HARRIS COUNTY FLOOD CONTROL DISTRICT
HCFCD.ORG
9900 Northwest Freeway
Houston, Texas 77092
346-286-4000

November 20, 2020

Col. Timothy R. Vail
Galveston District Commander
U.S Army Corps of Engineers
2000 Fort Point Road
Galveston, Texas 77550

Reference: Buffalo Bayou and Tributaries Resiliency Study Interim Feasibility Report (October 2020)
Harris County Flood Control District Public Comments

Dear Colonel Vail:

The Harris County Flood Control District (District) commends the U.S. Army Corps of Engineers (Corps) for releasing the Buffalo Bayou and Tributaries Resiliency Study Interim Feasibility Report (Interim Report) for public review before issuing a Draft Feasibility Report, as well as providing the public additional time to provide comments on the Interim Report. We also appreciate the additional effort that went into re-engaging the public and hosting four well-attended virtual public meetings under the pandemic circumstances we face today.

The themes that were voiced during the public comment period reflect the numerous and diverse interests of stakeholders within the watersheds of the Interim Report study area. Moving forward, it is the District's goal to work with the Corps to identify a plan that is consistent with our mission of aligning effective projects with community and natural values. Because feedback on the Interim Report indicates widespread opposition to several of the concepts and scales of the current array of alternatives as presented to date, the District supports a strategy to engage stakeholders before a Draft Feasibility Report is produced for public review next year. Without further engagement before a recommendation is made, we believe it will be very difficult to garner the level of public and political support that will be needed for potential projects of the magnitude discussed in the Interim Report to move forward. We do share some of the same questions and observations made by the public regarding screened measures, and we are hopeful that additional engagement will allow a deeper dive into those questions to ensure that alternatives or measures are not prematurely ruled out. We have also received and reviewed comments from the Houston Stronger coalition and others which we feel make compelling points, and as a result, we respectfully request that all measures and alternatives be preserved at this time such that a collaborative process of continued alternative refinement can occur while models proceed through the quality control process.

This letter, including the general comments below and the attached detailed comments, are provided for inclusion in the public scoping report.

1. While the District has shared a wealth of information and findings from our past and present studies related to the Interim Report study area, this information seems to have had little bearing on the analysis and conclusions that are presented in the Interim Report. Many comments and questions that we received during the public comment period refer to significant differences in the information that the District has shared with the Corps and the preliminary findings in the Interim Report. We would be glad to re-visit the information we provided to you as the Corps prepares responses to explain the differences.

2. The District is developing technical comments on the hydrologic and hydraulic models and associated economic evaluations used by the Corps to reach the preliminary results presented in the Interim Report. However, we note that the Interim Report presents benefits only in terms of annualized monetary values. Water surface elevation reductions, numbers of structures benefitted, and the locations of benefits are curiously absent in the main report. This information is needed to gauge the reasonableness of model outputs as well as to inform the public of where the various alternative benefits are located within the vast study area. This information will hopefully become more evident when technical appendices are released with the Draft Feasibility Report, but it should also be summarized in the main report for convenience and clarity. Additionally, the District's own studies and familiarity with the Buffalo Bayou watershed suggest some cost estimates should be revisited. In particular, we believe the Interim Report overestimates stormwater tunnel costs and underestimates costs, both environmental and economic, of large-scale conveyance improvements to Buffalo Bayou.

3. Alternatives presented in the Interim Report range in cost from $1.0 billion to $13.1 billion. Absent additional congressional authorization, a non-federal sponsor will likely need to bear 35% to 50% of the overall project cost, which ranges from $350 million to $6.55 billion. By contrast, the District's 2018 Bond Program makes available $2.5 billion in funds for projects across all 22 watersheds in Harris County, many of which experience frequent flooding at lesser rainfall events than those considered in the Interim Report. Additionally, there is no specific allocation in the 2018 Bond Program funds for any of the projects that are being evaluated as part of the Interim Report effort. We also anticipate a significant funding challenge at the federal level given the very low benefit-cost ratios of the structural alternatives. However, smaller scales of the alternatives could be more affordable and acceptable to the public, and as a result, are more likely to be funded and implemented. These variations, both for structural and nonstructural alternatives, warrant more attention moving forward.

