

Guidance for Flood Risk Analysis and Mapping

Letter of Map Revision (LOMR) Incorporation

December 2020



Requirements for the Federal Emergency Management Agency (FEMA) Risk Mapping, Assessment, and Planning (Risk MAP) Program are specified separately by statute, regulation, or FEMA policy (primarily the Standards for Flood Risk Analysis and Mapping). This document provides guidance to support the requirements and recommends approaches for effective and efficient implementation. Alternate approaches that comply with all requirements are acceptable.

For more information, please visit the FEMA Guidelines and Standards for Flood Risk Analysis and Mapping webpage (www.fema.gov/flood-maps/guidance-partners/guidelines-standards). Copies of the Standards for Flood Risk Analysis and Mapping policy, related guidance, technical references, and other information about the guidelines and standards development process are all available here. You can also search directly by document title at www.fema.gov/multimedia-library.

Table of Revisions

The following summary of changes details revisions to this document subsequent to its most recent version in May 2016.

Affected Section or Subsection	Date	Description
2.2 Data Format and Schema	December 2020	References added to evaluation lines used for 2D based floodway analyses.

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1.0 Overview

This document provides guidance to Production & Technical Services (PTS) Mapping Partners for Letter of Map Revision (LOMR) incorporation activities as part of Flood Risk Projects. The application of the guidelines in this document will facilitate data transfers between the PTS MT-2 teams, the PTS National Flood Hazard Layer (NFHL) teams, and the PTS Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) production teams. Topics covered by this guidance include MT-2 post-processing procedures, the incorporation of “mappable” LOMRs affecting the FIRM or FIS Report materials during the Data Development through Effective Issuance PTS production stages of a Flood Risk Project, and guidance on the re-incorporation of finalized (effective-ready) FIRM Database data back into the NFHL.

This document does not supersede, nor is it intended to provide guidance on, Letter of Map Change (LOMC) engineering and processing procedures, MT-2 revisions processing, or Summary of Map Actions (SOMA) procedures. For full details on MT-2 revisions and LOMC processing procedures, please continue to refer to FEMA’s Document Control Procedures Manual. Full details on SOMA procedures are being developed.

2.0 MT-2 and LOMC Post-Processing

LOMR processing includes incorporating submitted data into the regional Flood Hazard Layer (rFHL) for subsequent submittal to the NFHL. The below sections discuss MT-2 deliverables on the Mapping Information Platform (MIP) as well as GIS data format, schema, and versioning.

2.1 Deliverables

MT-2 GIS data should be uploaded to the MIP in the Environmental Systems Research Institute (ESRI) shapefile format (.shp). Shapefiles should be clipped to the LOMR bounding box, and should be compressed into a zip or 7zip folder called “Final_Shapefiles.”

Storage of final MT-2 GIS data on the MIP is required. While the PTS MT-2 team may upload MT-2 GIS data as a *Supporting Artifact* at any time through the MIP Tools and Links, Data Upload interface, final MT-2 GIS data, including the LOMR bounding box, must be uploaded to the MIP at the Distribute Determination Letter MIP activity portlet as a *Supporting Artifact*.

Figure 1: Supporting Artifacts Data on the MIP

Mapping INFORMATION PLATFORM

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Load Amendments/Revisions Data Artifacts

* indicates a required field.

Case Information:

* FEMA Case Number: 13-03-0301P

Submission Details:

* Product Type: --make selection--
 Annotations
 Best Available Data
 Correspondence
 Cover Letter
 FEED File
 Final Determination
 116 Letter
 316 Letter
 Modeling Hydraulics
 Modeling Hydrology
 316-PMR
 Review Notes
 Special Response Letter
 Supporting Artifacts
 Violation Letter
 Work Maps

* Effective Date:

* Abstract:

Submission Method:

Packages more than 1 Gigabyte in size or con

File Upload

If a user has multiple files, these files should be zipped together, and uploaded as a single file.

Warning: During the upload process, if there isn't activity in your current MIP session after 30 minutes you will be disconnected.

