REGION 6
DALLAS, TX 75270

April 18, 2024

BY EMAIL

Mr. Charles W. Munce, P.E.
Project Coordinator
GHD Services Inc.
11451 Katy Freeway, Suite 400
Houston, Texas 77079
mailto:charles.munce@ghd.com

Re: San Jacinto River Waste Pits Superfund Site; Notification of Serious Deficiency Pursuant to Paragraph 59 of Administrative Settlement Agreement and Order on Consent for Remedial Design, CERCLA Docket No. 06-02-18

Dear Mr. Munce:

On January 5, 2024, the U.S. Environmental Protection Agency ("EPA") provided notice that the North Impoundment Pre-Final (90%) Remedial Design deliverable ("90% RD") is seriously deficient under paragraph 59 of the Administrative Settlement Agreement and Order on Consent for Remedial Design, CERCLA Docket No. 06-02-18 ("Settlement"). The 90% RD was submitted by Respondents McGinnes Industrial Maintenance Corporation and International Paper Company ("Respondents") pursuant to the Settlement, which provides for implementation of the Remedial Design ("RD") of the EPA-selected remedy for the San Jacinto River Waste Pits Superfund site ("Site").

The EPA's January 5, 2024, letter included as an attachment the Grounds for Issuance of EPA Notification of Serious Deficiency (together with the EPA's January 5, 2024, letter, the "Notice"). The Notice describes the circumstances giving rise to the EPA's determination that the 90% RD is seriously deficient. As described in more detail in the Notice, the 90% RD is seriously deficient because it is not in compliance with the requirements of the Settlement; it is inconsistent with the Site remedy selected by the EPA in the Record of Decision ("ROD") dated October 11, 2017; it failed to include a "complete set of construction drawings and specifications" that are "suitable for procurement" as required by Section 3.6 of the Settlement's Statement of Work ("SOW"); and it is not consistent with EPA guidance as required by the Settlement.

In accordance with the terms of the Settlement, Respondents had a 20-day opportunity to remedy each of the serious deficiencies in the 90% RD specified in the Notice to the satisfaction of EPA, or in the alternative, submit a plan satisfactory to the EPA to remedy the serious deficiencies identified in the Notice and come into compliance with the Settlement. On January 25, 2024, Respondents submitted a plan ("Plan") in response to the EPA's Notice.

The EPA has reviewed Respondents' Plan and determined that Respondents' Plan does not remedy all of the serious deficiencies in the 90% RD specified in the Notice to the satisfaction of the EPA. However, Respondents have provided enough information in the Plan to potentially provide a path forward, as specified in this letter, to Respondents' submission of the North Impoundment Final (100%) RD ("100% RD") deliverable pursuant to the Settlement. In addition, the EPA's meeting with Respondents on February 9, 2024, supplied supporting information for the Plan; Respondents stated at the meeting that they are committed to remedying the serious deficiencies identified in the Notice and to come into compliance with the Settlement. Following the February meeting, Respondents have provided additional technical memoranda documenting their continued RD efforts.

After review of the Plan, the EPA has decided that the Plan and other information provided by Respondents provide a sufficient basis for the Respondents to continue performing the Work required under the Settlement, and specifically the submission of the 100% RD. The EPA rejects Respondents' proposal, discussed in the Plan, for submission of a revised 90% RD as the next deliverable.

The 100% RD shall be in compliance with the Settlement and address in detail both the serious deficiencies identified in the Notice and the attached comments on the 90% RD. The formal EPA comments on the 90% RD are being transmitted with this letter pursuant to the Settlement and include the following: 1) the EPA Response to Respondents' January 25, 2024, Plan and Supplemental EPA Comments on the 90% RD, which also incorporates by reference the EPA's Notice; 2) Additional EPA Comments on the Pre-Final 90% Remedial Design – Northern Impoundments, which includes comments not directly addressed in the Notice; and 3) Other Agency Comments provided by the Texas Department of Transportation ("TxDOT"), Texas Commission on Environmental Quality ("TCEQ"), Harris County, the Port of Houston Authority, and the Natural Resource Trustees for the Site. As stated above, all of the serious deficiencies identified in the Notice have not been addressed by Respondents to the EPA's satisfaction. Included in the EPA's comments is a detailed discussion of the elements of Respondents' Plan which must be modified or supplemented as part of submission of the 100% RD in order to satisfactorily address the serious deficiencies identified in the Notice.

Pursuant to sections 3.7 and 6.2 of the SOW, Respondents are required to submit the 100% RD for EPA's approval 30 days after receipt of the EPA's comments on the 90% RD, which will be received by Respondents on the date of this letter. After reviewing the Plan, the EPA is approving a schedule for submission of the 100% RD pursuant to which Respondents are required to submit the complete 100% RD, as described further in section 3.7 of the SOW, no later than 90 days after receipt of the attached EPA comments on the 90% RD, with the exception that Respondents must submit the following components of the 100% RD as follows:

100% RD Deliverables	Due Date
100% RD Components: Excavation Elevations and Associated Design Drawings (100% RD Revised Version of Version of 90% RD Table 5-1 and Excavation Sections and Excavation Plan Drawings) Field Sampling Plan (100% RD Revised Version of 90% RD Attachment 3 to Appendix J Supporting Deliverables) Site-Wide Monitoring Plan – Northern Impoundment (100% RD Revised Version of 90% RD Attachment 5 to Appendix J Supporting Deliverables) Hydraulic Heave Analysis Report (100% RD Revised Version Of 90% RD Attachment E to Appendix B – Geotechnical Engineering Report) ARAR Supporting Documents (100% RD Revised Version of 90% RD Appendix D - ARAR Supporting Documents)	30 Days After Receipt of the EPA's Comments on the 90% RD
100% RD Components: Supporting Deliverables (100% RD Revised Versions of 90% RD Appendix J – Supporting Deliverables, Attachments 1-2, 4 and 6-9) High Water Preparedness Plan Barge Impact Protection Memorandum (100% RD Revised Version of 4/3/24 Technical Memorandum on Barge Impact Protection, to be added as an attachment to 100% RD Revised Version of Appendix I - BMP Structural Design Report) Hydrodynamic Modelling Report (100% RD Revised Version Of 90% RD Appendix F- Hydrodynamic Modelling Report)	60 Days After Receipt of the EPA's Comments on the 90% RD
North Impoundment Final (100%) RD	90 Days After Receipt of the EPA's Comments on the 90% RD

The EPA has provided a revised section 6.2 of the SOW to incorporate this schedule into the Settlement. The EPA does not intend to modify this schedule, with the sole exception that Respondents alternatively may submit the entire 100% RD in accordance with the Settlement within 30 days after receipt of the attached EPA comments.

The EPA will not approve or provide formal comments on any components of the 100% RD before submission of the complete 100% RD 90 days after the date of this letter, but merely verify that Work is progressing and is in accordance with the ROD. The EPA will not extend the due date for submission of the 100% RD beyond the due dates provided in this letter and the attached, revised section 6.2 of

the SOW. No informal advice, guidance, suggestion, or comment by the EPA Project Coordinator or other EPA representatives regarding any deliverable submitted by Respondents, including but not limited to the 100% RD components, shall relieve Respondents of their obligation to obtain formal approvals required by the Settlement, or to comply with all requirements of this Settlement, including the due date for submission of the 100% RD in the revised section 6.2 of the SOW, unless there is a formal modification of the Settlement (*see* paragraph 88 of the Settlement).

As stated in the Settlement, EPA retains all authority and reserves all rights to take any and all response actions authorized by law. EPA reserves all, and waives none, of its authority and rights under the Settlement, whether or not specifically set forth in this letter. The Notice and this letter should not be construed as prohibiting, altering, or in any way limiting the ability of the EPA to seek any other remedies or sanctions available to the EPA as a result of the serious deficiencies in the 90% RD or any deficiencies in the 100% RD.

