MEMORANDUM

HARRIS COUNTY FLOOD CONTROL DISTRICT

9900 Northwest Freeway
Houston, TX 77092
713-684-4000

DATE: July 2019

TO: District PCPM Users

FROM: Russell A. Poppe, P.E.
Executive Director

RE: *Interim Guidelines and Criteria for Atlas 14 Implementation* for Current or Proposed Projects Affecting District Right-of-Way

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The purpose of this memorandum and attachments is to document updates made to the Harris County Flood Control District (District) Policy Procedure & Criteria Manual (PCPM), dated October 2018. These updates are being made to address the information included with the release of the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Precipitation-Frequency Atlas of the United States, Volume 11 Version 2.0 Texas (Atlas 14).

The release of Atlas 14 provides updated precipitation depths in Texas for average recurrence intervals of 1-year through 1000-year, and from durations from 5-minutes to 60-days. The updated information will replace the current precipitation depth and frequency information that is used for a variety of engineering analyses and designs including design of drainage facilities and floodplain modeling and mapping.

The District is currently conducting updated floodplain modeling and mapping studies that include Atlas 14 information as well as significant technological advances. The Modeling Assessment and Awareness Project (MAAP*next*) will update the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) for all of Harris County. As this project progresses, new methods of hydrologic and hydraulic analysis are being developed that may affect current District criteria. Therefore, it should be understood that these interim guidelines and criteria are subject to change as additional information is obtained and further analysis developed.

Revisions to the affected chapters of the PCPM are included as attachments to this memorandum, and this document and revised chapters serve as an amendment to the October 2018 PCPM. The unchanged portions of the October 2018 PCPM remain in effect at this time. PCPM users should follow the information included in the revised chapters as noted in the Transition Plan included in this memorandum.

Summary of *Interim Guidelines and Criteria*

The following revisions have been made to District policy and criteria. Each of the revisions is summarized below and included in the updated PCPM Chapters attached to this memorandum.

1. Hydrologic Regions and Depth-Duration-Frequency Updates

   Existing Hydrologic Regions were updated based on the Atlas 14 rainfall distribution. Updated rainfall depth-duration-frequency tables were created for each region. The full updated rainfall tables will be included in future updates to the District's Hydrology and Hydraulics Guidance Manual. The 24-hour depths are shown in the PCPM Sections 3.6.6 through 3.6.9. The table below includes 24-hour rainfall depths for comparison purposes.

Region	Representative Watershed	Current Rainfall (in)	Atlas 14 Rainfall (in)	Change (in)
2-year, 24-hour Rainfall Depth				
Region 1	Cypress Creek	4.1	4.8	0.7
Region 2	Greens Bayou	4.4	5.1	0.7
Region 3	Clear Creek	4.5	5.3	0.8
10-year, 24-hour Rainfall				
Region 1	Cypress Creek	7.1	8.2	1.1
Region 2	Greens Bayou	7.6	8.7	1.1
Region 3	Clear Creek	7.8	9.3	1.5
100-year, 24-hour Rainfall Depth				
Region 1	Cypress Creek	12.4	16.3	3.9
Region 2	Greens Bayou	13.2	16.9	3.7
Region 3	Clear Creek	13.5	18.0	4.5
500-year, 24-hour Rainfall Depth				
Region 1	Cypress Creek	17.7	24.2	6.5
Region 2	Greens Bayou	18.9	25.0	6.1
Region 3	Clear Creek	19.3	27.2	7.9

In addition, rainfall Intensity-Duration-Frequency (IDF) curves, typically used by local jurisdictions in the design of local conveyances such as storm sewers and roadside ditches, were updated and the existing equations for these curves were updated. This information, while not directly used in the PCPM, is available for use by local jurisdictions such as Harris County, the City of Houston, and other municipalities.

2. District Site Runoff Curve Updates

   Site Runoff Curves used in peak flow calculations for various levels of impervious cover were updated based on the increased rainfall depths and updated hydrologic methodology being used in MAAPnext. Revised site runoff curve equations for the 50% (2-year), 10% (10-year), 1% (100-year), and 0.2% (500-year) storm events are included in PCPM Section 3.3.5 and are shown in Exhibits 3.1 through 3.4.

3. Rainfall Loss Parameter and Direct Runoff Volume Updates

   Rainfall losses due to soil types and ground cover were updated based on revisions to soils information for portions of Harris County and the hydrologic model being used in MAAPnext (HEC-HMS version 4.3). The updated losses were used to calculate updated direct runoff volumes used in the Small Watershed Method and are shown in PCPM Sections 3.6.6 through 3.6.9. In addition, impervious cover percentages shown in PCPM Section 3.5.1 were updated based on information developed in the initial stages of MAAPnext.

