
DRAFT MEMORANDUM

TO: NCTCOG Floodplain Management Task Force
FROM: NFIP-CDC Model Consolidation Team
SUBJECT: Summary of Findings and Recommendations for the NFIP-CDC Combined Modeling Effort
DATE: November 7, 2019

The Floodplain Management Task Force (FMTF) established the NFIP-CDC Model Consolidation Team (Team) in January 2018. The Team was charged with developing an updated process for reviewing and issuing of floodplain permits that incorporates and maintains the new geo-referenced version of the upper Trinity River FEMA Model. This memorandum summarizes the Team’s findings for each of the 20 tasks identified in the Team Charter Scope of Work. The goal and objectives of the Team included the establishment of a streamlined process for addressing both NFIP and CDC actions and incorporating model files used to support each program. A plan for the development of a consolidated NFIP-CDC Model was developed that includes both the NFIP and CDC programs under one unified HEC-RAS model.

Summary of Scope of Work Tasks and Results

Task 1. Survey and Inventory of CDC Models

The upper Trinity River FEMA Model geographic area includes the Clear Fork, West Fork, Elm Fork and Main Stem of the Trinity River. There is currently no FEMA model for the East Fork of the Trinity River.

The upper Trinity River CDC Model geographic area includes the Clear Fork, West Fork, Elm Fork and Main Stem of the Trinity River. A CDC Model of the East Fork of the Trinity River and the portion of the main stem of the Trinity River, from the end of the CDC geographic area downstream to Rosser, is currently being developed.

Hydrology

The hydrology models for both the upper Trinity River FEMA Model and CDC Model were originally developed as part of the “Upper Trinity River Feasibility Study” in the 1990s. The hydrology models were developed using the HEC-1 program and consisted of 110 subareas for the Clear Fork, West Fork, Elm Fork, and Main Stem of the Trinity River. As part of the update of the CDC Model, the USACE, in partnership with the NCTCOG, converted the HEC-1 models to HEC-HMS. This work was completed in 2013.

The NFIP-CDC Consolidation modeling effort included the following hydrology information:

1. HEC-HMS models for the upper Trinity River and Elm Fork River, using 2005 land use data, were provided by the USACE in 2012.
2. RAMPP delivered hydrology package using FEMA standards to the FEMA Mapping Information Platform (MIP).
3. Discharges for each river reach were developed from either local rainfall hydrology or reservoir spillway releases.
4. The routing reach in the vicinity downstream of the existing Dallas Floodway was modified to reflect existing conditions instead of the proposed Dallas Flood Extension project, which included the proposed Lamar and Cadillac Heights Levees.

Hydraulics

The hydraulic models for both the upper Trinity River FEMA Model and CDC Model were originally developed as part of the “Upper Trinity River Feasibility Study” in the 1990s. The hydraulics model were developed using the HEC-2 program. The HEC-2 models were later converted to the HEC-RAS program. These models were not spatially georeferenced equivalent to the more recent versions and capabilities of the HEC-RAS program.

The NFIP-CDC Consolidation modeling effort began with FEMA contracting with their mapping consultant to provide an updated and modernized model. The 2014 CDC Model for was used as the base model to represent current conditions. Flows were revised as appropriate based on the new USACE HEC-HMS models and included the 50%, 20%, 10%, 4%, 2%, 1%, 0.2%, annual chance storm events along with the Standard Project Flood. USACE provided original CAD (*.dgn) files for the river stationing and cross-section alignments and were used to develop the model spatial coordinates. The USACE also provided the cross-section layout maps developed for many of the CDC projects that have been reviewed and processed through the CDC Program. The maps identified the cross-sections developed by the design engineers associated with their respective CDC projects, including additional cross-sections used for the hydraulic analysis of each CDC project. The maps provided the NFIP-CDC Consolidation modeling effort the spatial information to add these additional cross-sections to the updated geo-referenced model. Reach lengths were updated as appropriate to match distances between spatially referenced cross-sections. Each model cross-section was compared to new cross-sections developed from 1991 topography. As appropriate, cross-section stations were shifted to match the horizontal alignment of the cross-sections found in the USACE CAD work maps.

The hydraulic package was delivered to FEMA’s Mapping Information Platform (MIP) and the deliverable was based on a scope outlined by FEMA and their mapping consultant partner. Only the flows for existing watershed development were included in the model. The CDC future conditions flows were not included in the model delivered to the MIP. Models developed for the NFIP typically do not contain future conditions and only represent existing conditions. As a result, the model developed for FEMA was modified to remove CDC permitted projects that had not been constructed as of May 2017.

