ATTACHMENT A
SCOPE OF SERVICES
RUSH CREEK FLOOD STUDY

The Collin County Engineering Department is currently investigating flooding impacts along an approximately 0.5-mile segment of Rush Creek, where property owners have placed fill in the floodplain. The study area is located just upstream of the Rush Creek crossing with Paul Wilson Rd. The limits of the study area are defined in **Exhibit A**.

On February 21, 2019, Freese and Nichols Inc. (FNI) met with Collin County Engineering staff to discuss their concerns and review background information. The study area is characterized by multiple detention ponds and a cursory overview of historical aerial imagery shows continued placement of fill material in the floodplain. Recently, Paul Wilson Rd. was overtopped during a storm event and residents submitted complaints to the County. Residents suggested that debris downstream of the culvert creates a blockage that causes flooding conditions at this location and at nearby properties upstream. The County recognizes this situation but also understands that floodplain encroachment upstream may contribute to increased flooding levels in the area. Therefore, the County requested a hydrologic and hydraulic (H&H) study to properly quantify the impacts of floodplain encroachment due to fill and determine if this may be considered the primary cause of increased flooding risks in the study area.

FNI proposes to develop a baseline two-dimensional (2D) hydraulic model using the U.S. Army Corps of Engineers (USACE) HEC-RAS model and historical (2001) Light Detection and Ranging (LiDAR) topographic data. The baseline model will reflect terrain and stream geometry conditions before floodplain encroachment occurred in the study area. Subsequently, the most recent LiDAR data (2018) will be used to develop an existing conditions 2D hydraulic model. Additional topographic survey data will be collected in the area defined on **Exhibit B** to accurately represent features such as pavement edges, culverts, spillways, berms, walls, and tops and toes of slopes. A comparison of the baseline vs existing conditions hydraulic simulation results will serve as the basis for determining how modifications in floodplain topography have altered the degree of flooding risks in the study area. FNI will render the following Professional Engineering Services in connection to the development of this project.

Basic Services

Task 1 – Data Collection

- Obtain and review pertinent existing data from the County for the study area. Data needed will primarily consist of but is not limited to: historic aerial imagery (2004 – 2019), the most recent (2018) and historical (2001) LiDAR data, and record drawings. FNI will utilize 2001 LiDAR data to represent the baseline condition and 2018 LiDAR to represent existing conditions. It is assumed that all data shall be received from the County within 2 weeks of notice to proceed.
- Conduct one (1) site visit to investigate and document existing conditions. Collin County will coordinate and obtain right of entry onto private property.
- Topographic field survey of study area as defined in **Exhibit B**. Survey will include up to five (5) culverts and one (1) roadway cross section. A survey scope of work and fee is provided as **Attachment A**. Collin County will coordinate and obtain right of entry onto private property.

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Task 2 – Hydrologic Analysis

- Delineate contributing drainage area based on LiDAR topography to be obtained from the County.
- Determine hydrologic parameters for the study area.
- Develop HEC-HMS hydrologic models to generate runoff hydrographs for up to three (3) design frequency storms. FNI recommends the 2-, 10-, and 100-year storm events. Runoff hydrographs will serve as input to the 2D hydraulic models to be developed under **Task 3**.

Task 3 – Hydraulic Analysis

- Generate two (2) topographic surfaces using LiDAR data collected in **Task 1** and perform a raster compare in ArcGIS to determine and highlight differences in terrain due to development and fill in the study area.
- Develop two-dimensional (2D) hydraulic models of the study area using HEC-RAS version 5.0.7. Two models will be developed, one will represent baseline conditions and one existing conditions.
- Execute 2D hydraulic model simulations applying runoff hydrographs calculated in **Task 2** directly to a 2D flow area of the study site for each scenario (baseline and existing).
- Analyze impact of changes in terrain on water surface elevations and velocities within the study area and document in tabular and graphical format.
- Develop baseline and existing conditions floodplains in the study area for the 2-, 10-, and 100-year storm events.
- Determine hydraulic performance and level of service analysis for the Paul Wilson Rd. culvert crossing. Determine culvert sizes required to avoid road overtopping up to the 10-year storm event.

Task 4 – Technical Report

A technical report will be prepared documenting the methodology, H&H analysis, and results. The report will include a detailed comparison of floodplain extents to highlight the effects of fill in the floodplain. A draft report will be submitted in digital format (.pdf file) for County review. FNI will perform one (1) round of revisions to the report after receiving feedback from County Staff. Final report will be submitted in digital format (.pdf file) and up to two (2) hard copies will be provided.