4. The District recommends that the full array of alternatives be consistently evaluated for environmental impacts, both beneficial and adverse. For example, we see opportunities for habitat restoration associated with the Addicks and Barker excavations alternative similar to the potential benefits identified for the Cypress Creek Dam and Reservoir that would not be offset by the adverse environmental consequences of building a new dam. The District is also concerned the environmental impacts associated with the Buffalo Bayou channel improvement alternative are underestimated, especially given the history of community support for bayou preservation and the new round of public comments confirming that this community value has not changed. Additional clarification and analyses are needed to adequately address the revegetation and restoration of the Buffalo Bayou riparian corridor following proposed channel improvements because native woody species could not be planted in the articulated concrete block channel lining that is described for this alternative. We sincerely believe that upon closer environmental inspection and right-of-way evaluation, coupled with consideration of the renewed public opposition, this alternative as presented will not be deemed plausible.

5. The Interim Report acknowledges a potential nonstructural measure to modify water control operations at the existing reservoirs and update the reservoirs' Water Control Manual. Unfortunately, the report does not explore how existing reservoir operations could be modified in the absence of a new project, nor does it explain what operational changes would be considered for implementation in conjunction with a new project. The District encourages more thorough evaluation of operational changes at the existing reservoirs, as other structural and nonstructural alternatives will take many years to implement at significant cost. Operational changes could reduce the scale of alternatives necessary to achieve the desired level of resilience. Plus, modified operations alone could reduce flood risks and mitigate erosion and slope failures along Buffalo Bayou downstream of the reservoirs, both of which are problems that the study aims to address.

6. Regarding additional property acquisition upstream of the reservoirs, we understand that current Corps policy would potentially require a non-federal sponsor to cost-share and acquire real estate for any alternative other than a Dam Safety alternative. However, we find it interesting that the District would be asked to participate in the acquisition process to expand the footprint of a federal asset. Over the lifetime of the reservoirs, the Corps has owned, operated and maintained these facilities, and asking a non-federal sponsor to now co-mingle ownership responsibility with the Corps seems counterintuitive. While the District supports property acquisitions where it makes sense to do so, we need to more fully understand why the Corps feels it is our responsibility to participate financially should this alternative move forward.

We understand and appreciate the difficulties associated with proposing improvements to the Addicks and Barker Reservoirs and associated drainage system that, for so many years and rainfall events, have protected our community. It took a Harvey event, where rainfall was measured in feet instead of inches, to illustrate the reality of damages possible within the reservoir system due in large part to past decisions, funding limitations, and changes to our environment. Strong public opinion, limited options, and the magnitude of infrastructure needed to make a measurable difference are stark realities that must be accepted as part of this historic evaluation. That said, we feel taking an approach that focuses on working with the public to define their expectations regarding resiliency, scaling and combining alternatives appropriately, and incorporating nature based solutions that promote multiple benefits within these large footprint opportunities create the best recipe for success.

Sincerely, DocuSigned by: Russell A Poppe 4BD1C2EDFD264B7...

Russell A. Poppe, P.E.
Executive Director

cc: Brian Harper
Andrew Weber
Ian Hudson

**Harris County Flood Control District Comments**
**Buffalo Bayou and Tributaries Resiliency Study (BBTRS) Interim Report (October 2020)**