The original non-georeferenced CDC Model included a geometry file representing the West Fork, Elm Fork, and Trinity River Main Stem and one representing the Clear Fork. The West Fork, Elm Fork, and Trinity River Main Stem geometry was split into two separate files based on simulating flows for the 2-year to 100-year flood and another for the 500-year and SPF flood.

The modernized FEMA Model can be used as the base for the development of the new CDC Model, but will require some additional updates by USACE before being adopted as the official CDC model. This FEMA Model includes a similar geometry file organization as the non-georeferenced model representing each of the main reaches. The difference between the modernized FEMA Model and CDC Model are the flows used (existing watershed development flows as compared to future watershed development flows).

Task 2. Survey and Inventory the FEMA NFIP Models within the CDC Footprint

The CDC Model includes approved CDC projects that may or may not have been constructed, whereas the FEMA Model represents existing conditions, i.e. projects that have been constructed. The development and history of the hydrologic and hydraulic models are described in Task 1 above.

The modernized model was developed for the NFIP program and includes existing conditions flows, FEMA floodway profiles, and multiple profiles required by FEMA. Letters of Map Revisions (LOMRs) are issued as individual snippets of models. A single model of the entire Trinity River, which includes all LOMRs, does not exist. The NFIP-CDC Consolidation Team asked FEMA's Production and Technical Services contractor (Compass Team) to flag any LOMRs that have been submitted since the georeferenced model was finalized.

Task 3. Identify and Outline the NFIP Conditional Letter of Map Revision (CLOMR) and the Letter of Map Revision (LOMR) Processes

FEMA oversees the CLOMR and LOMR processes. FEMA requires a CLOMR when a proposed project encroaches into a FEMA Floodway or causes an increase in the base flood elevation by more than one foot. Local communities may have higher standards for floodplain management that also require CLOMRs.

A LOMR is required after a project is complete if the constructed project results in changes to the floodplain, including new or updated hydrology and hydraulics. If a CLOMR was submitted prior to the project being built, then a LOMR is required to be submitted to document the floodplain changes resulting from the project. LOMRs may also be submitted to correct floodplain mapping errors. Local communities may have higher standards for floodplain management that require LOMRs.

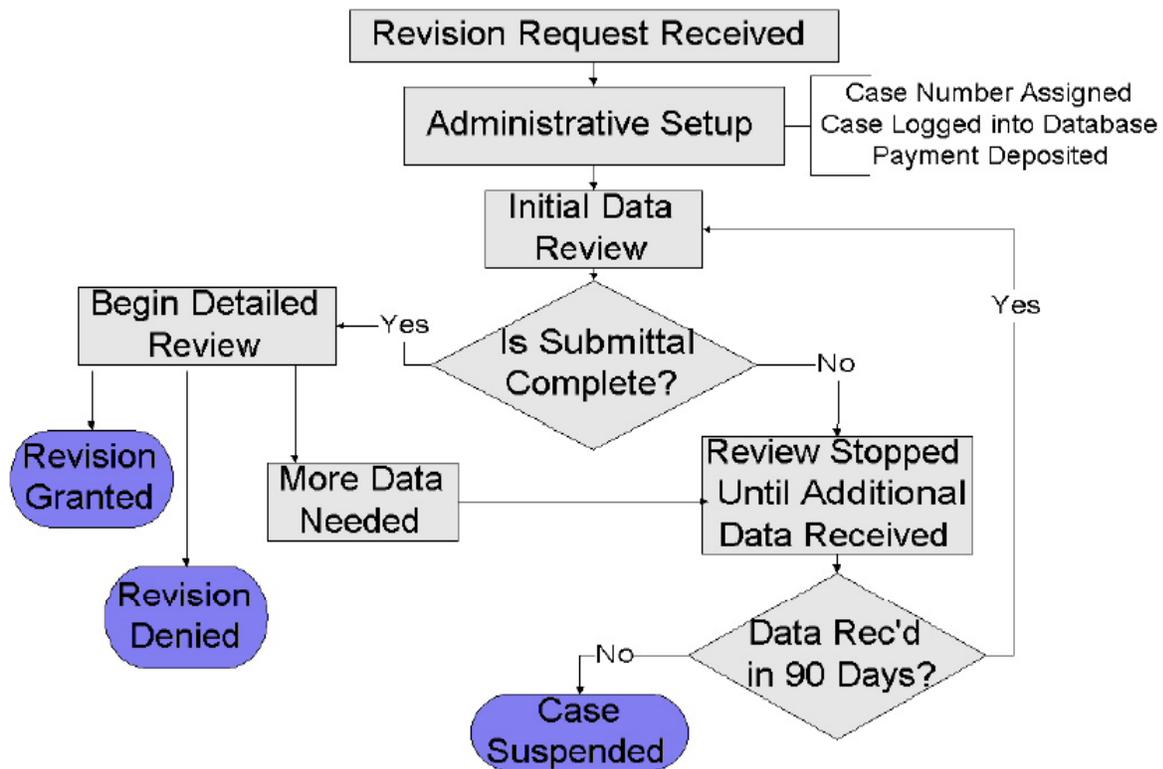
The following must be submitted with CLOMR and LOMR applications (MT-2 Submittal):

