Appendix D
Geotechnical Engineering

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1 EXISTING CONDITIONS

1.1 PROJECT LOCATION AND HISTORY

The study area consisting of 5,930-acre (9.3 square mile) upper River Des Peres watershed, located in eastern Missouri just to the west of the City of Saint Louis. The watershed contains approximately 11 miles (17 km) of streams. Refer to Appendix C – Civil Engineering for additional details on location, history, and survey data currently being utilized.
This appendix provides information on the geotechnical engineering aspects of the project features.

1.2 EXISTING FEATURES

The existing project area does not have any flood control measures, such as levees, berms, floodwalls, detention basins, etc. The Non-Federal Sponsor, University City, does have an existing partial flood warning system that was installed in 2018.

2 MEASURES

2.1 DETENTION BASINS 3 & 4

The TSP does not currently contain any detention basin (DB) features. However, the Project Delivery Team (PDT) will consider adding DB3 and/or DB4 to the TSP as a refinement that may optimize annual net benefits. Therefore these detention basins will be carried forward for further analysis in the study. Refer to the main report and Appendix C – Civil Engineering for additional details on each detention basin alternative.

2.2 SUBSURFACE DATA

There was no subsurface data available for review within the project site.

Additional subsurface exploration will need to be obtained during preconstruction engineering and design (PED) for all modification features. The additional exploration should consist of Standard Penetration Test (SPT), auger borings with undisturbed samplings, and laboratory testing to characterize the subsurface conditions for each modification feature. The subsurface investigation is needed for the design of detention basins, weir control structures, levees, floodwalls or other water flood control features to be constructed.

The locations of the borings will be finalized when each feature location is finalized. It is assumed that a minimum of one boring will be needed for each feature or structure with significant loading. Testing will vary for each structure, but at a minimum testing will include soil classifications (sieve and atterberg limits), moisture contents, as well as UU triaxial strength testing and consolidation testing under structures with significant loading. All testing will follow the appropriate ASTMs.

Borings will also be needed throughout the basin area(s) to verify suitability of materials, testing will include soil classifications (sieve and atterberg limits) and moisture contents.

After appropriate subsurface information is obtained, the foundation for each concrete weir control structure and containment levees will be designed via geotechnical analyses. The basin bottom elevations will also be verified based on subsurface data.

2.3 SURVEYING

Post- exploration surveying will need to be completed at each boring location.

2.4 GENERAL DESIGN INFORMATION

Geotechnical will coordinate with and provide soil material properties to the structural engineer for control structure shallow or deep foundation design. Geotechnical will coordinate all cross-section limitations and elevations for the basins and containment levees to the civil engineer. Analyses will include settlement, seepage, and stability as appropriate per each feature to meet the needs of the project and USACE criteria.

3 BORROW

All borrow is anticipated to come from onsite material. Excavated material from the basin will be used for embankment material.

Material classification of borrow material could influence the design and slopes of the levee containment modifications.