| No. | Section | PDF Page | Comment |
|---|---|---|---|
| 1 | Cover | 1 | The photo shown on the cover of the report shows a submerged Buffalo Bayou, not Interstate 10. Photo is near the Studemont/Montrose bridge looking downstream. Please update caption to accurately describe the photo. |
| 2 | Executive Summary (ES) | 8 | It is stated that the old outlet structures had a combined maximum design discharge of 16,630 cubic feet per second (CFS), and that discharge for the new outlet structures will not exceed the previous maximum discharge. However, 15,000 CFS is a target conveyance capacity cited throughout the rest of the report. Please explain this difference. |
| 3 | ES Table 1 | 10 | Please clarify to what source the "old version" of precipitation-frequency values refers. |
| 4 | ES Table 2 | 10 | Please clarify where on Buffalo Bayou stage elevations in this Table were observed. |
| 5 | ES | 11 | It is recommended that Addicks Reservoir, Barker Reservoir, and Buffalo Bayou watersheds be listed first under "Study Scope" since these watersheds are the focus of the study, as stated below the list. Comment also applies in Section 1.3.1. |
| 6 | ES | 12 | Please explain how 2019 public scoping comments were considered and incorporated. |
| 7 | ES | 13 | Under "Problems," please explain how land subsidence lowering the spillway elevations is a problem. Has subsidence been uniform across the entire area, or has there been differential subsidence? This comment applies to multiple sections of the report. |
| 8 | ES | 13 | Under "Objectives and Constraints," please explain why the period of analysis starts in 2036 and also explain what is meant by "recovery" in the third objective. This could be interpreted as post-disaster aid, for example, which is not an objective of the study. |
| 9 | ES | 14 | Under "Plan Formulation," please include "environmental impacts" with "required mitigation" or "cultural impacts." Environmental impacts are among the most important decision criteria, along with incorporating public comment. |
| 10 | ES | 14 | Under "Alternative Plans," please re-write the second sentence to make more sense. Suggested language: "Generally, alternatives consider each of the following either as singular actions or taken in combination with one or more of the following alternatives." |
| 11 | ES | 14 | Under "Alternative Plans," it should be noted that inter-watershed diversions could violate the planning constraint of transferring flood risks. Diversions are noted as "prohibitively expensive," but Table 3 shows that they are less expensive than other alternatives. There is also inconsistent discussion in this section as to whether diversions are technically feasible. |

**Harris County Flood Control District Comments**
**Buffalo Bayou and Tributaries Resiliency Study (BBTRS) Interim Report (October 2020)**

| No. | Section | PDF Page | Comment |
|---|---|---|---|
| 12 | ES Table 3 | 15 | If Alternative 1 (No Action) must be carried forward like Alternative 7 (Nonstructural), please note. |
| 13 | ES Table 3 | 15 | "Added measures" and the "focused array" need to be defined before being introduced in this table. |
| 14 | ES Table 3 | 15 | At minimum, environmental impacts to the native Katy Prairie should be a note associated with Alternative 2 (Cypress Creek Dam and Reservoir). |
| 15 | ES Table 3 | 15 | Please explain what is meant by Alternative 3 (Addicks and Barker Reservoir Excavations) providing "only localized benefits." Just because benefits are localized does not mean they are not significant, as there are thousands of structures within the flood pools of the reservoirs. Additional storage provided directly within the reservoirs is more effective than storage provided within a Cypress Creek reservoir as 100 percent of the volume created goes towards benefitting Addicks and Barker reservoirs, whereas only a portion of the volume captured by a Cypress Creek Reservoir would be “removed” from the Addicks Reservoir. Additionally the Corps should consider leaving some of the excavated material on-site, creating multiple mountains or hills above flood pool elevations, to help cut down on haul costs. An example of this approach used on another Corps project is the Hill at Sims. |
| 16 | ES Table 3 | 15 | Please explain the reasoning behind the scales of Alternative 4 (Tunnels at 20,000 CFS) and Alternative 6 (Buffalo Bayou Channel Improvements at 15,000 CFS). Alternative 4 is a significantly larger-scale alternative when the existing capacity of Buffalo Bayou is taken into account. It does not appear that an equal comparison (design capacity, level of cost estimate, hydraulic modeling) of these conveyance alternatives were performed and, as a result, tunnels may have been prematurely eliminated from evaluation. Additionally, there does not appear to have been consideration of avoiding impacts which would be associated with a Buffalo Bayou channel conveyance improvement alternative in the decision to drop the tunnel alternative from further consideration. Tunnel benefits should also be evaluated against a ratcheting effect from multiple smaller storms as experienced in the 1992 pool of record event. |
| 17 | ES Table 3 | 15 | Were alternative tunnel inlet/outlet locations considered? Varying the length of the tunnel and inlet/outlet locations may generate additional data points for analysis of tunnel benefits and costs. We feel there is additional opportunity to further value engineer this alternative to maintain or increase benefits while reducing costs. We also believe the tunnel alternative and appropriately scaled, strategically located channel improvements should not be considered mutually exclusive of one another. |