1. Completed MT-2 application form
2. Hydrologic computations

3. Hydraulic computations
4. Topographic work maps
5. Annotated FIRM map
6. Certified as-built plans or survey (LOMRs only)
7. Endangered Species Act (CLOMRs only)
8. Property owner notifications for flood hazard revisions (if required)
9. Review fee payment

Applications may be submitted electronically or in paper format. Once received, FEMA follows similar processes for CLOMRs and LOMRs, which is shown in the following flowchart (Figure 1).

Figure 1: FEMA CLOMR/LOMR Process



Local jurisdictions each have their own processes for receiving and reviewing CLOMRs and LOMRs. All the local communities require the same documents that will be submitted to FEMA to be submitted for local review. Some local jurisdictions have third-party reviews with associated review fees that are required prior to the community signing the MT-2 forms. Others use in-house staff to review the applications and may or may not charge a review fee. Once the local jurisdiction is satisfied with the CLOMR or LOMR, the appropriate representative will sign the MT-2 form. Some communities forward the CLOMR or LOMR application to FEMA. Others require that the Applicant forward the application to FEMA. Check with the local jurisdiction for its specific requirements and be sure to follow the local jurisdiction’s process.

Task 4. Survey How Others Store and Archive NFIP Models

The Team researched how other agencies manage and store NFIP models, including the San Antonio River Authority (SARA), Harris County Flood Control District (HCFCD) and FEMA. The Team reviewed websites and spoke with representatives from these agencies. The overwhelming recommendation was to use a GIS-based software program to manage the models.

FEMA is responsible for maintaining the current effective models and LOMRs. However, obtaining the current effective models from FEMA is sometimes a challenge. FEMA’s default response to request for current effective models is to direct the requestor to the appropriate

local jurisdiction to make such request. Sometimes, the local jurisdiction does not have the current effective model or is unaware that the model has been superseded. Local jurisdictions are involved in reviewing models and signing MT-2 forms, but the local jurisdiction does not receive a final, FEMA-approved model after the FEMA review is complete. FEMA sends the local jurisdiction a letter stating that the LOMR was approved but does not provide a link to the location where the approved model can be retrieved.

The Team identified the following items that need to be addressed with regards to the FEMA effective models:

1. A single location is needed to host regional FEMA-approved models
2. A GIS-based system should be used
3. The footprints of CLOMR and LOMR projects need to be shown on a map
4. Color coding of the CLOMR/LOMR project status would be helpful
5. The local jurisdictions should have access to the FEMA-approved CLOMRs and LOMRs once approved
6. The model checkout process should be defined
7. A “notes” section is needed to allow those who check out the model to be notified when someone else checks out the model in the same vicinity
8. FEMA should send local jurisdictions a link to download the final, FEMA-approved report and model for each project.

