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WASHINGTON, DC 20310-2600

Proposed Interim Report

DAEN

SUBJECT: Buffalo Bayou and Tributaries Resiliency Study, Harris County, Texas, Flood Risk Management

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my interim report on flood risk management recommendations for the Buffalo Bayou and Tributaries Resiliency Study (BBTRS), Harris County, Texas. It is accompanied by the Report of Findings of the U.S. Army Corps of Engineers (USACE) Galveston District Engineer. The study is being conducted under the authorities of Section 216 of the Rivers and Harbors Act of 1970 (33 U.S.C. § 549a), the 2018 Bipartisan Budget Act (BBA-18; Pub. L. 115-123, Division B, Subdivision 1, Title IV), and Section 1221 of the 2024 Water Resources Development Act (Pub. L. 118-272). Section 216 authorizes the Secretary of the Army, acting through the Chief of Engineers, to review the operation of projects for which construction has been completed and which were constructed by the U.S. Army Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes when found advisable due to significantly changed physical or economic conditions, and to recommend to Congress on the advisability of modifying the structures or their operations and for improving the quality of the environment in the overall public interest. Investigation work was subsequently initiated under the Bipartisan Budget Act. This study is an interim response to the Section 1221 authorization.

This interim report is being submitted to Congress pursuant to Section 1221 of the Water Resources Development Act of 2024 (WRDA 2024), which directs the Chief of Engineers to expedite completion of the Buffalo Bayou Tributaries and Resiliency Study, Texas, carried out pursuant to title IV of the Bipartisan Budget Act of 2018. Section 1221 directs that the final report of the Chief of Engineers shall contain recommendations for projects that: (a) align with community objectives; (b) avoid or minimize adverse effects on the environment and community; (c) promote the resiliency of infrastructure and (d) shall be delivered to the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Environment and Public Works of the Senate no later than December 31, 2025.

The Report of Findings for BBTRS examines the original project, including two Federal projects, Addicks and Barker Dams, authorized and constructed under the Rivers and Harbors Act of 1938. The Flood Protection Plan for Buffalo Bayou was developed in 1940 in response to damaging floods that impacted Harris County, which includes the

City of Houston, in 1929 and 1935. The plan included the construction of the Addicks and Barker Dams, which were completed later that decade; however, other major components of the project were never built including: (a) White Oak Reservoir; (b) 25-mile North Canal; (c) 25-mile South Canal; (d) Cypress Creek Levee; and (e) 2-mile Brickhouse Gully Bypass Channel. The Cypress Creek Levee was a component above the reservoir that would have helped reduce inflows into Addicks reservoir; the South Canal would have routed reservoir discharges and downstream Buffalo Bayou flows around highly developed areas of downtown Houston and the Port of Houston. Components of the Flood Protection Plan that were constructed include the Addicks and Barker Dams along with 7.4 miles of channel modifications immediately downstream of the dams. The Flood Control Act of 1954 (FCA54) authorized channel enlargement of the remaining 21.9 miles of Buffalo Bayou but was not constructed following public opposition in 1971.

2. The BBA18 BBTRS was initiated in response to several recent flood events in the Houston metro area including Hurricane Harvey, which struck Texas in August 2017 resulting in flood conditions throughout Harris and surrounding counties, including upstream and downstream of Addicks and Barker Dams. Pool levels exceeded government owned land above both dams for more than 10 days. Hurricane Harvey was ultimately one of the costliest tropical storm events in U.S. history, with an estimated $160 billion in damages across the state of Texas, and 36 storm related deaths in Harris County. Hurricane Harvey and Hurricanes Irma and Maria, which also struck the United States in 2017, led to the passage of BBA18, which authorized investigations and funded construction projects to address disaster recovery in the affected states and territories.

3. The purpose of the BBTRS is to identify and analyze comprehensive plans that efficiently and effectively reduce the residual flood risk in Harris County, Texas, along Buffalo Bayou and its tributaries. The residual flood risk is a combination of the rainfall, flooding, performance of existing flood risk management features such as Addicks and Barker Reservoirs, and the consequences of the flooding in the form of damages to public and private property, critical infrastructure and/or impacts to human well-being. The study focuses on addressing residual flood risk of catastrophic storm events in the project area that remain following the construction and ongoing operation and maintenance of Addicks and Barker Dams. Urbanization and the increased frequency of large-scale rainfall events are driving factors in the residual flood risk. Addicks and Barker Dams perform well at reducing the flood risk for small and more frequent flood events. However, recent large-scale events have demonstrated that significant residual flood risk remains both adjacent to the Addicks and Barker reservoir pools and downstream of the reservoirs on the Buffalo Bayou main stem.