**Harris County Flood Control District Comments**
**Buffalo Bayou and Tributaries Resiliency Study (BBTRS) Interim Report (October 2020)**

| No. | Section | PDF Page | Comment |
|---|---|---|---|
| 18 | ES Table 3 | 15 | The tunnel cost is shown as $6.5B to $12B. This is significantly higher than estimates prepared during the District's Phase 1 tunnel study based on the length and diameter. Based on the cost estimates prepared during the Phase 1 study, a tunnel capable of conveying 10,000 cfs from the reservoirs to the Houston Ship Channel would cost $3 to $3.5 billion including bond, engineering design, construction management, real estate, mobilization and a 50 percent contingency. |
| 19 | ES Table 3 | 15 | The residual impacts of structural and nonstructural plans that would allow a combined discharge of 15,000 CFS to Buffalo Bayou need further consideration and discussion in the report. What would the residual structural flooding be? How would bridges and roadways be impacted by this magnitude of discharge and/or channel enlargement? Under the nonstructural alternative, would erosion issues get worse? Would there be downstream impacts in the Downtown area? |
| 20 | ES Table 3 | 15 | "Alternative 7: Nonstructural" should be re-named Nonstructural (Downstream) so as to avoid confusion with the upstream land acquisition for system operations that is presented separately. This comment applies throughout the report. |
| 21 | ES | 17 | The terms "ancillary measure" and "anchor measure" need to be defined before they are introduced under "Revised Array of Alternatives." Throughout the report, it is difficult to differentiate costs and benefits that are attributable to anchor measures, versus combinations of anchor measures and ancillary measures. |
| 22 | ES Table 4 | 17 | This table is generally hard to understand. There are also new measures introduced that have not been explained (e.g. North Canal and Cane Island Branch Channel Improvements). |
| 23 | ES | 18 | Under "Alternative Plan 2: Cypress Creek Dam and Reservoir," please elaborate on the emergency operations schedule that was developed for this alternative. Also clarify whether the "downstream control point" is physical or simply a stream gage and whether costs include environmental mitigation costs. Please summarize benefits of this alternative and clarify how much benefit the ancillary measures provide for the additional cost. |
| 24 | ES Table 5 | 18 | Please clarify what is meant by 392 feet of "Footprint/Right of Way." |
| 25 | ES | 18 | It is not clear as to why 15,000 cfs (or alternatively 6,000 cfs for the Cha1 measure) was selected as the design flow for the Buffalo Bayou Channel Improvements alternative, and there is no discussion of context within the reservoir release capacity and gate operations coupled with runoff generated downstream of the reservoirs when measured at Piney Point. It appears that channel improvement measures were arrived at arbitrarily and did not aim to maximize defined project metrics in line with the objectives of the study. Additionally, what are assumed costs for stream habitat loss associated with deepening the bayou 11-12 feet?; How many acres of land would have to be acquired for this alternative, at what cost? How many parcels and/or structures? Please also summarize benefits of this alternative. |

**Harris County Flood Control District Comments**
**Buffalo Bayou and Tributaries Resiliency Study (BBTRS) Interim Report (October 2020)**