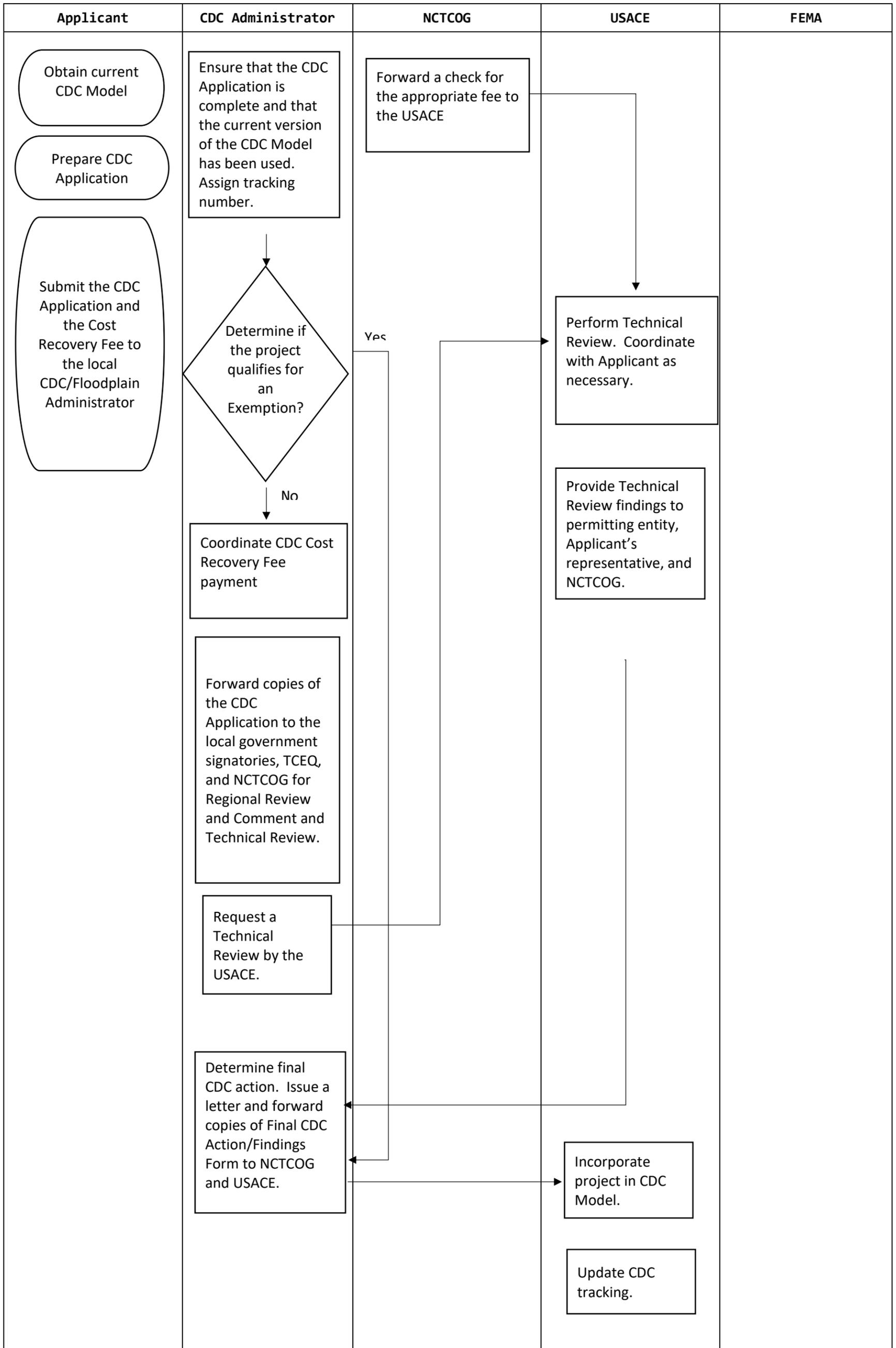
The NCTCOG Floodplain Management Task Force (FMTF) investigated the possibility of having NCTCOG host and manage the FEMA effective models, similar to SARA. FEMA is not supportive of adding new LOMR delegates at the local/regional level. The consensus of the FMTF was to allow FEMA to continue serving as the LOMR delegate for the region. FEMA is currently researching options to make historical datasets available nation-wide.

Task 5. Current CDC Process

A description of the current CDC process is provided on the NCTCOG website at <https://www.nctcog.org/envir/watershed-management/corridor-development-certificate-program>

USACE is responsible for the management and upkeep of the CDC models. The CDC process from USACE’s point of view is shown in Figure 2.

Figure 2: USACE CDC Process



Local jurisdictions each have their own process for implementing the CDC program. While they have some unique features, they seem to follow similar processes. As with the FEMA model reviews, some local jurisdictions require a third-party review with associated review fees for the CDC permit review. After the local jurisdiction is satisfied with the CDC application, the local jurisdiction collects the NCTCOG CDC Cost Recovery Review Fee and one hard copy of the report with a CD. The local jurisdiction sends the NCTCOG CDC Cost Recovery Review Fee and a link to an electronic copy of the CDC application to NCTCOG. The local jurisdiction sends a hard copy with a CD to USACE and requests a USACE Technical Review of the CDC application upon receipt of the Cost Recovery Review Fee from the NCTCOG. The local jurisdiction sends a link to the CDC participants and provides 30 days for review comments and questions to be submitted to the local jurisdiction. Oftentimes, the local jurisdiction allows the Applicant to work directly with USACE to answer questions and revise the models and/or report. Any questions or comments received from the CDC participants and responses to those questions/comments are forwarded by the local jurisdiction to USACE to maintain communication. The USACE informs the local jurisdiction and the Applicant of the results of the Technical Review. It is up to the local jurisdiction to grant or deny a CDC permit.

Task 6. Current CDC Model Storage

The CDC Model is currently stored at the USACE Fort Worth District. USACE staff has the CDC Model stored on USACE laptops and on the USACE network server. Most frequently, local jurisdictions and engineering firms request the CDC Model from the USACE via email.