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The “Final_Shapefiles” zip file will be unpackaged automatically by the MIP after the upload is complete, and the “Final_Shapefiles” folder will appear in the Artifacts directory (for example, *K:/R03/PENNSYLVANIA_42/CHESTER_42029/EAST_PIKELAND_421483/15-03-0002R/SubmissionRepository/Revisions.SupportingArtifacts/Final_Shapefiles*).

Please refer to the [FIRM Database Technical Reference](#), Section 4, FIRM Database Table Deliverables by Task, Table 2, FIRM Database Submittal Table, for MT-2 GIS deliverables requirements. Submitted files should match FIRM Database schema naming convention.

2.2 Data Format and Schema

While the PTS MT-2 team must be careful to avoid unwanted revisions outside of the LOMR revision footprint, LOMR processing is not always limited to a clip of the LOMR bounding box. Additionally, the PTS teams must remain cognizant of any relationships between the MT-2 Geographic Information System (GIS) data and the FIS Report. For example, cross section stationing and multi-frequency elevation changes in the Floodway Data Table must also be incorporated into the S_XS and L_XS_Elev tables within the FIRM Database. LOMR GIS data should be checked against the LOMR map attachment, floodway data table, and other relevant tables for accuracy, and LOMR GIS data should match its associated components. PTS teams performing LOMR incorporation in the NFHL should reference the [NFHL Guidance](#) document.

Per KSS Standard #222, the format for LOMR products for modernized FIRMs must match both the FIRM Panel and FIS Report Technical References. Standard #222 outlines the format of LOMR products for modernized FIRMs. Map attachments in the LOMR area should show elevations for the cross sections or evaluation lines regardless of version ID. Elevations for cross sections or evaluation lines outside of LOMR area are only required if the Version ID is greater than 1.1.1.0. If elevations are shown on cross sections or evaluation lines outside of the LOMR area, these should be reviewed to make sure they match the elevations printed in the effective FIS or adjoining LOMR tables. Historic data in the NFHL may not have all the current Standards applied and should be reviewed before elevations are printed.

Per KSS Standard #218, LOMRs must revise existing effective data.

MT-2 GIS data should be in the current NFHL schema and projection, and should be delivered in the same vertical datum as the effective FIRM/FIS Report. MT-2 GIS data should conform to the following requirements:

- Always submit the FIRM Database S_LOMR layer. For FIS Report-only LOMRs, the LOMR bounding box in S_LOMR should encapsulate every tabular change. The LOMR bounding box may consist of any cross sections or evaluation lines, stream reaches, or studied areas (watershed, basin, coastline) affected by the FIS Report component revisions.
- Clip the data to the LOMR bounding box.
- Data attributes should agree with their associated FIRM and FIS Report MT-2 attachments, including decimal point precision.
- Only full-text domain value descriptions should be used; do not deliver domain codes within the shapefile attributes.
- The DFIRM_ID and VERSION_ID fields should be present and attributed in all layers.
- The STUDY_INFO DBREV_DT field should be attributed with the newest effective date of the LOMR of the data being submitted.
- Data should line up vertex-to-vertex and vertex-to-edge, across the LOMR bounding box.
- Data should meet topology specifications as established in the NFHL Technical Reference.

2.3 GIS Data Version IDs

For MT-2 spatial data that is submitted in accordance with the FIRM Database schema outlined in the FIRM Database Technical Reference, the following FIRM Database Version ID rules apply:

- If the source data is attributed as Version 1.1.1.0, then NULL values do not have to be updated in the newly available FIS Report-related fields.
- If the Version of the source data is higher than 1.1.1.0, all fields that contain FIS Report-related data should be attributed.

- If the Version of the source data is higher than 1.1.1.0, and S_Profil_BasIn contains Z and M values, the profile baseline features should be updated. In this particular case, the profile baseline features may extend outside the LOMR bounding box to achieve accurate stationing measurements.

