

Department of Engineering
Dan Gaillet, P.E., County Engineer

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MEMORANDUM

August 30, 2018

To: Sheila Jones, Supervisor, District I
Trey Baxter, Supervisor, District II
Gerald Steen, Supervisor, District III
David Bishop, Supervisor, District IV
Paul Griffin, Supervisor, District V

From: Dan Gaillet, P.E. *dg*
County Engineer

Re: Mendrop Engineering Resources, LLC
Little Bear Creek Drainage Study

Due to the numerous complaints that the County receives about flooding in the Little Bear Creek Drainage Basin (an area close to 8 square miles, north and south of Yandell Road), the Engineering Department is recommending that Mendrop Engineering Resources, LLC be hired, for a fee not to exceed \$68,950.00, to conduct a study of the area for direction on corrective actions.

**WORK ASSIGNMENT NO. 19
LITTLE BEAR CREEK WATERSHED EVALUATION
MADISON COUNTY**

THIS WORK ASSIGNMENT TO THAT CERTAIN GENERAL ENGINEERING SERVICES CONTRACT IS EXECUTED BY AND BETWEEN MADISON COUNTY BOARD OF SUPERVISORS AND **MENDROP ENGINEERING RESOURCES, LLC**, EFFECTIVE THE 16th DAY OF FEBRUARY, 2016, IS INCORPORATED THEREIN AS IF COPIED FULLY IN BOTH WORDS AND FIGURES AS A PART OF EXHIBIT NO. 1.

LET IT BE KNOWN THAT:

WHEREAS, the parties to the above stated CONTRACT are now desirous of implementing an additional Work Assignment or phase thereunder: and,

WHEREAS, each of said parties represents that it continues to have authority to execute this Work Assignment and that all certifications previously made in said CONTRACT remain in effect;

NOW THEREFORE, the parties hereto do further contract and agree to add the following items of work to the above CONTRACT under the additional terms and conditions as are hereinafter stated:

SPECIFIC SCOPE OF WORK FOR THIS WORK ASSIGNMENT

The CONSULTANT, in accordance with the General Services Agreement, shall provide a hydrologic and hydraulic investigation of flooding along Little Bear Creek and Tributaries at Yandell Road near the Dollar General Store, Madison Crossing Elementary School and Hampton Hills Subdivision; Smith-Carr Road near Kemper Creek Subdivision, and Oakfield Boulevard in Oakfield Subdivision in Madison County.

The following engineering services shall be performed by the CONSULTANT on behalf of Madison County in accordance with the CONTRACT at the direction of the County Engineer or his designee, unless otherwise modified by the Madison County Board of Supervisors (MCBOS).

The CONSULTANT shall provide the following specific services as part of the watershed evaluation. The study shall be completed in two (2) separate phases as authorized and approved by the MCBOS. Phase I shall be considered the base scope of work, and include the hydrologic and hydraulic investigation of flooding issues and recommendations for possible alternatives to mitigate the flooding concerns at the locations designated above. Phase II, if approved, shall be considered as additional services to Phase I, and include the development of a Special Flood Hazard Area (SFHA), Zone "AE" and a floodway for those areas currently designated as SFHA, Zone "X" on the effective Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Map Numbers 28089C0415F and 28089C0420F, revised March 17, 2010.

Phase I – Field Surveys, Hydrologic and Hydraulic Analyses, and Recommendations

The CONSULTANT shall perform and provide services included in Phase I as the minimum scope of work.

Task 1 –FIELD RECONNAISSANCE & DATA COLLECTION

The CONSULTANT shall make an initial site visit to document existing site conditions and other information which may be pertinent to the study.

The CONSULTANT shall prepare and submit a Flood Insurance Study (FIS) Data Request for Little Bear Creek to the FEMA Engineering Library.

Task 2 – FIELD SURVEY

The CONSULTANT shall perform topographic surveys for the following stream reaches as shown on Attachment 1. The survey information shall include, but is not limited to, site specific topographic data to document the size of existing channels, drainage structures, invert elevations, finish floor elevations of residential structures, roadway profiles, and other pertinent survey information that will be part of the study. The field survey shall not be all inclusive of topographic data that would be required for preliminary or final design.

