project Officer, Max Yuan.

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


~~Judy Burton, Chair~~ ~~Craig Fildemore~~
Clark County Board of Commissioners

12-9-03
Date (Printed)


Approved as to Form Only
Arthur D. Curtis, Clark County Prosecuting Attorney

11/24/03
Date (Printed)


Dave Carlton, Regional Project Officer
Federal Emergency Management Agency, Region X

10/27/03
Date (Printed)


Dan Sokol, State NFIP Coordinator
Washington State Department of Ecology

09/23/03
Date (Printed)


Max Yuan, Project Officer, Western Studies Team
Federal Emergency Management Agency

January 26, 2004
Date (Printed)