Sincerely,

Ashley Howard
Remedial Project Manager
Superfund Emergency Management Division

Attachments

1. Revised Section 6.2 of the Settlement Statement of Work (Revised RD Deliverables Schedule)
2. EPA Comments on the North Impoundment Pre-Final (90%) RD including the following:
   - EPA Response to Respondents' January 25, 2024, Plan and Supplemental EPA Comments on the 90% Remedial Design, which also incorporates by reference the EPA's Notice;
   - Additional EPA Comments on the Pre-Final 90% Remedial Design – Northern Impoundments; and
   - Other Agency Comments provided by the Texas Department of Transportation, Texas Commission on Environmental Quality, Harris County, the Port of Houston Authority, and the Natural Resource Trustees for the Site including the National Oceanic and Atmospheric Administration

cc: Mr. Brent Sasser, P.E.
Judy Armour, P.E.
Sonja Inglin, Counsel for International Paper Company
Tobias Smith, Counsel for McGinnes Industrial Maintenance Corporation
Katie Delbeq, Texas Commission on Environmental Quality
Latrice Babin, PhD, Harris County Pollution Control District
Trae Camble, Port of Houston Authority
Jeanne Javadi, Texas Department of Transportation
Susan Snyder, National Oceanic and Atmospheric Administration

6.2 RD Deliverables Schedule

	Description of Deliverable, Task	Ref.	Deadline
	Draft First Phase PDI Workplan	3.3(a)	60 days after the Effective Date of the Settlement.
	Final First Phase PDI Workplan	3.3 (a)	30 days after receipt of EPA comments on the Draft First Phase PDI Workplan.
	Draft RDWP	3.2	135 days after EPA's Authorization to Proceed regarding Project Coordinator or Supervising Contractor, pursuant to Paragraph 13.c.2 of the Settlement.
	Final RDWP	3.2	60 days after receipt of EPA comments on the Draft RDWP.
	Draft Treatability Study Workplan	3.4	In accordance with the EPA approved RDWP
	Final Treatability Study Workplan	3.4	30 days after receipt of EPA comments on the Draft Treatability Study Workplan.
	Draft Second Phase PDIWP	3.3(a)	60 days after receipt of EPA comments on draft RDWP.
	Final Second Phase PDIWP	3.3(a)	45 days after receipt of EPA comments on the Draft Second Phase PDIWP.
	South Impoundment Preliminary (30%) Design	3.5	225 days after approval of the Final Second Phase PDIWP
	North Impoundment Preliminary (30%) RD	3.5	270 days after approval of Final Second Phase PDIWP.
	South Impoundment Pre-Final (90%) RD	3.6	90 days after receipt of EPA comments on the South Impoundment Preliminary (30%) RD
	North Impoundment Pre-Final (90%) RD	3.6	845 days after receipt of EPA comments on the North Impoundment Preliminary (30%) RD
	South Impoundment Final (100%) RD	3.7	30 days after receipt of EPA comments on the South Impoundment Pre-Final (90%) RD.

	100% RD Components: • Excavation Elevations and Associated Design Drawings (100% RD Revised Version of the 90% RD Table 5-1 and Excavation Sections and Excavation Plan Drawings) • Field Sampling Plan (100% RD Revised Version of 90% RD Attachment 3 to Appendix J Supporting Deliverables) • Site-Wide Monitoring Plan – Northern Impoundment (100% RD Revised Version of 90% RD Attachment 5 to Appendix Supporting Deliverables) • Hydraulic Heave Analysis Report (100% RD Revised Version Of 90% RD Attachment E to Appendix B – Geotechnical Engineering Report) • ARAR Supporting Documents (100% RD Revised Version of 90% RD Appendix D - ARAR Supporting Documents)		30 Days After Receipt of the EPA's Comments on the 90% RD
	100% RD Components: • Supporting Deliverables (100% RD Revised Versions of 90% RD Appendix J – Supporting Deliverables, Attachments 1-2, 4 and 6-9) • High Water Preparedness Plan • Barge Impact Protection Memorandum (100% RD Revised Version of 4/3/24 Technical Memorandum on Barge Impact Protection, to be added as an attachment to 100% RD Revised Version of Appendix I - BMP Structural Design Report) • Hydrodynamic Modelling Report (100% RD Revised Version of 90% RD Appendix F - Hydrodynamic Modelling Report)		60 Days After Receipt of the EPA's Comments on the 90% RD
	North Impoundment Final (100%) RD	3.7	90 days after receipt of EPA comments on the North Impoundment Pre-Final (90%) RD.
	Progress Reports	4.1	Monthly, no later than the 15th day of the following month; starting 60 days from the Effective Date of the Settlement

EPA Response to Respondents' January 25, 2024, Plan and Supplemental EPA Comments on the 90% Remedial Design ("EPA Response and Supplemental EPA Comments")

Administrative Settlement Agreement and Order on Consent for Remedial Design, CERCLA Docket No. 06-02-18 ("Settlement")

San Jacinto River Waste Pits Superfund Site ("Site")

April 18, 2024

On January 5, 2024, the Environmental Protection Agency ("EPA") provided a notification under paragraph 59 of the Settlement to Respondents McGinnes Industrial Maintenance Corporation and International Paper Company ("Respondents"), including as an attachment the Grounds for Issuance of EPA Notification of Serious Deficiency (together with the EPA's January 5, 2024, letter, the "Notice"). On January 25, 2024, Respondents submitted a plan ("Plan") in response to the EPA's Notice, and on February 9, 2024, Respondents met with the EPA to discuss the Notice and the Plan.

Pursuant to the EPA's April 15, 2024 letter, the EPA has determined that Respondents' submission of the Plan is sufficient for Respondents to continue work under the Settlement and submit the Northern Impoundment Final (100%) Remedial Design ("100% RD"). The April 15, 2024, letter is not an EPA determination that all of the serious deficiencies identified in the Notice have been remedied by Respondents to the EPA's satisfaction, or addressed in the Plan, the February meeting, or subsequent technical memoranda to the EPA's satisfaction. The EPA is providing its formal comments on the North Impoundment Pre-Final (90%) Remedial Design deliverable ("90% RD") to be addressed in the Respondents' submission of the 100% RD pursuant to the Settlement. The EPA is incorporating the Notice as EPA comments on the 90% RD. This EPA Response and Supplemental EPA Comments on the 90% RD includes EPA comments on the 90% RD related to deficiencies identified in the Notice, but they are comments which EPA prepared after review of, and in response to, the Plan. This EPA Response and Supplemental EPA Comments discusses elements of Respondents' Plan which, based only on review of the Plan and additional deliverables submitted by Respondents, the EPA already has identified as requiring modification or supplementation in the 100% RD in order to satisfactorily address the serious deficiencies identified in the Notice. This EPA Response and Supplemental EPA Comments does not address all the information provided in the Plan; there may be serious deficiencies where the Plan appears to have presented a potentially satisfactory path forward to address the deficiencies, but the EPA will not be able to make a final determination on whether any of the deficiencies are satisfactorily addressed until after its review of the 100% RD.

The EPA notes that there are factual inaccuracies in the Plan and inconsistences between statements in the Plan and statements made in the 90% RD, but will not specifically address them except as discussed below. In addition, while the EPA has not reviewed in detail the Plan's summarizations of the EPA's Notice, Respondents appear to have inaccurately summarized the EPA's statements in the Notice in some respects. The EPA's Notice speaks for itself.

Excavation Depths

Summary of Relevant Notice Deficiency: The excavation limits provided by Respondents cite hydraulic heave as a reason to not remove waste above 30 ng/kg in select areas, but, with the exception of the Northwest Corner, Respondents do not evaluate alternative approaches to achieve the 30 ng/kg cleanup level such as dredging through the water column.