- 1) Little Bear Creek From North Old Canton to $\pm 6,700$ feet upstream (south) of Yandell Road;
 - a) Approximately thirteen (13) channel cross sections from ± 25 feet either side of the existing channel top banks; and
 - b) Roadway profile in the immediate vicinity of the stream crossing and two (2) drainage structures along Yandell Road.
- 2) Tributary #1 from the confluence at Little Bear Creek to just upstream of Bradshaw Crossing in Bradshaw Crossing Subdivision;
 - a) Approximately twelve (12) channel cross sections from ± 25 feet either side of the existing channel top banks;
 - b) Seven (7) roadway profiles in the immediate vicinity of the stream crossing and drainage structures along 2 driveways, Smith-Carr Road, Yandell Road, Clarkdell Road (2), and Bradshaw Crossing; and
 - c) Finished floor elevations (FFE) for approximately twelve (12) residences in Kemper Creek Subdivision located on Cannon Run and Brigade Ave near the subject tributary.
- 3) Tributary #2 from the confluence at Little Bear Creek to downstream of the existing detention basin in Sawgrass Subdivision;
 - a) Approximately four (4) channel cross sections from ± 25 feet either side of the existing channel top banks;
 - b) One roadway profile in the immediate vicinity of the stream crossing and drainage structures along Hampton Hills Blvd;
 - c) Finished floor elevations (FFE) for approximately two (2) residences on Hampton Hills Blvd nearest the existing stormwater detention basins; and
 - d) The outlet structures of the existing stormwater detention basins.
- 4) Tributary #3 from the confluence at Little Bear Creek to $\pm 1,000$ feet upstream (south) of Oakfield Boulevard in Oakfield Subdivision.
 - a) Approximately seven (7) channel cross sections from ± 25 feet either side of the existing channel top banks;
 - b) One roadway profile in the immediate vicinity of the stream crossing and drainage structures along Oakfield Blvd;
 - c) Finished floor elevations (FFE) for approximately two (2) residences nearest the existing stormwater detention basins; and
 - d) The outlet structures of the existing stormwater detention basins.
- 5) Roadside ditch along south side of Yandell Road from the existing driveway of Magnolia Bank to approximately Clarkdell Road.
 - a) Approximately nine (9) channel cross sections of the roadway side ditch from ± 25 feet south of the existing channel top bank and the centerline of Yandell Road;

- b) Seven (7) driveways and pipe culverts from the electrical substation to the access road northeast of the Dollar General driveway.

Task 3 – HYDROLOGIC AND HYDRAULIC ANALYSES & MITIGATION ALTERNATIVES

The CONSULTANT shall perform the necessary hydrologic and hydraulic analyses as well as mitigation alternative analyses in order to provide recommendations for flood prone areas along Yandell Road near Madison Crossing Elementary School and Hampton Hills Subdivision; Smith-Carr Road near Kemper Creek Subdivision, and Oakfield Boulevard in Oakfield Subdivision

- A. HYDROLOGIC ANALYSES: The CONSULTANT shall perform the hydrologic analysis necessary for the flooding sources listed in the hydraulic analyses and utilize the published FEMA estimated peak discharges included in the Madison County Flood Insurance Study (FIS) for the stream reach of Little Bear Creek from North Old Canton Road to Yandell Road. The CONSULTANT shall utilize the appropriate hydrologic methodologies for the respective drainage areas to estimate the peak discharges for the typical 2- through 500-year recurrence intervals.
- B. HYDRAULIC ANALYSES: The CONSULTANT shall use the U.S. Army Corps of Engineers (USACE) Hydrologic Engineer Center, River Analysis System (HEC-RAS) software to perform a one-dimensional steady flow analysis of the following flooding source reaches within the study area:
 - 1) Little Bear Creek From North Old Canton to $\pm 6,700$ feet upstream (south) of Yandell Road;
 - 2) Tributary #1 from the confluence at Little Bear Creek to just upstream of Bradshaw Crossing in Bradshaw Crossing Subdivision;
 - 3) Tributary #2 from the confluence at Little Bear Creek to downstream of the existing detention basin in Sawgrass Subdivision;
 - 4) Tributary #3 from the confluence at Little Bear Creek to $\pm 1,000$ feet upstream (south) of Oakfield Boulevard in Oakfield Subdivision; and
 - 5) Roadside ditch along south side of Yandell Road from the existing driveway of Magnolia Bank to approximately Clarkdell Road to evaluate the sizes of the pipe culverts beneath the existing driveways.

The HEC-RAS hydraulic model shall be utilized to evaluate the hydraulic capacity of the existing drainage structures along the subject roadways within the study area. These models shall be utilized to help evaluate flood prone roadways at the designated locations. The model geometry will utilize the field surveys collected as part of Task 2 merged with the readily available existing LiDAR elevation data for Madison County. LiDAR elevation data will be obtained from the dataset prepared by MDEQ as part of the flood map modernization.

