

SUPPLEMENT #1 TO DESIGN SERVICES
for
North Beach Street (Vista Meadow to Shiver)
Flood Study, Letter of Map Revision, and
Additional Storm Drain Analysis and Design
City Project No. TPW-01292

SCOPE OF SERVICES

A flood study is required for the design of the North Beach Street crossing of an unnamed Tributary of Stream WB-1. The unnamed Tributary appears on Tarrant County Flood Insurance Rate Map (FIRM) Map No. 48439C panel no. 0070K.

The purpose of this scope of services is to provide a flood study and a Letter of Map Revision (LOMR) for a reach of an unnamed tributary of Stream WB-1. The flood study will include calculating water surface elevations for the FEMA Flood Insurance Study profiles, developing a culvert design based on fully developed watershed conditions and delineation of the 100- and 500-year floodplain based on existing watershed conditions. The LOMR will be based on as-built conditions after the roadway is substantially complete and prepared on behalf of the City for submittal to FEMA.

Additionally, this supplement to the design services contract provides additional analysis and design services for storm drainage due to adjacent commercial development which alters the existing conditions from the previous designs. This supplement also addresses changes to the City of Fort Worth's drainage standards effective in 2006 but only as it relates to tabulations and reporting. It is the City's direction that the 2006 Drainage Manual criteria will be *waived* in favor of maintaining the integrity of the previous design and it's tie-ins because portions of that design have been installed to date. A design waiver form will be submitted in this context for the City's review and approval.

I. FLOOD STUDY

A. Data Collection

1. Assemble existing hydrologic information for the watershed, including zoning, topography, drainage infrastructure and previous studies. This task also includes a site visit for two (2) engineers to examine existing conditions of the watershed and project site.
2. Obtain site information and existing development plans, to be provided by the Client.
3. Use available topographic information for site, including LIDAR topography, existing project survey, and new survey of the channel flowline outside the limits of the roadway project.

B. Hydrology

1. This portion of the unnamed Tributary of Stream WB-1 was not included in the current effective Flood Insurance Study (FIS) for Tarrant County. No adequate existing or "current effective" hydrologic models are available. A new hydrologic model will be prepared using HEC-HMS for the unnamed tributary watershed.
2. Hydrologic modeling will include calculations of the 2-, 10-, 50-, 100-, 500-year existing watershed and 100-year fully developed watershed peak discharges. The fully developed

watershed conditions model will be prepared based on available zoning or other future land use information.

C. Hydraulics

1. No hydraulic models are available for this unnamed Tributary of Stream WB-1. A baseline HEC-RAS model of the stream and existing roadway will be prepared using available information and existing and fully developed watershed conditions hydrology as described in section **B** of this scope. The limits of this model will be from the confluence of the unnamed Tributary and Stream WB-1 to approximately 300 feet upstream of North Beach Street.
2. Calculate 2-, 10-, 50-, 100-, 500-year and 100-year fully developed water surface elevations (base flood elevation) and velocities based on existing hydraulic conditions. Delineate the existing 100- and 500-year floodplain.

E. Culvert Design

1. A design HEC-RAS model will be prepared by modifying the baseline model to include the proposed roadway. The culvert design will be provided using the fully developed conditions hydrologic data and roadway data coordinated with transportation roadway design.
2. Up to three culvert design alternatives will be modeled through the HEC-RAS model. If additional culvert designs or roadway modifications are necessary and additional hydraulic modeling is required, that effort will be provided through additional services after approval by the City.

F. Flood Study Report

1. One flood study report will be prepared to describe the hydrologic and hydraulic analysis. The study report will provide calculated peak discharges, water surface elevations and floodplain delineations.
2. Jacobs will provide floodplain maps that show calculated 100- and 500-year floodplains for existing watershed development conditions and the 100-year floodplain for fully developed watershed conditions.
3. A City of Fort Worth Floodplain Development Permit (FDP) application will be provided with the flood study report, which will include the required exhibits and maps.

G. Meetings

1. This scope of services includes two (2) meetings with the City to coordinate, explain, and/or justify the hydrologic and hydraulic analysis. Meeting duration is assumed to be less than two (2) hours per meeting.
2. This scope of services assumes a maximum of twenty (20) hours for coordination with the client.

II. LOMR

1. Upon completion of the project, a LOMR will be prepared and submitted to revise the FEMA 100-year floodplain for the unnamed tributary to Stream WB-1. The LOMR submittal will include one design report, maps, exhibits and FEMA forms.
2. The LOMR request will be submitted to the City of Fort Worth for review and approval. The City of Fort Worth will submit the requests to FEMA.
3. The required FEMA review fee is the responsibility of the Client. Currently, the review fee this type of LOMR is \$4,800. A check for \$4,800 payable to "National Flood Insurance Program" will be required prior to submittal to FEMA. This scope of services assumes one LOMR.
4. Coordination of the submittals with the client, City of Fort Worth, FEMA and FEMA contractor assumes a maximum of twenty (20) hours. If additional submittals or coordination are required that will be provided as additional services after approval by the client.

III. STORM DRAIN ANALYSIS & DESIGN

1. The YMCA site near Statesman Dr has no on-site underground storm drainage evident based on our research and field reconnaissance. This runoff appears to all enter the North Beach Street ROW and flows into the intersection. Jacobs will as part of this SA 1 analyze this situation and present findings to the City.
 - a. Check inlet and pipe capacity of system collecting runoff from YMCA
 - b. Check runoff flowing from YMCA driveway onto northbound lanes for street capacity of northbound lanes.
 - c. If the runoff from the YMCA site does require additional storm drain facility design and the scope of that work is agreeable by the City, Jacobs will submit a separate proposal for the additional design work at that time.
2. Recalculate current design of storm drain system along north- and southbound lanes between Heritage Glen and Heritage Trace, using City standard tabulation methodology.
3. Recalculate current design of storm drain system along northbound lanes between Alta Vista and Vista Meadows, using City standard tabulation methodology.
 - a. Redesign pipe connecting privately-owned inlets on Fellowship of the Parks church site to the proposed pipe.
 - b. Analyze 60" outfall pipe inform Heritage Addition for capacity.
 - c. Analyze storm drain runoff from Fellowship of the Parks church site) to check for overflow into northbound lanes of North Beach Street.

ASSUMPTIONS

1. Hydraulic modeling will be performed only within the limits as described in this scope of services. Should modeling be required on other waterways they will be accomplished as Additional Services, after approval by the Client.
2. Any additional work not specifically included in the above scope of services will be accomplished as Additional Services, after approval by the Client.
3. This scope of services does not include preparation or submittal of a Conditional Letter of Map Revision (CLOMR).
4. If additional meetings or additional meeting duration are required, they will be performed as additional services.
5. This study does not include coordination for a 404 Permit through the USCOE.