4. Minimum Detention Criteria Updates

   The current minimum detention volume rates included in PCPM Chapter 6, Section 6.9.5 were reviewed based on the updated rainfall and loss data, the hydrologic methodology changes occurring as a result of MAAP*next*, and the updated Site Runoff Curves. Various scenarios of development were modeled using the effective and updated criteria. The result of this work showed that the increase in the 1% (100-year) 24-hour rainfall depths requires an increase in minimum detention criteria. The major changes to the criteria are summarized in the table below. All changes have been included in the updated PCPM Chapter 6, Section 6.9.5 and subsequent sections.

Detention Rate Increases (100-Year Rate Shown)				
Hydrologic Method	**Current Criteria - Size of Project (Acres)**	**New Criteria - Size of Project (Acres)**	**Current Minimum Detention Rate (Ac-ft/ac)**	**New Minimum Detention Rate (Ac-ft/ac)**
1	0-50	**0-20**	0.55	**0.65**
2	50-640	**20-640**	0.55	**0.65**
3	> 640	> 640	0.45	**0.55**
Pumped	N/A	N/A	0.75	0.75

   It should be noted that the volumes included in the table are minimum amounts. Additional detention volume may be necessary to meet allowable discharge criteria.

   In addition to the increase in minimum detention, the threshold at which detailed engineering calculations and a report provided for District review was reduced from 50 acres to 20 acres. Lastly, large projects (typically larger than 300 acres) that can be analyzed using the Watershed Modeling Method (Method 3) will be required to use the current effective hydrologic and hydraulic models and include the 0.2% (500-year) analysis in addition to the 50%, 10%, and 1% storms.

5. Floodplain Mitigation Criteria Updates

   With the upcoming changes to regulatory floodplains that will occur as a result of MAAPnext, it is probable that area outside of the current regulatory (100-year) floodplain will be incorporated into newer, wider floodplains. Due to the similarities in rainfall depths, the current effective 0.2% (500-year) floodplain will serve as an interim estimate of the future MAAP*next* 1% (100-year) floodplain. Therefore, projects that are located within the current effective 0.2% (500-year) floodplain will be required to mitigate fill placed within this floodplain until the future MAAP*next* floodplains are adopted and this criteria is reviewed. This mitigation is in addition to any other requirements that may be enforced by local floodplain administrators.

   For the same reason, bridges and culverts affecting District Right-of-Way will also be required to show no hydraulic impacts in the current effective 0.2% (500-year) event in addition to the 10%, and 1% storms per current criteria. Where possible, new bridge low chord elevations should be set at or above the higher of the current requirement (1.5 feet above the Base Flood Elevation) or the 0.2% (500-year) water surface elevation. This requirement may not be possible due to roadway approach restrictions and can be reviewed on a case-by-case basis. The goal of the project should be no adverse impact from the bridge for storms up to and including the current effective 0.2% event.

The affected PCPM Chapters are attached to this memorandum. In case of conflict between these *Interim Guidelines and Criteria* and the October 2018 PCPM, the user should coordinate with the District Watershed Management Department to request clarification.

Transition Plan

These *Interim Guidelines and Criteria* will be effective upon adoption by Harris County Commissioners Court. All projects submitted for review after the effective date will be subject to these *Interim Guidelines and Criteria* and the District encourages all projects currently in progress to review and use the *Interim Guidelines and Criteria* immediately.

In accordance with Texas Local Government Code Chapter 245, the following projects are not subject to review under these *Interim Guidelines and Criteria*.

1. Projects with a completed or unexpired administratively complete application for Preliminary Plat to Harris County or a municipality on or before midnight of the effective date of these *Interim Guidelines and Criteria,* provided that the project is not substantially modified.
2. Projects with an administratively complete development permit application submitted to Harris County on or before midnight of the effective date of these *Interim Guidelines and Criteria*, provided that the project is not substantially modified.
3. Projects with an administratively complete drainage report submittal or plan submitted to Harris County or the District, or projects with an Interpose No Objection (INO) letter from the District issued on or before midnight of the effective date of these *Interim Guidelines and Criteria,* provided that the project is not substantially modified.

Dormant projects as defined under Texas Local Government Code Section 245.005 are subject to review under these *Interim Guidelines and Criteria*.

Substantially modified means changes to the approved plans or drainage report that will increase impervious cover, or the volume and/or peak discharge of the stormwater runoff from portions of, or the whole of the project, or any other change that would affect the volume or peak discharge of stormwater runoff that would cause adverse impacts to offsite properties.

Future Modifications

These *Interim Guidelines and Criteria* will be periodically evaluated based on the availability of new information, results of the MAAP*next* project, and additional data and information developed by the District. At a minimum, these *Interim Guidelines and Criteria* will be reviewed and updated upon Harris County Commissioners Court adoption of updated regulatory floodplain information as Best Available Data.

----------END of MEMORANDUM----------

RAP:ctm

ATTACHMENTS

Updated PCPM Chapter 2 Procedures
Updated PCPM Chapter 3 Hydrology
Updated PCPM Chapter 6 Stormwater Detention Basins
Updated PCPM Chapter 7 Bridges
Updated PCPM Chapter 8 Culverts
Updated PCPM Appendix A (TOC and Introduction)