Target excavation elevations should have been based on the existing dataset of inventoried waste, which includes a maximum excavation of -28 ft NAVD88, plus an additional 2-foot overcut if necessary after confirmation sampling because there may be additional waste at depth not identified in the pre-design sampling efforts. The post-excavation confirmation sampling approach proposed by Respondents would not extend into affected depth interval(s) where material potentially exceeding the clean-up level is more than 4 to 6 inches under the proposed bottom of excavation target surface, according to previous boring data. The EPA notes that it cannot evaluate the confirmation sampling plan as provided, as the primary objective is to demonstrate compliance only on the surface, which does not satisfy the ROD requirement for "removal of all waste material that exceeds the clean-up level of 30 ng/kg regardless of depth." Generally, EPA would expect the confirmation sampling plan to include some targeted sampling in areas of high uncertainty, such as sidewalls and slopes, or along proposed berm boundaries. Also, the confirmation sampling plan may need to consider action levels or procedures for extra/over excavation prior to initiating excavation activities to ensure expedited excavation.

Supplemental EPA Comment After Review of Plan – Potential Hydraulic Heave and Excavation Surfaces:
Previous submittals from Respondents have discussed many safety concerns regarding the potential for hydraulic heave during excavation. Respondents have previously described the red line on the excavation elevation tables in submittals as the calculated "Safe Hydraulic Heave Excavation Surface." In the Plan, Respondents propose draft excavation surfaces that are either close to or below their previously calculated "safe" excavation surface. Before submission of the 90% RD, Respondents presented alternatives to address waste below this "safe" excavation surface where there may be potential hydraulic heave concerns, and the EPA agreed that one of these alternatives, mechanical dredging, would address this risk and meet the requirements of the ROD. However, in Respondents' Plan, Respondents have proposed using mechanical dredging only for the Site's Northwest Corner, not in other areas of the Site where they have calculated there is a potential for hydraulic heave. The Plan states that the other areas with the potential for hydraulic heave will be addressed with monitoring and prescribed mitigation procedures, without further explanation as to why this is the preferred approach over mechanical dredging. The 100% RD should provide details regarding the proposed monitoring and mitigation procedures for use in areas with calculated hydraulic heave potential, including how the procedures are designed to address the potential risks. The 100% RD should also include documentation of Respondents' evaluation of different potential mitigation approaches to address areas where there is a potential for hydraulic heave, including mechanical dredging and other potential approaches proposed by the EPA and USACE.

It is the EPA's expectation that Respondents' 100% RD will address all waste above the cleanup level in accordance with the ROD, as stated in the Notice. This includes having a contingency plan to use an alternative method to remove the waste if the risk of hydraulic heave is detected and it is determined to not be safe to excavate in the dry. This alternate method must be in compliance with the ROD. The design should be compatible with implementing the contingency plan without a significant delay in the project.

As stated in the EPA Notice, the RD should also allow for an additional 2-foot overcut, if necessary, if the confirmation sampling shows that they have not met the cleanup level. In the 90% RD, however, Respondents selected design options which act to restrict the ability to implement a 2-foot overcut if necessary to fully remove waste above the cleanup level, including their design of the BMP and selecting almost complete excavation in the dry where mechanical dredging was also an EPA-approved excavation option in compliance

with the ROD. As discussed in the Notice, there are hydraulic heave mitigation procedures which may allow for implementation of the remedy in accordance with the ROD, some of which Respondents now say they are willing to consider; the EPA's concern after reviewing the Plan is that Respondents' almost total focus on excavating 'in the dry' may lead them to not evaluate the option of mechanical dredging outside of the Northwest Corner, regardless of any potential advantages of that approach. Additionally, design decisions, such as the depth of the BMP wall and dredging procedures, should not limit the ability to excavate the required 2-foot overcut. For example, calculations in Appendix B-1 Figure 6 shows that the water elevation chosen for the Northwest Corner may be sufficient for the maximum elevation at 28.4 ft but not sufficient for an additional overcut at the maximum excavation or total of –30 ft excavation. In summary, the design should be able to accommodate the 2-foot overcut if necessary to meet the cleanup level; include monitoring and prescribed mitigation procedures for areas planned for excavation in the dry but with calculated potential for hydraulic heave, considering an appropriate factor of safety; and the design should also be compatible with contingency plans that include using an alternate method to remove waste not removed in the dry due to potential hydraulic heave concerns. The design should prevent delays in the project and be in compliance with the ROD.

Supplemental EPA Comment After Review of Plan: Post-Excavation Confirmation Sampling. The Plan states in Section 3.1.2 that *"*[w]ith the proposed excavation surface revisions, the confirmation sampling approach should be sufficient to determine if all material above 30 ng/kg has been removed." However, Respondents' Plan did not address EPA's concern regarding targeted sampling in areas of high uncertainty, such as sidewalls and slopes, or along proposed berm boundaries. The Plan also did not consider action levels or procedures for extra/over excavation prior to starting work to ensure expedited excavation. The 100% RD should be updated to address this issue identified in the EPA Notice.

Supplemental EPA Comment After Review of Plan: The purpose of this EPA Response and Supplemental EPA Comments is not to correct all factual inaccuracies the EPA has identified in the Plan, but the EPA notes Respondents' statements in section 3.1.2 of the Plan that "Respondents proposed a SWAC approach in the 90% RD in light of conversations with EPA during Technical Working Group (TWG) meetings and monthly project calls," with the implication that the EPA did not object to the use of SWAC in the TWGs, and "Respondents' understanding that SWAC would be an acceptable approach here". As stated in the Notice, Respondents' contractor proposed using the SWAC approach rather than a point-by-point approach to achieve the goal of 30 ng/kg TEQ during the December 2020 TWG discussions. As documented in Respondents' contractor's notes of that meeting, the EPA stated that the SWAC approach was not acceptable to the EPA and not in compliance with the Site Record of Decision (Notes of December 15, 2020, TWG Meeting prepared by GHD). As discussed in the Notice, the EPA reiterated in several subsequent meetings that SWAC would not be acceptable to the EPA and the community, and that the design should not use SWAC when determining the excavation contours and that all inventoried waste over the cleanup level, no matter the depth, should be excavated in the design.

Bulk Water Treatment

Summary of Relevant Notice Deficiency: After installation of the BMP, large volumes of river water trapped behind the BMP would need to be returned to the San Jacinto River in order to excavate in the dry. The 90% RD design specifications do not include the large volumes of water from the initial dewatering and subsequent dewaterings after the BMP is intentionally filled. Measures should be taken to minimize withdrawal of pore water from within the waste material and also to minimize fine sediment entrainment as the water within the BMP is pumped out for dewatering. TPDES General Permit No. TXR150000, which is an ARAR, requires appropriate controls to be utilized to minimize the offsite transport of suspended sediments and other pollutants if it is necessary to pump or channel standing water from the Site, and that stormwater discharges from basins or

impoundments utilize outlet structures that withdraw water from the surface. In multiple TWG meetings, GHD discussed dewatering best practices to address sediment discharge, such as utilizing a floating intake, pumping from the deepest parts of the impoundment, and utilizing multiple pumps.

Respondents' Plan states that after installation of the BMP, prior to the initial work season, and as required for dewatering after intentional flooding of the BMP during the RA, the water within the BMP will be pumped down, without treatment, to 2 feet (ft) at the lowest collection point(s) and the remaining water below this two-foot level will be treated prior to discharge. Respondents state the Plan will also address procedures for complying with the TPDES General Permit. Although GHD discussed dewatering best practices to address sediment discharge at TWG meetings, the approaches discussed were not included in the 90% RD or the Plan. The Plan also states Respondents will provide specifications describing the water removal, monitoring and treatment procedures, and the metrics for when treatment is required, including metrics for scenarios in which the excavation area is intentionally flooded.