A LOMR may modify the second and/or third digits of the VERSION_ID for specific feature classes within the FIRM Database. Regardless of whether FIRM Panel and/or FIS Report attachments have been created as part of the LOMR, the second digit of the VERSION_ID number should properly indicate which underlying FIRM Database schema has been used to produce the LOMR. The second digit of the VERSION_ID number is directly related to how the submitted LOMR feature classes are subsequently quality checked as part of the NFHL data. If the second digit is not populated correctly, false errors or issues may be flagged with the LOMR data during the Quality Assurance/Quality Control (QA/QC) tasks associated with the incorporation of the LOMR data into the NFHL.

Please reference the [Versioning Guidance](#) document for further information on VERSION_ID numbers and Technical Reference versions.

3.0 LOMR Incorporation During Flood Risk Study Production

The processing Mapping Partner shall ensure that mappable Letters of Map Amendment (LOMAs), mappable Letters of Map Revision based on Fill (LOMR-Fs), and effective LOMRs are incorporated into the new FIS Report and FIRM where new or revised flood hazard information do not supersede the determination made by the LOMC. Study data with a more recent study date than the effective LOMR may not necessarily be more accurate than the effective LOMR simply because of the newer study date. Mapping partners should take care to examine the accuracy of all new study data as it relates to effective LOMRs before superseding effective LOMRs. An effective LOMR should be superseded only where new study data is determined to be more accurate than the information used for the effective LOMR. Please refer to the KSS for all required accuracy standards for topographic, engineering/modeling, base map, and floodplain mapping data.

3.1 Acquiring Effective LOMR data

There are several sources where the Mapping Partner can access LOMR data for ongoing Physical Map Revisions (PMRs) or Countywide Flood Risk Project production.

According to KSS Standard #363, the NFHL is the sole source for beginning any map revision. At the time of NFHL download prior to FIRM and FIS Report production, effective LOMRs may exist inside the downloaded NFHL data. The mapping contractor should cross-check the LOMRs already incorporated into the NFHL with a comprehensive list of effective LOMRs, to ensure all possible effective LOMRs get incorporated into the ongoing Flood Risk Project by the appropriate cut-off date.

The Mapping Partner may acquire this comprehensive list of effective LOMRs from the MIP General Reports Project Listing Report, by selecting “Revisions” as the Project Category. Determination documents and/or associated backup data can be acquired from various sources:

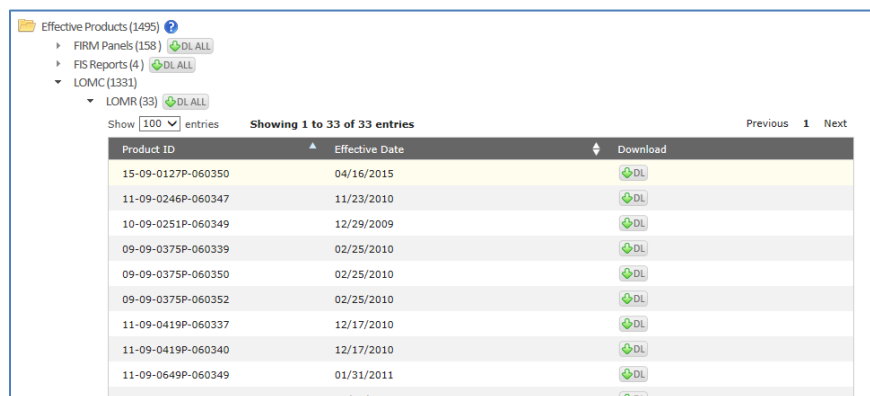
- MIP File Explorer, MIP Search Engineering Data
- FEMA Engineering Library (Filetrail)
- Map Service Center (MSC) data download (via State > County > All Jurisdictions)
- The PTS MT-2 team responsible for LOMR production.

Regardless of the source of the LOMR data, the map attachment and tables should be used to visually check the LOMR GIS files prior to incorporation with the ongoing Flood Risk Project, to ensure complete and accurate data is being incorporated into the current PMR or Countywide study.