| No. | Section | PDF Page | Comment |
|---|---|---|---|
| 26 | ES | 18 | There is limited discussion or documentation on sedimentation, erosion, environmental, right-of-way and other implications associated with the Buffalo Bayou Channel Improvements alternative. The use of ACBs was identified as a component which could increase channel slope stability, but there does not appear to be any slope stability analysis to look at various failure modes associated with the proposed configuration. Please provide additional documentation on slope stability and scour potential created due to high shear stresses within the incised channel. 4:1 side slopes may not be possible along the entire project. |
| 27 | ES | 19 | Please summarize the benefits of Alternative 7 (Downstream Nonstructural) and Alternative 8 (Buffalo Bayou Conveyance and Cypress Creek Dam and Reservoir). |
| 28 | ES | 19 | Under "Structural Alternatives," Alternative 6 (Buffalo Bayou Channel Improvements) is purported to have the strongest benefit cost ratio (BCR) of the structural alternatives; however, there is no preceding discussion of benefits to support that claim. |
| 29 | ES | 19-20 | Under "Structural Alternatives" and in Table 7, we suggest presenting Life Safety benefits as an overall percent reduction of risk. Presenting specific numbers of lives and day/night scenarios introduces several questions that are not answered by the report. |
| 30 | ES Table 7 | 20 | Please define Mitigation Acres in this Table and explain why the value for Alternative 8 is not additive. |
| 31 | ES | 21-22 | Please add inundation maps to complement Figures 3 and 4, which by themselves are hard to understand. Differences between the hydrographs look small because of the scale used in the graph, but they are not. |
| 32 | ES | 24 | "Real Estate Requirements for Systems Operations" comes across as an afterthought by being presented separately from other alternatives. Why is it not included in the initial and final alternative arrays? |
| 33 | ES | 25 | The narrative below Figure 5 refers to spillway crest elevations that are not depicted in the Figure. Please update this section with content that was developed for the public information sessions to avoid confusion on this topic. Also please clarify if a structural project is identified that would reduce the need for upstream acquisitions, could those cost savings count toward benefits achieved? |
| 34 | 1.0 | 37 | In the first paragraph under "General Information," please correct the date of the FCSA execution to 10 October 2018. |
| 35 | 1.0 | 37 | In the third paragraph under "General Information," please note that the local sponsor may cost share between 35 and 50 percent of the project cost. |
| 36 | 1.0 | 37 | In the third paragraph under "General Information," please clarify that "specifically authorized" refers to authorization provided by Congress. |
| 37 | 1.1 Figure 3 | 43 | Please explain whether the 100-yr and 500-yr hydrographs in this Figure represent runoff downstream of the reservoirs with the gates closed, followed by a controlled release of 2,000 CFS. The Harvey 2017 and Tax Day 2016 events had different operational conditions. |

**Harris County Flood Control District Comments**
**Buffalo Bayou and Tributaries Resiliency Study (BBTRS) Interim Report (October 2020)**

| No. | Section | PDF Page | Comment |
|---|---|---|---|
| 38 | 1.3.1 | 50 | Under "What Has Changed Since The Dams Were Built," it bears repeating that gates were added over time in response to development downstream of the dams. Please remind reader of when gates were added. |
| 39 | 1.3.2 | 53 | Please explain the District's study role and differentiate study sponsorship from project sponsorship. |
| 40 | 1.3.3 | 53 | Please ensure this is a complete list with proper titles. Texas Congressional District 22 should be included on the list. |
| 41 | 1.5 | 54 | Please expand this list to include all relevant information that the District has shared with the project delivery team. |
| 42 | 2.1.2 Figure 13 | 62 | This Figure does not accurately depict the naturally occurring overflow from Cypress Creek to Addicks Reservoir. |
| 43 | 2.1.2 | 64 | Under "Tides and Mean Higher High Water," please clarify tidal limits by saying that "Buffalo Bayou is tidal through downtown Houston." The City of Houston extends well west of the tidal influence. |
| 44 | 2.7.2 | 72 | Please clarify that most of Harris County Flood Control District's existing right-of-way acreage is upstream of Beltway 8. |
| 45 | 3.0 | 77 | Do Future Without Project conditions account for supplemental criteria that became effective in 2016 for new development in the Upper Cypress, Addicks Reservoir, and Barker Reservoir watersheds within Harris County? Narrative does not suggest so. If not, please update this and other scenarios as applicable to reflect the current District detention and retention criteria that is being enforced for new development. |
| 46 | 3.1.2 Figure 22 | 79 | Please clarify which Figure represents existing and which Figure represents Future Without Project conditions. |
| 47 | 4.0 | 89 | Please clarify whether the Tentatively Selected Plan (TSP) may be a single alternative, a combination of alternatives, and whether the alternatives as presented in the Interim Report are scalable. |
| 48 | 4.1 | 90 | The problem/opportunity of how the existing reservoirs contribute to erosion along Buffalo Bayou deserves more attention here and throughout the report. |
| 49 | 4.2 | 92 | Under "Planning Constraints," please make language absolute - "Plans shall/will avoid increasing flood risk…" |
| 50 | 4.4 | 94 | In the fourth paragraph, please define "lots of flood risk" more specifically. |
| 51 | 4.5.1.1 | 96 | Please confirm whether a non-federal sponsor will be responsible for operation and maintenance of a Cypress Creek Dam under current law and policy. What operational schedule was modeled? If overflow is only "reduced somewhat," how much remains and were ancillary measures to reduce residual risk modeled? |
| 52 | 4.5.1.3 | 100 | Please clarify the flood risk management benefits of this measure (Extending Existing Spillways) and the property acquisitions that would be required. |