Supplemental EPA Comment After Review of Plan - Reducing Sediment Before Discharge - Section 5.6.2.1 Cell Dewatering – The 100% RD should detail the type of suction controls proposed to mitigate the uptake of suspended sediments during dewatering of the BMP. Controls to be discussed and considered include, but are not limited to:

- Floating intake
- Maintain minimum freeboard of 2 ft when pumping (This should be reevaluated when pump size is selected, and will be reviewed in the 100% RD)
- Use geotextile fabric as a filter at the intake or the discharge points of the pumping system
- Pump from the deepest parts of the impoundment
- Utilize multiple pumps
- Evaluate pump sizes and pumping rates that will cause minimal turbulence
- Consider flocculants to knock down suspended sediments for both regular discharging and storm preparedness.

Supplemental EPA Comment After Review of Plan - Water Treatment - The 100% RD should include clear definitions of both non-contact water and contact water in developing the metrics for when treatment is required. Subject to 100% RD review, non-contact water may be returned to the river with appropriate sediment controls. Contact water includes water generated after adverse events including, but not limited to, overtopping (if determined water was potentially exposed to waste), material handling incidents, spillage of waste, or some other scenario of release or potential release. These events could potentially generate large volumes of water that may need to be treated. Therefore, the 100% RD should have a contingency plan to be able to treat the additional water without delaying the project, and estimates of worst-case volumes of water to be treated should be included. Contingency planning may include plans to scale up the treatment plant quickly if necessary or designing the treatment plant to be able to handle these water volumes.

The definition of Contact Water in Appendix H Design Specifications, found at 46 07 01 Water Treatment System (WTS), and Table 1 Summary of Contact Water Influent Sources, also in Appendix I, do not appear to account for all potential sources of contact water that could infiltrate or otherwise be present in the BMP. As there is a potential for upward seepage from groundwater, Respondents should include seepage water as contact water in addition to mounded water (pore water should also be included with mounded water). In addition, contact water should include water from potential releases as discussed above, as well as remaining water above the TCRA cap below the 2-foot level when the Site is dewatered. When updating the volumes of water requiring treatment in the 100% RD, Respondents should include detailed calculations supporting each total.

The 100% RD should also include estimated water volumes to be discharged from the initial dewatering and potential additional dewaterings of the BMP during the RA.

Hydraulic Heave

Summary of Relevant Notice Deficiency: The 90% RD is not implementable, not complete, and not suitable for procurement or biddable because of the inconsistent heave analyses; the underlying concerns with the validity of the analyses; and Respondents' failure to address mitigation measures used for areas with hydraulic heave concerns. The heave analysis in the NWC 90% RD adopted a different methodology to calculate factors for the hydraulic heave evaluation, and it is presented by Respondents as potentially invalidating unknown portions of the June 90% RD addressing most of the Site. The NWC 90% RD alludes to a forthcoming heave evaluation using the revised methodology for the majority of the Site, but Respondents have not provided this new analysis for review.

Supplemental EPA Comment After Review of Plan: A draft Updated Hydraulic Heave Analysis is included as Appendix B of the Plan. The Plan states that the draft Updated Hydraulic Heave Analysis in Appendix B is to "combine the analysis for the Northwest Corner with that for the remainder of the site." Together with the statements in the 90% RD, this would indicate that the Plan hydraulic heave analysis is a continuation of Respondents' second heave evaluation and methodology provided in the November 2022 Northwest Corner component of the 90% RD (NWC 90% RD). However, a review of the depths in the Northwest Corner where Respondents estimate hydraulic heave will become an issue are markedly different between the NWC 90% RD heave analysis and the Plan hydraulic heave analysis; the "safe" excavation surface is in some places up to 12 feet lower in the Northwest Corner in the Plan hydraulic heave analysis than it is in the NWC 90% RD. The EPA's preliminary review of the Plan hydraulic heave analysis indicates a new methodology for identifying total stresses in the analysis, but there may also be additional changes not yet identified by the EPA. The EPA is concerned that Respondents have now submitted three different hydraulic heave analyses using the same set of Site data, with a great variety of results, over the course of less than two years. The Plan hydraulic heave analysis also does not address the concerns identified by the EPA regarding the previous two analyses, nor does it provide sufficient detail supporting the analysis. The final hydraulic heave analysis used for the 100% RD should include a transparent discussion of the changes in methodologies between each of the three heave analyses, and the reasons for those changes, along with a table of the associated specific surface elevation calculations that support the final analysis.

The 100% RD should also address the concerns identified in EPA's Notice regarding previous analyses as summarized in the EPA Notice, with supporting detail (i.e. regarding Site stratigraphy and the extrapolation of data to make assumptions about the site, depth of Beaumont clay, sand lens connectivity/hydraulically connected, data supporting conditions capable of generating flow volumes of concern, etc.).

Section 3.4.2 of the Plan states that Respondents "will also provide specifications for the Remedial Contactor to manage the heave in areas identified by the monitoring during excavation, including (1) limiting excavation activities in specific areas to periods considered safe from hydraulic heave based on the hydraulic head readings in the piezometers, and (2) utilizing mitigation measures during excavation to offset hydraulic head." Because of the potential speed of developing hydraulic heave issues during excavation, Respondents should prioritize proactive mitigation measures to offset hydraulic heave, such as an appropriate dewatering system with high head pumps, deep well pumps or a well point system with adequate backup power; deeper BMP sheet piles in suspected heave areas; extensive grouting in the Beaumont sands where heave risk has been

identified; and/or dredging, as opposed to focusing only on monitoring potential heave. Monitoring systems should be automated and checked continuously.

BMP Elevation/Seasonal Excavation Approach/Intentional BMP Flooding

Summary of Relevant Notice Deficiencies: Respondents must adequately address any potential safety and structural issues raised by the BMP's top elevation, either through re-design and/or documented evaluation of mitigation, protection and safety measures in the event of overtopping. Respondents should reconsider the 90% RD proposed seasonal excavation approach for the reasons stated in the Notice, as well as evaluation of what specific work could be completed outside of the seasonal excavation season in order to maximize that work. In addition, the 90% RD is inconsistent on whether the BMP will be intentionally flooded during the non-excavation season, and appears to leave this issue for resolution by the remedial contractor without a plan, performance metrics, procedures or mechanisms to timely flood the BMP to accomplish intentional flooding if it is deemed necessary.

The 90% RD basis of design for the remedial excavation approach includes (1) installation of a physical BMP around the perimeter of the Northern Impoundment, with a BMP top elevation that would be protective of high water events (based on hindcasted historical data) during the planned excavation season of November through April, assuming that high-water events during the planned excavation months would not exceed historical levels; (2) return of river water back to the river prior to removal of the TCRA armored cap, (3) removal of the waste material working within a seasonal cell, removing the TCRA armored cap as work progresses (while leaving in place the portions of the TCRA armored cap in areas not being excavated), (4) placing an engineered cap over the exposed slope of the seasonal cell excavation at the end of each excavation season, and (5) flooding the impoundment with river water for the duration of the off-season. (Section 5.2 Remedial Approach of the June 90% RD, Excavation Methodology, p. 44; and Seasonal Excavation, and Top of Wall Elevation, p. 41; see also the 30% RD, Section 5.2.2 Excavation Season and BMP Height, p. 35).