3.2 Incorporation of LOMR data into Ongoing Flood Risk Studies

LOMRs that have been issued, but that are not yet effective, should not be incorporated as part of Preliminary or LFD/Effective FIRM production. Issued LOMRs may be subject to comments or appeals, and are not yet legally binding. Only Effective LOMRs should be incorporated. Issued LOMRs will clearly appear on the MSC under the “Pending” Products category. Effective LOMRs will clearly appear on the MSC as “Effective” products. Any LOMRs that have been rescinded (closed, suspended, or withdrawn) should not be incorporated. The effective NFHL data would continue to apply in the case of a rescinded LOMR.

Figure 2: LOMRs on the MSC



Product ID	Effective Date	Download
15-09-0127P-060350	04/16/2015	DL
11-09-0246P-060347	11/23/2010	DL
10-09-0251P-060349	12/29/2009	DL
09-09-0375P-060339	02/25/2010	DL
09-09-0375P-060350	02/25/2010	DL
09-09-0375P-060352	02/25/2010	DL
11-09-0419P-060337	12/17/2010	DL
11-09-0419P-060340	12/17/2010	DL
11-09-0649P-060349	01/31/2011	DL
17-09-0753P-060337	09/06/2017	DL

Although supporting LOMR data may be provided as modeling files or GIS files in various formats, LOMR determination documents are provided as PDFs. Per KSS Standard #192, LOMCs and Flood Risk Projects are assigned unique FEMA Case Numbers. This standard LOMR naming convention includes the year associated with the LOMR, the Region in which the LOMR applies, and a unique identifier (i.e., 15-09-0001P). Older LOMRs may be named with a unique identifier including the year and contractor information (i.e., 199534754MBJ).

Only “mappable” MT-2 data should be incorporated into the Flood Risk Project production process. In general, MT-1 data and CLOMRs should not be incorporated. If a CLOMR has an existing condition model (corrected effective or revised existing conditions model) that has significant changes compared to the duplicate effective model or effective model, then that model information should be evaluated for incorporation into the new study. However, the processing mapping partner shall review LOMA and LOMR-F files to determine if past LOMA and LOMR-F actions are mappable (i.e., of sufficient size and scope to warrant inclusion in the

ongoing revision). In general, single-lot LOMAs and LOMR-Fs do not warrant inclusion because of map scale limitations. However, multiple-lot LOMAs and LOMR-Fs may warrant inclusion in a PMR. Generally, mappable LOMAs or LOMR-Fs only apply to property removals, not structure removals. Additional information on LOMA and LOMR-F processing is provided in the LOMC Guidance document and in Section 3 of the Document Control Procedures Manual.

Per the FIRM Database Technical Reference, the S_LOMR layer is not required as part of the FIRM Database deliverable. However, the processing Mapping Partner should include the outline of the areas covered by LOMRs with the submitted FIRM information by entering the S_LOMR footprint as a “source boundary” (“Other” line) in the FIRM Database. The LOMR data should receive its own SOURCE_CIT in the FIRM Database to distinguish the LOMR-revised data from the remainder of the study data. This SOURCE_CIT should correspond to its associated metadata record per all FIRM Database Technical Reference and Metadata Guidance requirements.

A LOMR may revise only the FIRM, only the FIS Report, or both the FIRM and FIS Report. All data from the LOMR map attachments must be incorporated in the FIRM product, and all data from the FIS Report attachments must be incorporated in the FIS Report. GIS layers, where available, should be used to incorporate effective LOMR data. Only as a last resort should a LOMR determination document be georectified and digitized, in order to incorporate spatial LOMR data.

3.3 Special Situations and Cascading LOMRs

Where only a portion of an effective LOMR is superseded by a newer study (i.e., in the case of a new PMR study) the unaffected portions of that LOMR must still be incorporated into the FIRM and FIS Report data.