**Harris County Flood Control District Comments**
**Buffalo Bayou and Tributaries Resiliency Study (BBTRS) Interim Report (October 2020)**

| No. | Section | PDF Page | Comment |
|---|---|---|---|
| 53 | 4.5.1.4 | 102 | Please clarify the flood risk management benefits of this measure (Raise Embankment) and the property acquisitions that would be required. |
| 54 | 4.5.1.5 | 104 | Please confirm existing capacities of the reservoirs (unit error?). |
| 55 | 4.5.2.2 and 4.5.2.3 | 108-109 | Please clarify the assumed flow capacities for each of the various tunnel options (Reservoir Tunnels and Brazos Tunnels). Again we feel additional cost savings can be realized by optimizing the location of intake structures and balancing tunnel flow against acceptable flow rates within Buffalo Bayou to reduce the required tunnel size and length. |
| 56 | 4.5.2.5 | 111 | Please clarify whether Articulated Concrete Block (ACB) lining would be continuous or limited to areas prone to erosion. ACBs will limit establishment of vegetation other than turf. Also what assumptions were made regarding bridges and the need to replace them with losing over 11 feet of skin friction on the support piers or not being able to pass sufficient flow with the revised cross section? |
| 57 | 4.6.1 Table 23 | 116 | Please clarify the peak flow rates associated with the frequency events in this Table. |
| 58 | 4.6.1 | 117-119 | Please define the limits of Reaches 1, 2, and 3 that are referenced in Tables 24 through 31. |
| 59 | 4.6.2 Table 32 | 122 | Approximately how many structures are impacted upstream of the reservoirs at each of the elevation thresholds listed in this Table? |
| 60 | 4.6.2 | 124 | The terms "parcel" and "tract" are used interchangeably throughout the report, and within this section. Use of one term is suggested. |
| 61 | 4.6.2 Table 34 | 124 | As was done for the public meetings, please round the estimated number of property acquisitions to reflect the level of detail of the analysis. |
| 62 | 4.7 Figure 53 | 126 | Another exhibit was shown during public meetings showing different limits within Addicks Reservoir. Please clarify which scenarios were evaluated and the limits of excavation for each scenario, and if they changed from pervious versions, please explain why. |
| 63 | 4.7 | 127 | Please clarify whether tunnel intake gates would be operated by the Corps or a local sponsor. |
| 64 | 4.7.1 | 127 | Please explain the benefits of this measure (Upper Buffalo Bayou Dam). |
| 65 | 4.7.1.1 | 128 | Please explain the benefits of this measure (Cane Island Branch Channel Improvement) and correct spelling of Stockdick Road. |
| 66 | 4.7.1.2 Figure 58 | 129 | Please confirm that the schematic in this Figure accurately depicts the City of Houston North Canal project. |
| 67 | 4.8 Table 36 | 132 | Please provide commentary that further explains this Table (Initial Array of Alternatives). |
| 68 | 4.8 Table 37 | 133 | We recommend using the term "benefits" rather than "impacts" as the latter may be confused with "adverse impacts." |