Using this design approach, the 90% RD selected a top elevation for the BMP of +9 feet NAVD88 and a proposed excavation season of November through the end of April, based on the initial hindcast model of historic river elevations since 1996 during those months. The 90% RD states that after procurement and construction of the BMP, there would be a minimum of five years of waste removal to be performed during the proposed excavation season. Respondents state that the estimated excavation schedule is for their SWAC-based excavation approach (which is not compliant with the ROD) and is dependent on their ability to meet the estimated volume and excavation rates supporting the schedule. With procurement and construction, this is an estimated 7-year remediation schedule for only a portion of the waste required by the ROD to be excavated. In the 90% RD, Respondents also listed as a "technical uncertainty" the possibility that the BMP with their selected elevation of +9 feet NAVD88 could be overtopped.

This 90% RD basis of design should be reconsidered for several reasons:

1. Respondents now have provided EPA with three iterations of their hindcast model used to support Respondents' combined BMP height/seasonal excavation design approach: the first iteration provided with the May 2020 30% RD and the June 2022 90% RD included 6 months of Site transducer data as one of the model inputs; the second in the November 2022 added 2 more years of transducer data; and the third in March 2024 added another year of Site transducer data as model inputs. Each iteration has produced model results which vary in their representations of historical San Jacinto River levels at the Site since 1996. Only the hindcasted data from the original version of the model appears fully consistent

with Respondents' combined BMP height/seasonal excavation approach in the 90% RD, specifically the selection of +9 feet as the top elevation of the BMP and a proposed excavation season from November to April. The EPA's concerns with the methodology of Respondents' hindcast model are discussed below. While not discussed in the Notice, Respondents' top of wall elevation also did not take into account wave and vessel wake protection, since waves could overtop the BMP even where river levels do not reach +9 feet, and would likely overtop the BMP when river levels are approximately +9 feet. Regardless of potential issues with the hindcast model, as discussed in the Notice and by Respondents in the 90% RD, there is a continuing risk in this area of severe flooding events throughout the year which must be addressed.

2. The 90% RD proposed excavation season was limited to only six months, resulting in an extended, approximately 7-year remediation schedule for the reduced amounts of waste for excavation using Respondents' SWAC approach. This 7-year schedule would be further extended by including excavation of the additional wastes necessary to be compliant with the ROD. Texas Department of Transportation (TxDOT) work on the adjacent I-10 bridge also could create additional delays to this schedule, especially if the delays occur in the short, proposed excavation season. As discussed under "Inadequate Consideration of Alternatives to Trucking" below, Respondents also propose stopping work whenever TxDOT does not give access to the TxDOT ROW, which, if that continues to be their position, would extend the remediation still further.

3. After the Notice questioned inconsistent positions taken in the 90% RD about the plan to intentionally fill the BMP in the off-season, Respondents stated in the Plan and at the February meeting that it is not necessary to fill the BMP for structural support, but the BMP would be filled primarily to protect against scour on the BMP interior (see Section 3.7.2 of the Plan). Intentionally filling the BMP for six months of the year would have precluded excavation during those months, and greater flexibility is possible if that design element is modified. Respondents stated that they are developing specifications for when and how to intentionally, and timely, fill the BMP as a contingency measure, but did not anticipate that it would be filled on a yearly seasonal basis as discussed in the 90% RD.

The basis of design in the 90% RD requires reassessment to address the impacts of the 90% RD design choices on the implementability and biddability of the remedy. Changes to the design discussed in the Notice and/or developed by Respondents in response to the Notice provide an opportunity to address the extended proposed schedule and associated technical issues presented in the 90% RD which are related to the selected 90% RD basis of design for seasonal excavation and BMP height.

Supplemental EPA Comment After Review of Plan: Additional Documentation and Supporting Information. For all potential modifications and re-evaluations in the RD, the EPA needs better documentation of Respondents' evaluation processes and analysis. The 90% RD often presents Respondents' design conclusions without supporting information or information about evaluation of other alternatives informing that conclusion. It is difficult for the EPA to provide meaningful oversight without information about the factors and alternatives considered which form the basis of Respondents' conclusions, and more transparency is required.

Supplemental EPA Comment After Review of Plan: Need for Additional Best Management Practices, Contingency and Protective Measures for High-Water Events. The RD should consider more efficient and expedited implementation of the remedy while also addressing the potential for high-water events through BMPs and contingency measures.

The EPA is encouraged by Respondents' commitment in the Plan to more thorough contingency and mitigation planning. The EPA continues to be concerned about safety and releases, but as stated by Respondents in the 90% RD and the Plan, extreme floods in the Houston area are possible at any time of year. It is the EPA's expectation that Respondents will develop adequate controls, best management practices, and protective measures to address adverse weather or flooding events which are possible during any month. These measures are also necessary to address the possibility of an extreme flood event, as there have been multiple 500-year flood events in the last ten years in the Houston area.

Regarding both BMP height and the seasonal excavation approach, the Plan recognizes the need to add additional monitoring and mitigation procedures in an attempt to address the potential effects of high water and BMP overtopping. Section 2.2 of the Plan discusses "how the potential for overtopping of the BMP during the excavation season will be addressed through a comprehensive monitoring program and specific performance metrics and mitigation procedures." The Plan states that a High-Water Preparedness Plan will be included in the RD, and Remedial Contractor specifications added, to address potential overtopping events.

Respondents should put emphasis on developing and evaluating BMPs, procedures and measures which are both protective and potentially more flexible, more quickly implementable, and targeted to address periodic high-water events, allowing the Remedial Contractor to be able to more quickly prepare the Site for a high-water event should one arise. This could in turn allow flexibility for the Remedial Contractor to work during a longer excavation season, or even year-round excavation. Respondents could evaluate whether they should vary proposed excavation procedures and mitigation measures by month or season in a way that would not stop all excavation work entirely for prolonged periods; historically, the most extreme events such as the 1994 flood and Hurricane Harvey are less likely at the Site in some months than in others, although contingency plans should be in place to address high-water events at any time of year. Respondents also are developing new specifications addressing when and how to intentionally fill the BMP as a contingency measure, and the potential for these new specifications to support a longer excavation season should be considered as part of this process.

Specifications for protective BMPs, mitigation measures and contingency planning which specifically address periodic high-water events could be developed instead of reliance on extended seasonal shutdowns as proposed in the 90% RD, and this potential flexibility in the specifications would increase the biddability of the project.

Adequate protective measures should not only be provided in RD plans and specifications, but also discussed and evaluated in the RD for their sufficiency. This is true for both specifications and plans which are newly developed and also those already included in the 90% RD (*see* Appendix H Design Specifications, which provides for submission of a Flood Contingency Plan, a Hurricane and Severe Storm Plan, specifications for dewatering the BMP including stormwater, provisions for riprap on the interior of the BMP to address scour; and provision for the water treatment system to be capable of treating stormwater; and the Emergency Response Plan in Appendix J).

Respondents should provide a detailed evaluation of how overtopping the BMP during excavation might affect the design or the interior of the BMP and an analysis of how, of if, the RD plans and specifications address overtopping issues. This will allow the EPA to evaluate the extent that these specifications and outlined plans could address or mitigate the potential for overtopping. For instance, there are no supporting calculations provided for the location and potential severity of scour inside the wall to evaluate whether the riprap described in the specifications is sufficient if overtopping occurs. The 100% RD should also discuss and evaluate

contingencies both for more limited overtopping by wind/wave and wake action as opposed to high-water events where the BMP could be fully submerged. The 100% RD should address the various scenarios of how and to what extent overtopping may occur and describe how water entering the BMP will be categorized and handled in each scenario.

The 100% RD should describe how river levels will be monitored and how limited overtopping occurring during high-water events will be identified. For example, Respondents should consider water level gauges on the inside of the cofferdam and monitoring buoys or tide gauges on the outside. These gauges/monitoring buoys should be designed to withstand storms and floods, as previous Site equipment has been washed away by flood waters or required removal prior to storms.