- C. DETENTION BASIN MODEL: The CONSULTANT shall use an appropriate hydrologic model program to evaluate the existing storage-volumes of the existing basins located in Hampton Hills Subdivision. Tributary #2 appears to have been realigned to flow through the two existing basins; therefore, storage-volumes will need to be investigated in order to help develop mitigation alternatives, for the flooding concern along Yandell Road at Hampton Hills Boulevard.

Additionally, if it is determined that Tributary #3 flows through the existing detention basin(s) in Oakfield Subdivision, storage-volumes of the these basins may need to be evaluated in order to help determine a mitigation alternative for the overtopping of Oakfield Boulevard immediately downstream (north) of the basins.

- D. HYDRAULIC REPORT: Hydraulic report shall include, as a minimum, a narrative that describes the project scope; statements defining any additional sources of information including cross sections, topographic data, and other supporting information; analysis considerations; supporting documentation stating analysis procedures including existing and proposed conditions; documentation of all modifications made to models to correctly represent the conditions; recommendations and details to help mitigate frequent roadway overtopping, if applicable; tables comparing water surface elevations between the models.

The CONSULTANT shall submit a draft preliminary engineering recommendations to MCBOS for review. Subsequent to MCBOS review, a meeting will be scheduled to review and discuss the findings of the study. Subsequent to the review meeting, the CONSULTANT shall make all necessary changes which arise during the review prior to submitting final recommendations. All pertinent hydraulic data, documentation, and reports shall be included in the submittal.

Phase II – Floodplain Analyses and Mapping

Phase II shall only be performed by the CONSULTANT if specifically authorized by the MCBOS, and shall be considered as additional services to the base scope of work provided in Phase I.

Task 1 – FIELD SURVEY

The CONSULTANT shall perform topographic surveys for the following stream reach as shown on Attachment 1. The survey information shall include, but is not limited to, site specific topographic data to document the size of existing channels, drainage structures, invert elevations, finish floor elevations of residential structures, roadway profiles, and other pertinent survey information that will be part of the study. The field survey shall not be all inclusive of topographic data that would be required for preliminary or final design.

Collect approximately four (4) channel cross sections from ± 25 feet either side of the existing channel top banks of Tributary #4 from the confluence at Tributary #3 upstream (south) the section line between Section 26 and Section 35, Township 8 North, Range 2 East.

Task 2 – HYDROLOGIC AND HYDRAULIC ANALYSES

The CONSULTANT shall use the U.S. Army Corps of Engineers (USACE) Hydrologic Engineer Center, River Analysis System (HEC-RAS) software to perform a one-dimensional steady flow analysis of Tributary #4 from the confluence at Tributary #3 upstream (south) the section line between Section 26 and Section 35, Township 8 North, Range 2 East.

Task 3 – FLOODPLAIN AND FLOODWAY ANALYSES

The CONSULTANT shall utilized the hydrologic and hydraulic data and models developed in Phase I and Phase II, Task 2, to develop a 100-year floodplain with base flood elevation and a floodway along the flooding sources and stream reaches designated. The floodplain and floodway shall be developed

in accordance with the FEMA National Flood Insurance Program (NFIP) Regulations utilizing the field surveys collected as part of this work assignment combined with the readily available existing LiDAR elevation data for Madison County.

Task 4 – INUNDATION MAPPING

The CONSULTANT shall prepare and submit as the deliverable inundation map(s) for the flooding sources included in this scope of work. The inundation map(s) shall utilize a current aerial photograph as the base map with the floodplain and floodway overlaid. Inundation map(s) shall include all pertinent information, including but not limited, road names, stream reaches, cross sections, base flood elevations, floodplain and floodway boundaries similar to a FEMA FIRM. Flood Profiles similar to those included in the FEMA FIS shall also be provided for the flooding sources.

These recommendations, floodplain and floodway analyses, and inundation map(s) do not include a Conditional Letter of Map Revision (CLOMR) or LOMR, as per FEMA regulations. However, if the MCBOS determine that CLOMR and LOMR submittals are necessary, the appropriate documentation can be provided as additional services.

MAXIMUM ALLOWABLE COST

The CONSULTANT'S fee for completion of this Work Assignment – Phase I shall be **\$50,920** and Phase II shall be **\$18,030**, for a total sum of **\$68,950**. Services will be billed monthly on an hourly basis for cost incurred during the period, but shall not exceed the total estimated fee for Phase I or Phase II without prior written authorization from the Client.

SO EXECUTED AND AGREED THIS THE _____ DAY OF _____, 2018.

THE MADISON COUNTY BOARD OF SUPERVIORS

SO EXECUTED AND AGREED THIS THE _____ DAY OF _____, 2018.

MENDROP ENGINEERING RESOURCES, LLC

ATTEST: (affix seal)