**Harris County Flood Control District Comments**
**Buffalo Bayou and Tributaries Resiliency Study (BBTRS) Interim Report (October 2020)**

| No. | Section | PDF Page | Comment |
|---|---|---|---|
| 69 | 4.8 Table 38 | 134 | Suggest titling third column "Screened from further consideration" to avoid confusion. |
| 70 | 4.8.1 | 136 | Are average annualized benefits of Addicks and Barker Reservoir Excavations greater than that of the Cypress Creek Dam and Reservoir? |
| 71 | 4.8.1 | 136 | Environmental impacts of Addicks and Barker Reservoir Excavations appear to be considered more closely than for other alternatives. Each alternative should be given the same level of consideration with respect to environmental impacts. We also believe there are options to mitigate concerns that are cited among the reasons for screening this alternative (e.g. erosion, top soil preservation and re-vegetation as the District successfully accomplishes this task on multiple sites). Additionally, we feel there is an opportunity to further value engineer this alternative by stockpiling material within the reservoirs to create hills which will help limit haul costs. A good example of this approach is on another Corps project - the Hill at Sims. Also please clarify if the groundwater levels are consistent across the reservoirs, whether this is perched groundwater, and if so, are there seasonal variations in the groundwater levels? |
| 72 | 4.8.1 | 138 | Please clarify whether the last sentence under "Alternative 8: Combo Plan" refers to annual costs or annual benefits. |
| 73 | 4.8.2 | 139 | In this section, please clearly state which alternatives were screened out and which moved forward. Additionally, the words "alone" and "only" in the Alternative titles are confusing when the descriptions refer to ancillary measures. |
| 74 | 4.8.4 | 145 | Suggested language: "Table 43 lists the number of mitigation acres that may be required for each alternative plan." |
| 75 | 4.8.5 | 146 | Please see comments regarding Life Safety in Executive Summary. It is also recommended that the last sentence that ties life safety to an additional expense be re-phrased or deleted. |
| 76 | 4.8.5 Figure 65 | 155 | Please update Figure title to clarify whether hydrographs are at Barker Reservoir or Piney Point. |
| 77 | 4.8.5 Table 49 | 155 | Please explain the operational scenario that is assumed for the Future Without Project and Future With Project flows at Piney Point that are listed in this Table. Using a comparison of peak flows at Piney Point is not necessarily an appropriate metric, as some alternatives include increases in channel conveyance at Piney Point. A more appropriate metric would be a comparison of Water Surface Elevations, which could be used as a proxy for comparing relative structural flooding. |
| 78 | 4.8.6 | 156 | Please remind the reader of the added measures that are referenced in this Section. |
| 79 | 4.9 | 160 | Please define IES ("September 2009 - IES Team recommended the classification be changed to DSAC 1.") |
| 80 | 4.9.2 | 168 | Please explain the existing emergency or early warning system and define mobilization rates. Improvements to the existing system need more consideration and discussion in the report. |

**Harris County Flood Control District Comments**
**Buffalo Bayou and Tributaries Resiliency Study (BBTRS) Interim Report (October 2020)**

| No. | Section | PDF Page | Comment |
|---|---|---|---|
| 81 | 4.9.2 | 169 | Please clarify the inundation and operational scenarios that may limit evacuation routes, and which evacuation routes are impacted. |
| 82 | 4.9.2.1 | 170 | Under "Build Seepage Barrier (Cutoff Wall) Inside Existing Spillway," please clarify what is meant by "Depth of wall would be minimal based on subsurface." |
| 83 | 4.9.3 | 172 | Under Alternative 2, please clarify that Dam Removal is a mandatory evaluation. |
| 84 | 4.9.3 | 172 | Under Alternative 5, strike "again" and insert "against." |
| 85 | 4.10 | 175 | Stating the possibility of induced development under "adverse impacts" gives the impression that the Corps is advocating against development. Harris County has among the most stringent development requirements in the country with respect to mitigating induced flood impacts. However, landowners have the right to develop land so long as they do not induce adverse impacts. Land must be acquired by the public (government) for floodplain preservation or other beneficial uses if development is to be legally prevented. |
| 86 | 4.10 | 176 | Were ungated control structures explored as a strategy to minimize the impacts of Alternative 2 (Cypress Creek Dam and Reservoir)? Could a series of multiple, smaller, ungated reservoirs achieve a similar or sufficient benefit? |
| 87 | 4.9 | Mult. | Please define the "Tolerable Risk Guidelines" that are referenced several times throughout the report. |
| 88 | Acronyms and Definitions | 206-210 | Please ensure that the table covers all acronyms and terminology used in the report, and consider moving table to the front of the report. Please also define acronyms upon first introduction in the text. |