The NWC 90% RD presents no additional mitigation measures for overtopping in areas being dredged in the Northwest Corner, despite describing even more severe consequences from the risk of flooding and overtopping during excavation season for the areas being dredged. The potential effects and contingency measures for overtopping in an area being excavated through the water column would be different than those for areas being excavated in the dry, but these changes were not addressed. Respondents should evaluate and provide for high-water contingency planning for area(s) being excavated through mechanical dredging.

Supplemental EPA Comment: Seasonal Excavation Schedule. The Notice urged reconsideration of the proposed 90% RD seasonal excavation approach. In the Plan, Respondents do not address the EPA concerns in the Notice regarding the limited six-month excavation season, but only state that they have already performed a "detailed evaluation" with "careful consideration," which indicates to the EPA that the six-month excavation season is not being reconsidered. Without additional supporting documentation of Respondents' evaluation, that is not a sufficient response, especially given the potential implications on the project's implementability, schedule and biddability which result from the design's proposed six-month annual shutdown of all excavation work and the extended remediation schedule.

As discussed in the Notice, the 100% RD should thoroughly evaluate the risks, limitations and effects on implementation of different excavation approaches including the 90% RD six-month seasonal approach, more extended excavation seasons, and potential year-round excavation, and document the many considerations, including all of the pros and cons, of the different excavation approaches. The 100% RD should contain adequate contingency, protective and mitigation measures and planning to address potential year-round flooding events, as discussed above. These contingency and mitigation plans and specifications should be robust in addressing potential releases, which could provide additional flexibility when determining whether a seasonal excavation approach is appropriate, and if so, its duration.

This 100% RD evaluation of excavation season risks and implementability issues should address the potential for prolonged work stoppages due to TxDOT's bridge reconstruction, and consider whether a longer excavation season could provide more contingencies for these delays. The seasonal excavation approach has other practical implications on implementation and biddability, such as the need for repeated mobilization/remobilization, which should be evaluated. The 90% RD approach also does not acknowledge that some months of the official hurricane season have limited or no historical exceedances of the +9 feet level at the Site based on available data; consideration also should be given to standard marine construction practices for these months in the Houston area. In addition, changes in the design in response to the Notice could facilitate changes in the planned excavation schedule. Respondents stated at the meeting that they are developing revised metrics for intentional filling of the BMP, which will not necessarily occur every year as

stated in the 90% RD, and these revised metrics could provide greater flexibility in the 100% RD to support the possibility of a longer excavation season.
After submitting the Plan, Respondents provided a March 2024 Updated Hindcast Model technical memorandum, updating the original hindcasted data in the June 90% RD and the second hindcast model report in the NWC 90% RD. A review of the three model reports indicate that Respondents appear to be committed to a November to April excavation season even where their own data does not currently support it. As discussed below, the EPA has concerns about the methodology of, and overreliance on, the hindcast model. However, the EPA notes that the 2024 updated hindcast model depicts only one high-water event since 1996 – Hurricane Harvey – exceeding a +9 feet river elevation at the Site. In the NWC 90% RD hindcast model, three non-Harvey events (in November 1998, Memorial Day 2016 and Tropical Storm Imelda in September 2019) were hindcasted as exceeding the +9 feet level, but in the March 2024 Updated Hindcast Model, all three of these flood events are now depicted as having hindcast elevations below the +9 feet at the Site (*see* Figure 1 of the 2024 Updated Hindcast Model compared to Figure 5-4 of the NWC 90% RD and Table 4-1, Historic High Water Events, from the Southern Impoundment High Water Preparedness Plan, dated July 28, 2023, which uses the same model inputs as the NWC 90% RD). Respondents' seasonal excavation approach indicating that excavating during November is appropriate, while excavating in May/June and September is not, is inconsistent with their own reasoning and updated hindcasted data for 1998, 2016 and 2019 – the hindcasted high-water levels for all three months now are all under +9 feet according to the March 2024 updated model. As stated, the EPA's concerns about the hindcast model and the proposed BMP elevation are discussed in more detail below, but the EPA is also concerned that Respondents continue to be focused on a six-month excavation season even where it may not be supported by their own analysis and data, and where the more appropriate focus would be on the continuing risk in this area of severe flooding events throughout the year which must be addressed through protective controls, best management practices, contingency and mitigation measures.

To the extent a seasonal excavation approach, whether of the same duration or more extended duration, is included in the 100% RD, the Notice also called for evaluation of what specific work could be completed outside of proposed seasonal excavation seasons and maximization of that work. While Respondents list in Section 3.12.1.7.1 of the Plan some potential non-excavation activities which they might consider performing during hurricane season, the Plan discusses only that they will "provide an evaluation of these and potentially other tasks that can be performed outside the excavation season." This evaluation and its results should be documented in the 100% RD for EPA review.

Supplemental EPA Comment: BMP Top Elevation. The Notice concluded, regarding the BMP height, that Respondents must adequately address any potential safety and structural issues raised by the BMP's top elevation, either through re-design and/or documented evaluation of mitigation, protection and safety measures in the event of overtopping. The EPA is encouraged that GHD now is reconsidering the BMP height, as discussed in the February meeting. If the risk of overtopping during high water events remains a significant uncertainty as indicated in the 90% RD, consideration should be given to increasing the height of the BMP to further reduce this risk.

While the ROD specifically left the design of the cofferdam BMP to be determined during the RD, the ROD did not require a BMP that would prevent overtopping in all high-water events, and the ROD considered (but not require) a BMP with a top elevation of +10 feet to be protective of a design flood with a 25-year to 50-year return period. In response to a public comment, the EPA stated that "[t]he intent of the proposed cofferdam elevation is to reduce the probability and frequency of inundation, limit the scour potential if inundated, reduce the potential volume of water to be treated from multiple dewatering events, and restrict the size of delays in production." ROD, p. 285, Response to Comment 2.5.86.

As discussed in the 90% RD and the Notice, Respondents' proposed top elevation of the BMP is tied closely to their hindcast model. Respondents' hindcast model was based on historical water level data upriver at the Sheldon gage, and the correlation of a set Sheldon gage inputs to data from a transducer installed at the Site in July 2019. The original hindcast model in the June 90% RD was based on only 6 months of transducer data; the revised hindcast model in the NWC 90% RD added an additional two years of transducer data. The addition of 24 months of Site transducer data changed the model results from hindcasting no events since 1994 with river elevations topping +9 feet NAVD88 from November to April as stated in the June 90% RD, to modeling an overtopping event in November 1998 at +9.78 feet, as stated in the NWC 90% RD. The EPA pointed out in the Notice that the revised hindcasted river levels for November 1998 would have overtopped the BMP, and, because November is during the proposed excavation season, this model result is inconsistent with Respondents' seasonal excavation approach. The March 2024 Updated Hindcast Model memorandum added another year of transducer data and produced new changes in the hindcasted model data. Based on the March 2024 Updated Hindcast Model, the hindcasted November 1998 river levels are now below +9 feet (as they were in the initial model results), making the November river levels consistent again with Respondents' proposed excavation season. However river levels at the Site are now also represented as below the +9 feet level in more months including May to July since 1996, which extends beyond the proposed six-month excavation season, and in fact are hindcasted below +9 feet for all high-water events since 1996 except Hurricane Harvey. (compare Figure 1 of the March 2024 Updated Hindcast Model technical memorandum and Table 4-1, Historic High Water Events, from the Southern Impoundment High Water Preparedness Plan, dated July 28, 2023; note that Figure 3 of the 2024 technical memo apparently includes the October 1994 flood, which also exceeded +9 feet).