4. As part of the BBA-18 BBTRS efforts, USACE and the non-federal partner, Harris County Flood Control District (HCFCD), hosted five public scoping meetings between April 30 and May 9, 2019. Through these meetings, brief problem statements and

planning objectives were developed and used to guide the identification and evaluation of potential solutions. Public feedback was also obtained through the release of an interim report of findings in October 2020, which served as a mid-point technical document for public review prior to recommending a tentatively selected plan and the official release of a draft feasibility report and environmental impact statement (EIS). Study cost increases and funding shortfalls delayed the development and release of a draft feasibility report. Feasibility study work was suspended in December of 2023 pending an additional exception to the Section 1001 study time limits, which was granted in July of 2025.

5. Several potential structural and nonstructural alternatives have been investigated that could reduce residual flood risk throughout the study area of Harris County along Buffalo Bayou and its tributaries. To address study objectives related to reducing residual flood risk, alternative plans considered combinations of measures that would: (a) increase system storage via new reservoirs, detention storage, or excavation in Addicks and Barker reservoirs; (b) increase conveyance with new tunnels or by increasing capacity in existing channels; (c) divert water away from the reservoirs and Buffalo Bayou; (d) increase the structural reliability of the dams; (e) use nonstructural measures to reduce exposure or vulnerability of people, homes and property. The Galveston District's Report of Findings documents plan formulation and evaluation efforts, and consideration of the criteria set forth in Section 1221 of WRDA 2024, which screened several of the measures and combinations, resulting in a final array of flood risk management alternatives. The final array of alternatives from the Report of Findings were:

a. No Action
b. Non-Structural Measures – Downstream Buyouts
c. Channel Improvement on Buffalo Bayou
d. Tunnel from Addicks and Barker to Houston Ship Channel

Other alternatives, related specifically to the dams, which were considered in the Report of Findings, include the buyout of existing structures within the reservoir flood pools and the armoring of the emergency spillways in order to bring life safety risks within tolerable risk guidelines.

6. The Galveston District Report of Findings presents four findings and associated recommendations: (1) complete a 35% design of the tunnel system and complete necessary environmental and coordination requirements, including public comment; (2) completion of a dam safety modification study; (3) updated Water Control Manuals for Addicks and Barker Dams; and (4) authorization to acquire additional real estate interests upstream of the dams. I concur with the Galveston District's recommendations (2) and (3), subject to the below modifications. At this time, the appropriate analyses, technical review, and environmental and public reviews have not been conducted to recommend design of only one specific alternative. Additionally, due to pending

litigation, the ongoing study process, the opposition of the non-federal sponsor, and other considerations, it is not possible to determine the nature, extent, or cost of upstream acquisitions that may be necessary or appropriate. Accordingly, I recommend the Galveston District further analyze real estate interests or relocations that may be necessary or appropriate due to changed conditions. To note, none of the potential actions are currently identified as the National Economic Development (NED) Plan or an actionable recommendation because the analysis to determine a NED plan has not yet been completed.

a. Increase Conveyance – I recommend that the Corps further study the alternatives, which should include completing necessary environmental reviews and coordination requirements. I recommend the Corps complete a 35% design of the tunnel system and/or any other preferred flood risk reduction alternative as a part of the feasibility report to determine an actionable recommendation that is consistent with the criteria set forth in Section 1221(b) of WRDA 2024. This continued study effort would include the necessary technical, environmental, and public reviews, and produce a BBTRS feasibility report and accompanying National Environmental Policy Act (NEPA) document. This report will provide greater confidence in estimated costs, benefits, and environmental impacts to inform a construction investment decision. A BBTRS feasibility report would be expected to culminate in a future Chief's Report with a certified project cost.

Given the analysis thus far, the tunnel alternative is the preferred alternative of HCFCD and the Galveston District Engineer, as identified in the Report of Findings. It would increase emergency operations capabilities, allowing combined releases of up to 15,000 cubic feet per second (cfs) out of Addicks and Barker reservoirs, while reducing the duration and extent of upstream flooding. It is estimated to reduce the risk of reservoir induced flooding upstream of the Addicks and Barker Reservoirs by 73% (Addicks) and 100% (Barker) in a 0.2% projected AEP event and reduce flood impacts on structures in the Buffalo Bayou watershed by 46% in a 1% projected AEP event. It is important to note that, even at their maximized use, flood conveyance tunnels will not fully eliminate residual flood risk. The tunnel alternative would be estimated to reduce average annual damages to structures in the floodplain by $137,000,000, which is about 27% of the without project average annual damages in the Buffalo Bayou watershed; meaning an estimated $379,000,000 in average annual damages would remain in the study area. The preliminary estimated benefit to cost ratio for the tunnel system is 0.4.