If any portion of a LOMR is incorporated, the LOMR should be included in Category 1 (“Incorporated”) on the SOMA. List the FIRM panels being revised by the current study. Unaffected LOMR panels should also be listed with a footnote indicating that those panels were beyond the scope of the PMR, and that users should continue to refer to the annotated FIRMs for the LOMR for those unrevised panels. This is to ensure that evidence of the LOMR remains, and so that future map users retain access to all supporting data shown on the FIRM or in the FIS. Full details on SOMA processing are being developed, as well as any applicable FEMA KSS Standards (especially KSS SID #553).

A “cascading LOMR” situation may occur in PMR studies where the PMR panel footprint must be continually enlarged to accommodate full LOMR footprints completely within the PMR study area. In general, PMR footprints should not be enlarged such that the study’s panel count increases by more than 15%. When a cascading LOMR occurs, ensure that all requirements of KSS Standard #535 are met, and ensure that all guidelines are met that are presented in the Physical Map Revision (PMR) Guidance document, Section 3.1, *Sample LOMR Scenarios*.

3.4 Timing

The incorporation of LOMRs should be coordinated with the MT-2 team so that the processing Mapping Partner meets all KDP3 (Preliminary) and KDP5 (LFD) cutoff dates, and should follow both KSS Standard #'s 169 and 368.

The Mapping Partner should not attempt to “squeeze in” LOMRs that have gone effective too close to the Preliminary or LFD date; mapped data should not change after Key Decision Point 3 (KDP3) and KDP5 approval is granted. Thus, LOMRs going effective after the KDP3 stage should be incorporated during Post-Preliminary processing. LOMRs going effective after the KDP5 stage should remain effective.

If a LOMR goes effective just prior to the new study’s effective date, the revised FIRM/FIS Report (temporarily) supersedes the LOMR. The LOMR is then re-issued under a new case number, as effective, the day after the revised FIRM/FIS Report goes effective. Processing Mapping Partners should coordinate closely with the MT-2 team so that the MT-2 team can adjust the LOMR processing date, or put the LOMR on hold to avoid this situation. Ideally, a LOMR will only be issued once.

For details on the timing of LOMR incorporation during PMR study production, please refer to the Physical Map Revision (PMR) Guidance document, Section 3.0, *LOMR Incorporation Timeline for PMRs*.

3.5 Data Quality

Any LOMR data incorporated on the FIRM or in the FIS Report should meet applicable Program and Working Standards, and should meet any Technical Reference requirements and specifications. Mapping Partners should perform a completeness and accuracy self-check after incorporating effective LOMR data. LOMRs are also subject to full QA/QC as part of the FEMA Quality Review 3 (QR3) review process.

If any errors are found in LOMR determination documents or with any LOMR GIS data, the mapping contractor should notify the MT-2 and FEMA Regional Leads. LOMRs containing errors may be incorporated as-is during Preliminary Production (due to it being effective data), with any corrections implemented during Post-Preliminary Processing.

4.0 Non-Regulatory Flood Risk Products

LOMR data should be shown on Changes Since Last FIRM (CSLF) products as areas of “no change,” because the LOMR data that has been incorporated by the processing Mapping Partner is already effective. Coordinate the processing of CSLF data so that recently effective LOMR areas are not inadvertently omitted from the finalized CSLF map. The only “area of change” on the CSLF map in terms of LOMRs would be if a new study completely or partially supersedes an effective LOMR.

Where a CSLF map is issued at the Preliminary stage, and LOMRs are expected during Post-Preliminary processing, the processing Mapping Partner may want to add a note to the CSLF map (reflective of the LOMR language in the Preliminary Letter template) indicating that LOMRs have been issued inside the study area, and that they will be incorporated before the study goes effective. Wording for the note (similar to the wording that may be present in the Preliminary Issuance Letter) may be as follows:

Figure 3: Example Note to Include on CSLF Workmaps

Note: recently approved LOMCs, specifically LOMRs, may have been issued for your community. The LOMR process is dynamic and FEMA is reviewing LOMR applications regularly. To complete production of the Revised Preliminary FIRMs which includes incorporating the effects of "mappable" LOMRs issued since the last map effective date, a specific cutoff was established. FEMA will address any approved LOMRs issued after the cutoff date when the final SOMA is distributed.