Task 7. Preferred CDC Model and Permit Tracking Features

The NFIP-CDC Team searched websites and spoke with representatives involved in the HEC-RAS computer model check-in/checkout processes. The San Antonio River Authority (SARA) and the Harris County Flood Control District (HCFCD) provided insight into managing model check-in/checkout best practices. They strongly encouraged the Team to use a GIS-based program. Other findings and recommendations from this research resulted in the following requirements for the NFIP-CDC consolidated model tracking website:

1. The program must be GIS-based
2. No special software should be required
3. The website must be user-friendly
4. Training should not be required in order to access and use the website
5. Color coding of project status would be useful and is preferred

The Team considered USACE and NCTCOG as potential website hosts for the CDC Model. The USACE network security protocols would not easily allow access to anyone outside the agency. If USACE was to host the CDC Model and tracking program, it would require a third-party vendor, something similar to the FEMA InFRM contract. Ultimately NCTCOG agreed to host the website.

The process will be set up so that only the USACE will have the ability to upload the updated NFIP-CDC Model. Anyone would be able to download the model. The following disclaimer will be acknowledged by the user before downloading the updated model.

“While the North Central Texas Council of Governments (hereinafter referred to as NCTCOG) and the United States Army Corps of Engineers, (hereinafter referred to as USACE) have made a reasonable effort to insure the accuracy of the models and associated data, it should be explicitly noted that neither NCTCOG nor USACE make no warranty, representation or guarantee, either express or implied, as to the content, sequence, accuracy, timeliness or completeness of any of the data provided herein. The NCTCOG and USACE, its officers, agents, employees, or servants shall assume no liability of any nature for any errors, omissions, or inaccuracies in the information provided regardless of how caused. It is the responsibility of the user to verify whether or not there are other on-going projects in the vicinity of user’s proposed project, and how the on-going project may or may not affect the user’s proposed project.

The NCTCOG and USACE, its officers, agents, employees or servants shall assume no liability for any decisions made or actions taken or not taken by the user of the models and associated data in reliance upon any information or data furnished here. By using these models and associated data the user does so entirely at their own risk and explicitly acknowledges that he/she is aware of and agrees to be bound by this disclaimer and agrees not to present any claim or demand of any nature against the NCTCOG and USACE, its officers, agents, employees or servants in any forum whatsoever for any damages of any nature whatsoever that may result from or may be caused in any way by the use of the models and associated data.”

Users will have the option to check out the NFIP-CDC Model with or without registering the potential project. The user associated with those projects registered in the software will be required to check the map at key points of the process to identify if/when another registered user adds a project in the vicinity, at which time the users are responsible for coordinating with each other if they so choose. The user assumes all risks if the NFIP-CDC Model is downloaded without registering the project name/area at the time of model checkout.

The HEC-RAS geometry must be downloadable with the NFIP-CDC Model and the file size must be manageable for downloading. The final NFIP-CDC Model with the proposed project must include appropriate HEC-RAS geometry.

The software must include a tracking scheme to keep users informed as to the status of their CDC applications as they proceed through the CDC permitting process. The tracking scheme should include:

1. Application and payment received by NCTCOG
2. USACE authorized to begin model review
3. Comments provided to Applicant
4. Review in progress
5. Review complete

6. Date CDC is issued
7. Active/Expired (after the CDC is issued)

Expired projects that are not constructed could be removed from the CDC Model after some predetermined period. However, no project expiration period has been defined and USACE does not have funding designated for this activity at this time. Therefore, no expired projects have been removed to date. It is recommended that an annual review of expired projects occur in coordination with USACE, NCTCOG, the communities, and applicant to determine removal of expired projects.

Task 8. Recommendations for Additional HEC-RAS Features

As the Team reviewed the NFIP and CDC models and processes, several recommended improvements within the HEC-RAS model were discussed. USACE Fort Worth District staff indicated they would forward the recommendations on to the Hydrologic Engineering Center (HEC) for consideration in future HEC-RAS updates. The NFIP-CDC Team recommends the following improvements within HEC-RAS:

1. Easy comparison of geometries
2. Tracked changes feature
3. Summary list of all projects included in the model

Task 9. Flowchart for NFIP-CDC Consolidated Permitting Processes

A flowchart defining the revised NFIP-CDC Consolidated Permitting Processes was developed and presented to the FMTF on April 12, 2019. The flowchart is shown on the following page as Figure 3.

Task 10. NFIP-CDC Consolidated Model Storage

The NFIP-CDC Model will be stored and maintained by the USACE. The model will be made available for download from the NCTCOG website. CDC projects that have been granted a CDC Permit will be incorporated into the consolidated NFIP-CDC Model and uploaded to the NCTCOG website. The local floodplain administrator will coordinate with USACE and FEMA if a CLOMR is involved to confirm that the project is consistent in the consolidated model.