b. Dam Safety – I recommend USACE complete a Dam Safety Modification Study (DSMS) at Addicks and Barker dams and propose recommendations to address flood risk in accordance with USACE Dam Safety Program guidelines. The DSMS recommendations shall complement the BBTRS feasibility report, EIS and subsequent Chief's Report recommendations described in paragraph 6.a.

c. Water Control Manual – I recommend that USACE analyze potential revisions to the Water Control Manual and reanalyze the induced surcharge plan to optimize use of available storage upstream and downstream of the Addicks and Barker Dams. USACE may examine potential opportunities for updates to the existing Water Control Manual to determine if any benefits to upstream and downstream risks may be achieved.

d. Upstream Acquisition – I recommend that any feasibility report address the real estate interests that USACE finds are required due to changed circumstances along the Buffalo Bayou and its tributaries and recommend that the report identify the cost-sharing requirements for such acquisitions. USACE emphasizes that it has not identified any specific acquisition alternative at this time, and further analysis is needed. Accordingly, I do not agree with the Galveston District’s upstream acquisition recommendation, nor with any inference that might be drawn from the Report of Findings suggesting that specific upstream acquisitions are required by law or policy.

7. The Harris County Flood Control District would be the non-federal cost sharing sponsor for any potential actions identified in paragraph 6.a. This report acknowledges and relies upon the non-federal sponsor’s additional floodplain management responsibilities and emergency response actions in conjunction with the State of Texas and the Federal Emergency Management Agency related programs to mitigate the plan’s residual risk, including potential life loss and damages to critical infrastructure. The costs of further study would be shared (50 / 50) in accordance with Section 105 of WRDA 1986, as amended, unless otherwise directed by Congress.

8. Further, the recommendations in paragraph 6.a should be completed before seeking a project construction authorization. This interim Chief’s Report presents the analysis completed thus far for transmittal to Congress, pursuant to Section 1221 of WRDA 2024.

9. This interim Chiefs Report does not recommend a project for authorization. A project could only be constructed if the analyses required by Army Civil Works policies and applicable laws, including completion of environmental reviews in accordance with the NEPA and other relevant environmental laws, are completed. This interim Chief of Engineers' report for the project recommends further feasibility-level planning and design work. Therefore, this report falls within the scope of the NEPA categorical exclusion outlined in 33 CFR 230.9(d).

10. The Washington level review determined that the Report of Findings was not formulated and evaluated in accordance with certain USACE Civil Works planning procedures and policies. USACE policies indicate that no project should be recommended for authorization for construction until the appropriate environmental compliance (NEPA, Clean Air Act, Clean Water Act, Coastal Zone Management Act, Endangered Species Act, Fish and Wildlife Coordination Act, Magnuson-Stevens Fishery Conservation & Management Act, Migratory Bird Treaty Act, National Historic

Preservation Act) has been performed and appropriate reviews have been conducted – to include Agency Technical Review and Independent External Peer Review. However, the Report of Findings is not a feasibility report and does not recommend an alternative for construction. The Report of Findings simply summarizes the analysis the Galveston District has completed to date in an attempt to comply with Section 1221 of WRDA 2024. The views of interested parties, including federal, state, and local agencies, will be considered and all comments from public reviews will be addressed and incorporated into the future feasibility report documents where appropriate. Previous public feedback indicates continued strong opposition to Buffalo Bayou channel modifications and removal of the remaining riparian habitat, views that are consistent with the 1971 public opposition to the 21.9 miles of Buffalo Bayou channel enlargement authorized in the FCA54, referenced in Paragraph 1. USACE will continue to obtain views of interested parties, including the public on alternatives considered in the BBTRS, as the study progresses.

11. Given the feasibility study is not complete, and the Report of Findings was not completed in accordance with USACE policies and procedures for feasibility reports and does not yet have the environmental documentation that would be necessary to recommend an alternative for construction, the recommendations in this report are interim in nature. Further analysis is recommended and will be undertaken prior to any recommendation for authorization or construction, to include compliance with all applicable laws, regulations, and policies, including Section 1221(b) of WRDA 2024.

12. The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program or the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before it is transmitted to the Congress. However, prior to transmittal to Congress, the non-federal sponsor, interested federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

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Chief of Engineers