Regarding the BMP height, the Plan response to the serious deficiency in the EPA's Notice is to 1) update the hindcast model by incorporating additional river water level data collected at the Site into the model to update and refine the model; and 2) to evaluate the BMP height based on this updated information (Section 3.5.2 of the Plan). At the February 9 meeting, Respondents stated they were "continuously" updating the hindcast model for the Site, as they have used the model to inform excavation seasons and wall height. Both in the Plan and at the meeting, Respondents stated that they would reconsider the BMP height only after the update of the hindcast model, with the possibility discussed in the February meeting of increasing the BMP height up to a foot.

The EPA is concerned about Respondents' potential over-reliance on their hindcast model. While refining the hindcast model may be useful, there may be limited utility to continuously fine-tuning a model of historic river heights relying on the limited dataset from the Site transducer installed in 2019. Most importantly, over-reliance on the hindcast model ties the BMP height and the excavation season to continuing fluctuations in a model of historical events without addressing other factors such as sea level rise and climate change. This ignores both the unpredictability of high-water events and their potential to increase both in number and strength in future.

The changes in the hindcast model's output also indicate the model's sensitivity to addition of relatively limited amounts of new transducer data. However, additional months of data added to the model may or may not be representative; for instance, at the February meeting, Respondents noted the unusually dry summer of 2023. Respondents should investigate the hindcast model's relative accuracy in extreme high-water events at the Site. Respondents' transducer used for the hindcasting was installed in July 2019, and, with the notable exception of Tropical Storm Imelda, there have been fewer extreme flood events on the San Jacinto River

during the timeframe since July 2019 than in the previous 5-year period (with multiple 500-year floods including in 2015, 2016 and Hurricane Harvey in 2017).

Respondents' varying model results for river levels at the Site during Tropical Storm Imelda indicate that they have not used their own transducer data to validate the hindcast model. Respondents have had Site transducer data from July 2019 (with the exception of 2022), however, a review of the NWC 90% RD and 2024 model reports indicate that the Site transducer data has not been used to calibrate their model and is not reflected in the model figures. Flooding associated with Tropical Storm Imelda, which occurred in September 2019, was hindcast in the NWC 90% RD model report to have exceeded a +9 feet river elevation at the Site, but is depicted as below +9 feet in the March 2024 updated model; this conflict between model reports is confusing because Respondents have the actual Site data for Tropical Storm Imelda. The EPA is unable to interpret the raw transducer data for Imelda provided by Respondents, which requires complex calculations for the higher river elevations, but presumably Respondents have done so. The EPA does have the transducer data for January and February 2024. The transducer data included in Respondents' monthly reports shows that Site river levels reached a maximum of +4.98 feet on February 4, 2024, following a late January high-water event on the San Jacinto River, and Site river levels exceeding +4 feet continued through February 29. Figure 1 of the Updated Hindcast Model, however, does not reflect that data and shows no exceedances of Site surface water levels over +3.75 feet for that entire timeframe. Respondents should calibrate the hindcast model with the existing transducer data and provide this information in the 100% RD.

Have Respondents investigated the potential for the 2019-2024 transducer data, which appears to include fewer extreme storm events, to result in hindcast data for the Site generally less accurate in high water events? A review of Figures 5-4 and 5-5 of the NWC 90% RD indicates several instances where the Sheldon gage data documents significant high-water events not reflected by corresponding changes in the Site hindcasted data for those times, including high-water events documented by the Sheldon gage in November, January and April during the proposed excavation season (specifically see the data in Figure 5-4 of the NWC 90% RD for January 1998, November 2003, April 2009 and March/April 2016). This failure for the hindcasted Site river elevations to deviate from average levels, even where the Sheldon gage indicates significant high-water events, is even more pronounced in the March 2024 Updated Hindcast Model results. According to the Respondents' hindcast models, there have been 17 high-water events documented at the Sheldon gage where the river level was at +10 feet or above. Figure 5-4 of the NWC 90% RD shows the Site surface water level reaching +5 feet or more during 14 of those high-water events, while for that same period, Figure 1 of the 2024 Updated Hindcast Model shows river levels at the Site at or above +5 feet only 9 times (compare data in Figure 5-4 of the NWC 90% RD for January 1998, May 2009, Memorial Day 2015 and March/April 2016, and hindcasted data for the same timeframes in Figure 1 of the March 2024 Updated Hindcast Model). The trend, especially in the March 2024 Updated Hindcast Model memorandum, is to hindcast overall lower river levels at the Site in high-water events, which may or may not be accurate. Have Respondents evaluated whether the hindcast model, based on the correlations between approximately 3 ½ years of transducer data to approximately 30 years of Sheldon gage data, accurately reflects the impact of the floodplain in different high-water events?

Respondents should search for and provide in the 100% RD available river elevation information from other sources that might help support or validate their hindcasted data, such as Harris County flood data, estimated USGS high water marks, and FEMA flood data. The figures in the 100% RD with year-round water surface elevations since 1996 should depict actual Site river levels after July 2019 using transducer data, instead of hindcasted levels (and clearly depict what data is hindcast and what is actual Site data), and Respondents should include the cumulative transducer data with the 100% RD, as well as continuing to send transducer data with the monthly reports. This data should be provided both as the raw Site transducer data and the calculated

river elevations based on that raw data; currently, instead of providing the calculated Site river levels, Respondents refer the EPA to the transducer manufacturer's support website for complex instructions on performing the calculations for river levels over a certain height. Respondents should provide the calculated river height data to the EPA in the 100% RD and with their monthly reports.

The March 2024 Updated Hindcast Model memorandum also fails to include any results for 2022, skipping from 2021 to 2023, nor does it adequately explain the corrupted data leading to all transducer results from 2022 being excluded.

Once Respondents are more confident in the historical river level data at the Site, it would be useful if Respondents provided technical data supporting any incremental increases in protectiveness in different increases in wall height, based on the existing historical river elevation data. Respondents at the February 9 meeting discussed evaluating increasing the height of the BMP up to +10 feet (a height also discussed in the Site Feasibility Study), and Respondents' revised hindcast data from the NWC 90% RD showed only two high water events in the last 30 years exceeding the +10-foot river elevation level (the 1994 flood and Hurricane Harvey). It would be useful to determine from what kind of storms (50, 100-year, etc.) different wall heights potentially will provide protection. The 100% RD should provide documentation of the number, months, and types of high-water events for which different BMP top elevations would/would not be protective based on historical data.

Regarding presentation of the river level data, Figures 5-4 and 5-5 in the NWC 90% RD and Figure 1 to the March 2024 Updated Hindcast Model memorandum (replacing Figures 5-2 and 5-3 in the June 90% RD), which compare the Sheldon gage data with the hindcasted Site river surface water elevations, are limited to elevations up to 10 feet, making it difficult to accurately compare the hindcasted data with Sheldon gage data for elevations over 10 feet. In the 100% RD, Respondents should provide not only revised versions of Figures 5-4 and 5-5 and Figures 1 and 2 of the March 2024 Updated Hindcast Model, but also a table of historic high-water events in the format of Table 4-1, Historic High Water Events, from the Southern Impoundment High Water Preparedness Plan, dated July 28, 2023. This would provide historic crest information with more precision than is possible in Figures 5-4 and 5-5. Respondents should add an additional column to this table showing the concurrent Sheldon gage data for each high-water event.

Respondents should also explain in the 100% RD why the selected BMP height does not include a safety factor above a maximum river level of +9 feet to address potential overtopping from wind waves and vessel wakes.