After the project is constructed, the current NFIP-CDC Model will be downloaded from the NCTCOG website and updated with as-built survey or record drawings, depending on the local floodplain requirements. LOMRs will be submitted to FEMA for review and approval. FEMA will incorporate the LOMR into the National Flood Hazard Layer. Once approved by FEMA, the LOMR will be submitted to USACE to be added as a completed project to the NFIP-CDC Model. USACE will upload the updated consolidated NFIP-CDC Model to the NCTCOG website.

Task 11. Identify and Detail a Set of Processes for Incorporating Model Changes from Both Programs into the Model Files Being Maintained for Each Program or as Combined by the Group

The proposed NFIP-CDC process for the Trinity River corridor outlined in Task 9 includes keeping the NFIP and CDC models up to date and in sync. Keeping models up to date and in sync, as well as having files combined into a single modeling package (HEC-RAS project file), will help with the administration of the NFIP and CDC programs. The processes for incorporating model changes can be found below.

1. CDC Model Maintenance. Upon granting of the CDC permit and/or CLOMR approval by the Community Floodplain Administrator, the proposed project will then be incorporated into the official CDC geometry by USACE. USACE will then upload the updated NFIP-CDC model to the NCTCOG website.
2. NFIP Model Maintenance. Upon LOMR approval by FEMA, the Community Floodplain Administrator will obtain and provide the final LOMR data to USACE. USACE will insert the post-project revision into the FEMA geometry and the CDC geometry in the NFIP-CDC model. The LOMR updates to the CDC geometry will supersede those made upon CDC acceptance, since LOMR updates are based on as-built conditions, not design. USACE will then upload the updated NFIP-CDC model to the NCTCOG website.

Task 12. Options for Online Tracking/Web-Based Solutions

NCTCOG received input from the Team regarding both their desired functionality for a website that hosts the NFIP-CDC Model and one that helps manage the CDC process electronically. After researching, reviewing, and testing nearly thirty software services and platforms, NCTCOG staff presented the top options to the Team and recommended a path forward. The current proposed plan was chosen based on a functionality-to-cost comparison and consists of several pieces of inexpensive software and a public facing website combined to create a full solution that meets the needs of the program. The draft Trinity Common Vision FY20 Work Program lists the website and platform set up as an additional technical activity. Pending work program approval by the Trinity Common Vision Steering Committee, NCTCOG will purchase the subscriptions to the software and begin work on website and interfacing with the software in FY 20. Instructions and training with the communities will follow once set up is complete.

Task 13. Responsibilities within NFIP-CDC Consolidated Permitting Process

The responsibilities within the NFIP-CDC consolidated permitting process have been defined in the flowchart developed in Task 9 above. The key responsibilities largely remain the same, in that the local Community Floodplain Administrator is still responsible for routing and review of both CDC and CLOMR/LOMR submittals to USACE and FEMA, respectively. USACE will still maintain the consolidated NFIP-CDC Model, however, their responsibilities will expand to provide additional review and incorporation of as-built projects in coordination with the FEMA LOMR process. The Applicant remains responsible for obtaining the most current NFIP-CDC Model, however this process will be enhanced through the use of the online web portal.

NCTCOG will continue their responsibility of administering the CDC Program including management of fees, hosting of data, and coordinating between USACE, FEMA, and local Community Floodplain Administrators.

Task 14. New Requirements for CDC Program

As discussed in the above sections, it was the desire of local, regional, and Federal partners to improve floodplain management activities within the upper Trinity River CDC area by consolidating the NFIP and CDC models. The management and upkeep of the consolidated model brings new requirements to the CDC Program that are necessary to prevent the model geometries from diverging as they had previously, as well as facilitating additional communication and coordination between the Applicant, local Floodplain Administrator, NCTCOG, USACE, and FEMA.