ADDITIONAL SERVICES

The following services are additional and shall not be included in the Scope of Services unless specifically approved by the County. FNI shall inform the County when a particular service falls into the "Additional Services" category.

1. Alternatives analysis or proposed conditions analysis to reduce flooding risks.
2. Analysis of areas beyond those outlined in the Scope of Basic Services.
3. Topographic field survey beyond that indicated in **Task 1**.
4. Additional site visits or meetings in excess of those defined on the Scope of Basic Services.
5. Letter of Map Revision (LOMR) submittal to FEMA or any other FEMA coordination.
6. Appearances before regulatory agencies other than the County.

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7. Assisting the County in preparing for, or appearing at litigation, mediation, arbitration, dispute review boards, or other legal and/or administrative proceedings in the defense or prosecution of claims disputes with third parties.
8. USACE 404 or other environmental permitting evaluations.
9. Public outreach efforts.
10. Providing basic or additional services on an accelerated time schedule. The scope of this service does not include cost for overtime wages of employees and consultants, inefficiencies in work sequence and plotting or reproduction costs directly attributable to an accelerated time schedule directed by the City.

TIME OF COMPLETION

FNI is authorized to commence work on the Project upon execution of this AGREEMENT and agrees to complete the services within sixty (60) days of receiving notice to proceed.

COST

Below are costs for the scope of basic services described above with breakdowns by task and by personnel classification. FNI proposes to furnish our services as described herein for a Not to Exceed fee of Twenty-Five Thousand Dollars and No Cents ($25,000).

BASIC SERVICES		**Task Cost**
1	Data Collection & Survey	$ 6,983
2	Hydrologic Analysis	$ 3,602
3	Hydraulic Analysis	$ 7,353
4	Technical Report	$ 7,062
	TOTAL PROJECT:	**$ 25,000**

	Position	Project Manager	Engineer IV	Engineer IV	GIS Analyst III	Senior Advisor	Group Manager	
Task	Hourly Rate	$ 197	$ 146	$ 146	$ 107	$ 175	$ 225	Total per Task
Data Collection & Survey		7	10	0	2	0	0	$ 3,083
Hydrologic Analysis		4	16	1	2	1	0	$ 3,602
Hydraulic Analysis		6	32	3	8	1	0	$ 7,353
Technical Report		7	33	0	4	2	1	$ 7,062
Survey (Subs)								$ 3,900
							Grand Total:	**$ 25,000**

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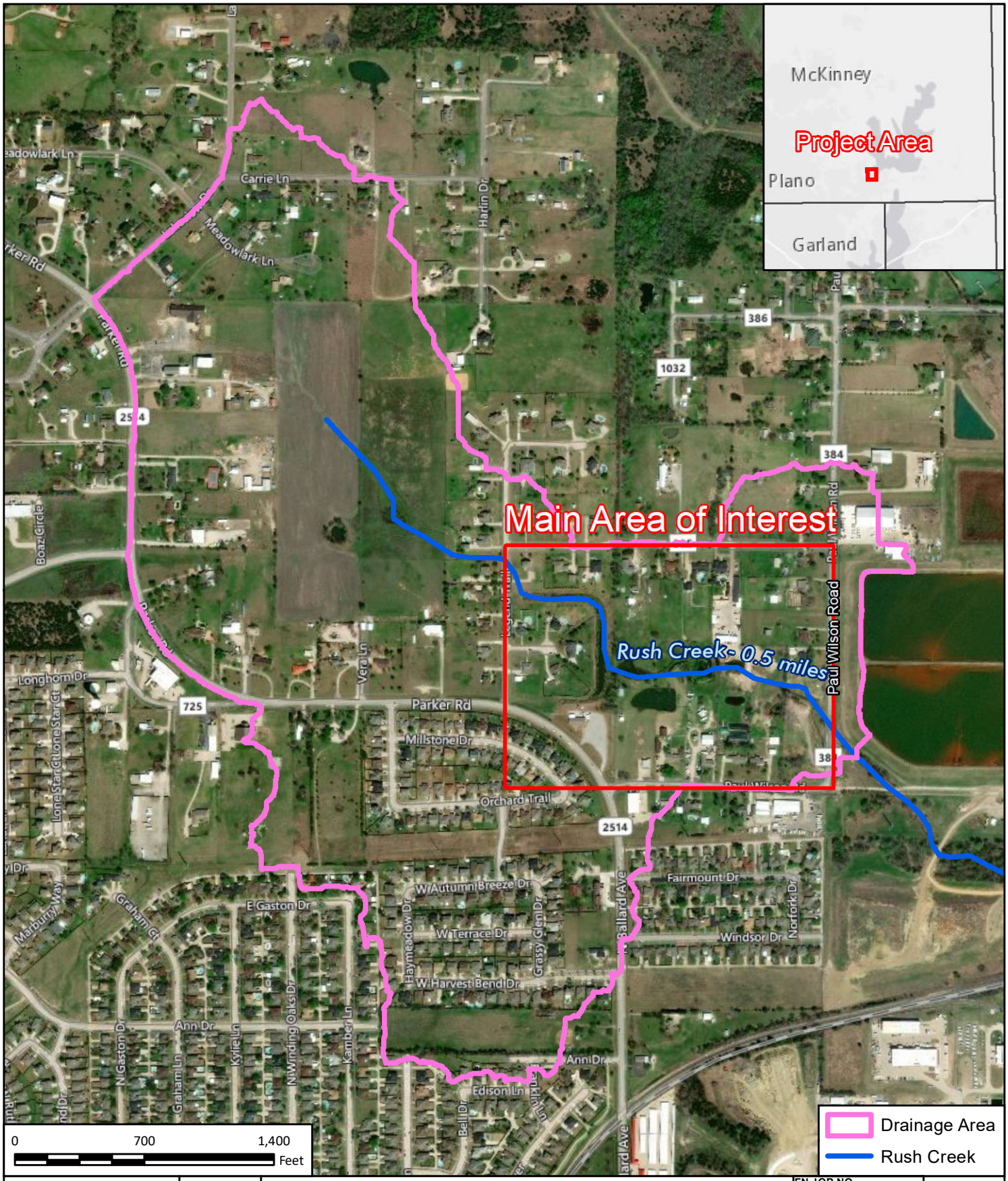

