



9900 Northwest Freeway
Houston, Texas 77092
346-286-4000
www.hcfc.org

July 15, 2021

Ms. Susan K. Humphries, P.E.
5engineering, LLC
11200 Westheimer Road, Suite 353
Houston, TX 77042
kelly@5engineering.com

SENT VIA ELECTRONIC MAIL: NO HARD COPY TO FOLLOW

RE: Project No. 2102100065
Northpark Drive Drainage Improvements Impact Analysis
HCFCD Units G103-33-00 and G103-38-00; Key Map 296-S,T,U; Pct. 4

Dear Ms. Humphries:

The referenced report has been reviewed pursuant to the HCFCD Policy, Criteria, and Procedure Manual and Section 3.02 of the *“Regulations of Harris County, Texas for the Approval and Acceptance of Infrastructure.”* The goals of the review are to provide technical support to the Harris County Floodplain Administrator and to apply HCFCD policy and criteria where appropriate.

This review addresses issues regarding hydraulic and hydrologic drainage design criteria only. Design criteria regarding the site layout of the proposed development and drainage facilities will be reviewed upon submittal of site plans.

Our understanding of the report is described below. Please see the response contained within the *“Hydrologic & Hydraulic Technical Review”* section.

HCFCD Jurisdiction

The project meets at least one of the following conditions; HCFCD criteria apply:

- The project directly affects HCFCD Infrastructure.
- The project proposes infrastructure to be maintained by HCFCD.
- The project is located within a watershed where HCFCD has a regional project adopted by Harris County Commissioners Court.
- A technical review has been requested by Harris County.

Submittal Information

Submitted Report

Northpark Drive Drainage Improvements
Impact Analysis
July 1, 2021

Consulting Engineer

5engineering, LLC
11200 Westheimer Road, Suite 353
Houston, TX 77042
TBPE Registration No. F-13748
Ms. Susan K. Humphries, P.E.
TX P.E. # 98399

Project Summary

This report describes an impact analysis for the Northpark Drive Roadway Improvements Project in Kingwood, TX. The area of analysis extends approximately 2.3 miles from Interstate Highway 69 (IH-69) to Woodland Hills Drive. This project is located in the San Jacinto River watershed in Harris County and partially in Montgomery County. The Northpark project is being completed for the Lake Houston Redevelopment Authority (LHRA) and Tax Increment Reinvest Zone (TIRZ) 10 project. The existing four lane will be reconstructed and widened by two additional lanes with the removal of the existing drainage ditch to be replaced with a proposed storm sewer system along Northpark Drive. The proposed improvement includes enlarging the proposed storm sewer system to provide inline detention and modeling the restrictors needed to meet allowable outflow requirements for both outfalls. This involves placing restrictors in the model and then iteratively upsizing the storm sewer system and adjusting the restrictors until an optimized solution is reached.

Detention Summary

Project Name: Northpark Drive Drainage Improvements Impact Analysis		Date: 6/1/21			
Detention Basin Service Area		23	acres		
Offsite Drainage Area		NA	acres		
Storm Event	Outfall	50% (2-YR)	10% (10-YR)	1% (100-YR)	
Flows (cfs)	Post-development Inflow	NA	NA	NA	
	Maximum Allowable Outflow (cfs)	Ben's Branch	175	249	
	Maximum Outflow Provided (cfs)	Ben's Branch	167	196	
	Maximum Allowable Outflow (cfs)	Kingwood Diversion	87	139	
	Maximum Outflow Provided (cfs)	Kingwood Diversion	71	104	
Elevations (ft)	Lowest Natural or Finished Ground Elevation Estimate	NA			
	Maximum Allowable Water Surface	NA			
	Based on	NA			
	Design Water Surface Elevation	NA			
	Water Surface Elevation Calculated	NA			
Storage	Minimum Storage Required (ac-ft)*	NA	NA		
	Inline Detention Storage Provided (ac-ft)**	NA	1.9		
	Storage Rate Provided (ac-ft/ac)	NA	NA		
Outflow Structure	Restrictor Size, if applicable	Ben's Branch	60"		
	Restrictor Size, if applicable	Kingwood Diversion	66"		
	Outflow Pipe Size	Ben's Branch	78" CMP (Existing)		
	Outflow Pipe Size	Kingwood Diversion	66" RCP		
	Outflow Velocity into Channel (fps)	Ben's Branch	8.0	7.1	7.9
	Outflow Velocity into Channel (fps)	Kingwood Diversion	6.2	6.2	6.2
	Weir Description, if applicable (type, size, elevation, etc)	NA	NA	NA	NA
Drain Time - 1% only (hours)	NA				
Emergency Overflow (type, size, elevation ,etc)	NA				

*There is no additional impervious area as a part of this project.

**The detention provided for the Northpark Drive Drainage is inline detention. Not all table fields are applicable.

Floodplain Related Information

According to FEMA FIRM Panel No. 48339C0750H, effective August 18, 2014, the project area is located outside the 1% exceedance floodplain (Zone AE) and the 0.2% exceedance floodplain (Shaded Zone X).

Please also note that the City of Houston and Montgomery County are the Floodplain Administrators for the receiving waterways. All issues regarding local floodplain regulations must be coordinated through the City of Houston and Montgomery County.

Report Findings

The report states, *“In summary, the proposed improvement meets COH criteria with no impacts to the receiving channels, Ben’s Branch (G103-33-00), Kingwood Diversion (G103-38-00), and including downstream properties within the City of Houston, for storm events up to and including the 100-year Atlas 14 storm event.”*

Hydrologic & Hydraulic Technical Review

HCFCD offers the following:

The report includes statements that the project will cause no adverse impact to the receiving waterways, including downstream properties within the City of Houston, in storm events up to and including the 100-year storm event. The documentation within the report generally supports the conclusions stated by the engineer. Based on the stated conclusions, HCFCD interposes no objection to the referenced report. Please note, this acceptance does not necessarily mean that the entire report, including all supporting data and calculations, has been completely checked and verified. However, the report is signed, dated, and sealed by a Professional Engineer licensed to practice in the State of Texas, which therefore conveys the licensed engineer’s responsibility and accountability.

Note: The project does not directly outfall into the HCFCD ROW. HCFCD approval does grant the authority to outfall into ROW that HCFCD does not own. Approval must be received from the property owners.

Additional HCFCD Criteria

Site plans must be submitted to HCFCD for review and signature.

All work proposed within existing and future HCFCD right-of-way must be designed and constructed in accordance with the HCFCD Policy, Criteria, and Procedure Manual.

Environmental Review & Permitting

The Harris County Flood Control District’s Regulatory Compliance Department requires that proposed projects impacting regulated waters of the U.S. obtain and document the required U.S. Army Corps of Engineers permit(s) for any portions of the project located within any existing or proposed HCFCD right-of-way. The type of permit required (if any) must be stated on the site plans even if written permit authorization from the Corps of Engineers is not required. If written permit authorization is required, copies of approved Corps of Engineers permits must be submitted with the HCFCD *Notification of Construction in Right-of-Way* and submitted to the HCFCD Development Coordination and Inspection Department at least 48 hours prior to construction along with the *48-hour Pre-Construction Notification*.

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Susan K. Humphries, P.E.
5engineering, LLC

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Thank you for coordinating this project with the Flood Control District. If you have any questions regarding the technical comments, please contact Mr. Wen Zhang, P.E. via email at *Wen.Zhang@hcfcd.hctx.net*. For any other questions, you may contact me at *david.saha@hcfcd.hctx.net*.

Sincerely,

David B. Saha, P.E.
Watershed Coordinator

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