The following items have been identified in this document as new requirements for the CDC Program:

1. Providing as-built model geometry with a Model Maintenance Fee to USACE following a FEMA-approved LOMR. Actual valley storage provided by the constructed project will be confirmed.
2. Review fees are being re-evaluated by NCTCOG. The Cost Recovery Review Fee will be determined by NCTCOG, but an additional \$2,500 Model Maintenance Fee will be required to update the NFIP-CDC Model with as-built information in conjunction with the LOMR application.
3. NCTCOG will work with local Community Floodplain Administrators to communicate the new program elements to the development and engineering community.
4. Clarify the permit extension text. While consolidating the CDC Model and NFIP Model and developing this revised process, it became apparent that the current permit extension requirements may contribute to the model containing outdated but approved projects that were never constructed. The Team agreed that these projects should be removed from the CDC Model if not constructed after a certain period. This topic should be further discussed by the Flood Management Task Force with the development of the next CDC Manual (5th Edition) updates.
5. Inclusion of a sample letter to FEMA to remind them to share their review comments with USACE on CLOMRs/LOMRs in the CDC corridor. This is an enhanced communication protocol between the local communities and FEMA to aid in the consolidated model maintenance.
6. Review/update sample CDC ordinances to provide for incorporation of the as-built CDC review following a FEMA-approved LOMR.
7. Use of consistent terminology within the CDC Manual, such as "CDC Package" or "CDC Application".

Task 15. New Requirements for NFIP CLOMR and LOMR Processes

Overall, the FEMA Letter of Map Change process is not changing. Enhanced communication

protocols will result in FEMA providing information on CLOMRs and LOMRs to USACE concurrent with their communication with Applicants and local Community Floodplain Administrators. FEMA will also send local Community Floodplain Administrators final reports and models from approved CLOMRs and LOMRs.

Task 16. Resources and Costs Associated with New NFIP-CDC Consolidated Process

Though some aspects of the NFIP-CDC consolidated process are the same, some aspects have changed. One of those aspects is the additional step of USACE inserting post-project revisions into the NFIP-CDC Model FEMA geometry and CDC geometry based on final LOMR data obtained from FEMA and provided to USACE by Community Floodplain Administrators. The current CDC Cost Recovery Fee is still sufficient, but there is an additional fee that is required for USACE to keep the combined NFIP-CDC Model up to date. The additional fee will be \$2,500 per project.

In order to update the NFIP-CDC Model, projects that have been constructed since May 2017, or CDC applications that have been granted since May 2017, need to be added to the respective geometries. The reason for this is because the georeferenced RAMPP model, which is expected to become the NFIP model, only includes projects that have been constructed since May 30, 2017.

The FEMA geometry could be updated with projects that have been constructed since May 2017 for a cost of \$2,000 per project. The CDC geometry could be updated with CDC projects that have been submitted since May 2017 for a cost of \$2,000 per project.

The below paragraphs contain recommended changes to the current 4th edition of the CDC Manual.

3.3 COST RECOVERY FEE STRUCTURE

The NFIP-CDC Model is a combined regional model consisting of two programs, the Corridor Development Certificate and the National Flood Insurance Program. Accordingly, there are two separate fees associated with each program.

3.3.1 CDC COST RECOVERY FEE

The CDC Cost Recovery Fee funds the costs associated with the USACE CDC Technical Review of CDC applications and NCTCOG corridor-wide CDC administration. The fees are paid by the CDC Applicant and sent to the NCTCOG and deposited into the CDC Review Fund. The USACE will incorporate data from only CDC granted applications into the respective CDC portion of the NFIP-CDC Model. The fees also support the continued USACE maintenance of the CDC Model and the CDC Tracking database.

The CDC Cost Recovery Fees are as follows:

- \$6,000 for development activities located within the Regulatory Zone and within a hydraulically effective flow area
- \$4,000 for development activities located within the Regulatory Zone but within a hydraulically ineffective flow area

The appropriate CDC Cost Recovery Fee is linked to the development activity location with respect to the ineffective flow areas within the upper Trinity River Corridor. The criteria governing the application of the ineffective flow area with respect to hydrologic and hydraulic impact requirements and CDC Cost Recovery Fee are as follows:

[Project is located within both the 100-year and SPF ineffective flow areas]

- No evaluation of the 100-year and the SPF water surface elevation is required
- 100-year and SPF valley storage evaluation is required
- CDC Cost Recovery Fee \$4,000

[Project is located within a 100-year ineffective flow area but within the SPF effective flow area]

- No evaluation of 100-year water surface elevation is required
- Evaluation of SPF water surface elevation is required
- 100-year and SPF valley storage evaluation required
- CDC Cost Recovery Fee \$6,000

The ineffective flow areas are defined in the CDC Model. The Applicant may also contact the local CDC/Floodplain Administrator and/or the USACE to determine the location of a development activity with respect to an ineffective flow area.

3.3.2 MODEL MAINTENANCE FEE

The Model Maintenance Fee funds the costs associated with the USACE LOMR Technical Review of the final LOMR submittal and NCTCOG corridor-wide LOMR administration. The fees are paid by the CDC Applicant and sent to the NCTCOG and deposited into the Model Maintenance Fund for use by USACE. The USACE LOMR Technical Review consists of the review of the development activity as-built condition. Any changes to the LOMR condition as compared to the CDC condition will be noted. The USACE will incorporate data from the LOMR granted submittal into the respective NFIP-CDC Model. The fees also support the continued

USACE maintenance of the NFIP Model and the Permit Tracking database. The Model Maintenance Fee is \$2,500.