FREESE AND NICHOLS
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Collin County

Rush Creek Drainage Area

FN JOB NO	OFF19041
FILE NAME	Rush_Creek_Watershed.mxd
DATE	3/5/2019
SCALE	1:8,400
DESIGNED	BH
DRAFTED	02271

EXHIBIT

A

Path: F:\FNI Working\David Rivera\2019_03_04 Wylie_watershed\Data\Rush_Creek_Watershed.mxd

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

Exhibit B - Survey Scope

Within red cloud area supplement with pipe culvert and flume sizes and invert elevations. For other man-made channel constrictions provide dimensions, flow lines, and top of berm/driveway elevations.

Attachment A

1519
SURVEYING & ENGINEERING

March 18, 2019

Topographic Survey

Client: Freese and Nichols, Inc.
c/o Wayne P. Hartt, PE

Project: Collin County – General Engineering Services

Scope of Services

The project limits for the proposed topographic survey are shown on the attached exhibit furnished by your office and include the topographic data of the three (3) the areas clouded in red.

Topographic Survey

1. Establish project control using Global Positioning System (GPS) methodology. Horizontal values will be based on the Texas State Plane Coordinate System, North American Datum of 1983, North Central Zone (4202) and scaled to surface using the surface adjustment factor of 1.000152710. The vertical values will be based on GPS derived ellipsoid heights and adjusted to North American Vertical Datum of 1988 (NAVD88) elevations using Geoid 12B. Horizontal and vertical control may be adjusted to match the Collin County 2018 LiDAR data.

2. Topographic survey of the three (3) areas clouded in red on the attached exhibit to include pavement edges, culverts, spillways, berms, walls, tops and toes of slopes, spot elevations, and other surface features.

3. Provide a digital design survey drawing in AutoCAD or Microstation format prepared to Freese and Nichols, Inc. standards showing visible surface features located, an ASCII point file, .TIN and Land .XML file, and a copy of field notes and field sketches.

Fee Schedule: $3,900.00 (hourly not to exceed)

Any additional services not outlined above will be negotiated on an as needed basis. We appreciate the opportunity to submit this proposal and we look forward to working with you and Freese and Nichols, Inc. If you have any questions or need further assistance, please call me 214-484-8586 or email shaun.piepkorn@1519LLC.com.

Sincerely,

Shaun Piepkorn

Shaun Piepkorn, RPLS

1519
SURVEYING & ENGINEERING

RATE SCHEDULE

Surveying:

Registered Professional Land Surveyor	$ 150 / hour
Survey Technician	$ 100 / hour
2-Man Survey Crew	$ 165 / hour
Aerial (UAV) Surveying	$2,500 / day

**All work conducted on Weekends or Holidays will be invoiced at 1.5 times the normal rate.*