Task 17. Schedule Modifications

Updating the NFIP-CDC Consolidated model will take time. Currently, the CLOMR process typically takes 6 to 12 months to obtain FEMA approval. The FEMA process will not likely change with the creation of the NFIP-CDC Model, except for communicating with USACE if any concerns arise during FEMA's review.

The CDC and CLOMR reviews can move forward at the same time. The review time for CDC participants is 30 calendar days. USACE has 30 days from the time payment has been processed and the CDC team has been authorized to provide first review comments to the Applicant. The complete review process, including any required revisions by the Applicant, typically takes 2 to 6 months to complete.

Once the CDC Model has been accepted by USACE and the local entity, USACE may require up to 30 days to post the updated CDC Model to the NCTCOG website. The project can move forward once the CDC permit has been issued. The project does not have to wait on the model to be updated on the NCTCOG website.

USACE will make any necessary revisions to the NFIP-CDC Model after a CLOMR has been issued by FEMA. USACE may require up to 60 days to update the NFIP portion of the consolidated model with the FEMA-approved CLOMR.

After a project is complete, the as-built survey or record drawings must be used to confirm that the construction represents the project that was approved in the CDC permit and CLOMR, if applicable. The as-built conditions NFIP-CDC model will be submitted to FEMA for LOMR review and approval. Upon LOMR approval by FEMA, the Community Floodplain Administrator will obtain and provide the final LOMR data to USACE where any geometry corrections will be made. USACE will update the consolidated model with the completed project. The LOMR process typically takes 6 to 12 months, although the LOMR process is often accelerated if a CLOMR was issued. The CDC process to incorporate a FEMA-approved LOMR may require an additional 60 days to complete.

Task 18. Other Impacts on CDC and NFIP Programs

Tasks 14 and 15 above discussed impacts to both the CDC and NFIP programs. No other programmatic impacts have been identified.

The NFIP-CDC Model Consolidation Team has kept the Floodplain Management Task Force informed on its progress. The Team has also sought direction and concurrence with the NFIP-CDC Advisory Group that consists of the decision makers for NCTCOG, FEMA, and USACE.

The Team presented a draft flow chart of the NFIP-CDC Consolidated Model Process to the FMTF on April 12, 2019. The FMTF agreed with the proposed flowchart. Figure 3 is the final version of the flow chart.

Task 19. Inclusion of Projects into NFIP-CDC Consolidated Model (Identify the point at which an approved project is incorporated into the respective model. For example, an approved LOMR is incorporated into the NFIP model but not an approved CLOMR because a CLOMR is not an existing condition. An approved CDC project is incorporated into the CDC model.)

The NFIP-CDC process within the CDC corridor is discussed throughout this memorandum. Figure 3 provides a detailed outline of the process. Task 9 of this memorandum provides a written description of the flow chart.

The Team specifically avoided making changes to the FEMA process, apart from improved communication between the local floodplain administrator and USACE. CLOMRs will continue to be reviewed and approved by FEMA. CLOMRs will also be provided to USACE upon FEMA-approval for CDC geometry comparison. Because CLOMRs represent proposed conditions, they will continue to be excluded from the FEMA current effective models. Upon project completion, LOMRs will be submitted to FEMA for approval and inclusion as the current effective model for that area.

The CDC Model will continue to include proposed projects within the CDC corridor. The CDC Model will continue to be managed by USACE. Upon FEMA approval of a CLOMR, the geometry included in the CLOMR will be compared to that which was included and likely approved in the CDC permit. Any significant differences will be brought to the attention of USACE by the local floodplain administrator. The CDC process will now include a project completion element that will incorporate LOMRs based on as-built survey or record drawings depending on the local community's requirements. FEMA will review and approve the LOMRs. The local floodplain administrator will note any significant differences between the approved LOMR and the permitted CDC. USACE will incorporate the LOMR and update the CDC project status to as completed, which will become the new existing condition for the Consolidated CDC Model.

Deliverables

1. Draft recommendation for the advisory group, FEMA, and the FMTF (this memorandum)
2. Workflow and file storage diagrams and charts detailing how the workflow will be structured from each program (completed April 12, 2019)
3. Prepare presentations for the AG, FEMA, and the FMTF to ensure members understand the proposed changes and their impacts on each program
4. Final recommendation report for the Advisory Group, FEMA, and the FMTF
5. Documentation to be incorporated into the NFIP and CDC program documentation