Supplemental EPA Comment: Intentional Filling of the BMP. The Plan states both that "[i]ntentional flooding of the BMP is not required to maintain the structural integrity of the BMP" and "[i]ntentional flooding would also decrease differential pressures across the wall further increasing the factor of safety against compromising the BMP structural integrity" (Section 3.7.2 of the Plan). While intentional flooding is perhaps not necessary for the structural integrity of the BMP, clearly it affects at least the factor of safety for the BMP's structural integrity. This relationship between intentional flooding and the factor of safety for the BMP should be clarified, and if possible, quantified (How much does intentional flooding affect the factor of safety, and in what circumstances? To what level(s) does the BMP need to be intentionally filled to address that factor of safety?). More detail should also provide evaluation/discussion of intentional flooding as a mitigation measure for internal scour within the BMP, including the level(s) of water within the BMP for protection against internal scour.

At the February meeting, Respondents stated that it is not their current intention to intentionally fill the BMP every excavation off-season but only as a contingency in circumstances to be defined by Respondents, but this is not clearly indicated by the Plan. The Plan states that Respondents "will provide specific procedures that will clearly define the requirements for monitoring the river levels and clear metrics, such as named tropical storm events, to define when mitigation measures are to be implemented." Respondents should evaluate specifications and plans with metrics, procedures and mechanisms for intentional flooding which are more flexible, more quickly implementable, and more targeted to individual high-water events, which could support an extended excavation season.

In developing procedures and metrics for intentionally filling the BMP and then addressing the accumulated bulk water, Respondents also should use procedures and metrics to ensure the filling process does not disturb the sediment.

Inadequate Consideration of Alternatives to Trucking.

Summary of Relevant Notice Deficiency: The 90% RD presents limited road access along the TxDOT right-of-way (ROW) to the Site as a "technical uncertainty" for remedy implementation, but the 90% RD does not document adequate consideration of alternatives to using trucks for all materials handling. Respondents selected a design option – sole reliance on trucking - potentially limiting or preventing implementation of the remedy, without sufficient evaluation of methods successfully used at other Superfund and sediment remediation sites for materials handling.

In the Plan, Respondents' only response to the serious deficiency identified by the EPA is that they believe trucking is the "safest and most effective transportation method" (Section 3.6.2 of the Plan). In the Plan and at the February meeting, Respondents provided several reasons for not evaluating alternative approaches to trucking: Respondents stated that they had conducted a prior evaluation of barges before the 30% RD; they cited the successful, safe and proven use of trucking for the Southern Impoundment Remedial Action; they relied on statements from TxDOT that it will work with EPA and Respondents to allow for use of the access road for remediation; provided general statements about potential disadvantages of barges; and discounted the possibility of using pipelines to transport waste because the Site remediation will not be using hydraulic dredging.

Given the circumstances of this Site and Respondents' own identification of this issue as a "technical uncertainty," this response is insufficient. Respondents stated at the meeting that they had no contingency if TxDOT shuts down use of the access road – the contingency is for the Superfund work to be shut down. The EPA's concern is that TxDOT may not, due to its own construction project, give sufficient access to the ROW to prevent significant delays in remediation of the Site, and Respondents have no contingency to the use of trucking on TxDOT's access road other than to stop work. This is particularly concerning because the 90% RD also provides for a limited excavation schedule. Respondents must provide a design suitable for procurement which addresses the issues with access and project schedule that have been identified; includes adequate contingency planning and/or specifications for contingency planning; and documents adequate analysis and evaluation of the potential means to address these issues.

While the use of trucks was successful for the Southern Impoundment Remedial Action, that remediation was not coordinating with TxDOT's major, adjacent, multi-year bridge replacement, and TxDOT owns the ROW required for truck access to the Site. While TxDOT has expressed willingness to work with the Superfund project, it has not guaranteed unobstructed use of the access road in its ROW, and TxDOT itself recently has suggested that the Superfund project should develop a contingency in case the access road is not available. The Plan, and Respondents at the February meeting, also rely on the fact that Respondents reviewed other transportation

alternatives, including barging, prior to submission of the 30% RD. This would have been before additional information about TxDOT's bridge reconstruction project was available, and no documentation of a detailed consideration of congestion and other issues has been provided for this prior evaluation. Even if using barges was previously evaluated by Respondents early in the RD, a new, more thorough evaluation should be conducted in light of the issues with trucking identified in the 90% RD and also identified by TxDOT.

Supplemental EPA Comment After Review of Plan: Respondents' current preferred approach of relying solely on trucking and shutting the remediation project down whenever TxDOT is unable to grant access to the TxDOT ROW may negatively affect the biddability of the project, especially as it is currently unknown how often and for how long this may occur during the bridge reconstruction. While TxDOT has committed to working with the Superfund project where possible, TxDOT has recently stated that the Superfund design should develop contingencies for potential prolonged shut-downs of traffic on the access road. The 100% RD should, at a minimum, provide parameters, metrics and specifications which address the requirements of the project, but which still would allow the future Remedial Contractor to develop alternate means of material handling and transport in order to complete the remediation and also support the biddability of the project. Bidding contractors may be able to develop more sophisticated approaches in light of the newest technologies and latest construction techniques, or employ more refined approaches in light of their own construction experience.

To support the 100% RD, Respondents should conduct a new, much more thorough review of potential alternatives or modifications to address issues related to limited road access to the Site through the TxDOT ROW and the limitation on Site areas available to be used for logistical purposes, or to reduce the impact of those issues on the project. Alternatives to trucking could be considered for selected activities, such as the use of fixed barges for water treatment or support equipment operations, or the alternatives could be developed as general contingencies to be used during the remediation when there are conflicts preventing use of the access road. This new review and evaluation should include supporting information or studies such as congestion studies, fleeting issues, or handling issues related to the viability of the alternatives for consideration. For instance, a study of vessel congestion could be conducted in relation to barging, with calculations of the cycle times of the project and adjustments made to the number of scows required to keep operations from having downtime, as well considering as the potential locations of a transloading facility. As another example, specifications for high solids pumping, with dewatering and water treatment and potentially in-line stabilization, could be developed after investigating their use at other sites and considering their potential use at this Site.

Information from this new evaluation could be used to inform the development of metrics and specifications which address the requirements of the project, but which still provide flexibility to the Remedial Contractor to develop alternate means of material handling and transport in order to complete the remediation. The Northern Impoundment remediation is a large, complex project, and evaluation of newer and more specialized technologies used successfully at other sites to address similar issues is appropriate.

Alternative sediment handling methodologies should be evaluated because they would mitigate the access road issues with the TxDOT highway expansion plans. One example of an alternate technology which could be considered is a mechanical dredging hybrid. This hybrid consists of using mechanical dredging as a one pass operation that can handle debris and larger material. The dredge sediment is placed in a screening system and then remaining sediments are pumped as a slurry through a pipeline that can extend for miles with the use of booster pumps. Examples include the Berry's Creek site in New Jersey and the Wyckoff Superfund site in Seattle. This is also similar to the process is being implemented in a similar situation at the EPA's Sediment Removal of the Cuyahoga River Gorge Dam GLLA Project, where 1 million CY of sediment are being mechanically dredged, placed into scows, offloaded, and pumped to an inline solidification/stabilization area.

Respondents' response to potential alternatives suggested in the Notice, both in the Plan and at the February meeting, indicates that Respondents have not, in fact, thoroughly evaluated them. For instance, at the February meeting, Respondents' objections to barging included the potential for releases when an excavator bucket with waste is swung out over the BMP in order to load a barge. However, the preferred approach to loading a barge, as discussed in the Notice, would be to use a contained conveyor belt system for loading and transport. Additional mitigation measures to prevent releases while loading barges are also available, for instance, a simple splash guard/drip pan, and transport could be by covered scow or covered deck barge conversion transport if required.

Respondents also stated at the February meeting that pipelines for materials handling are typically only used in projects where hydraulic dredging is the removal method, not mechanical dredging. However, pipelines are used in many different applications around the marine construction industry, and current remediation projects have successfully used pipelines for transportation of wastes at sites using mechanical dredging and even for dry excavations; at this Site, areas of the river bottom at the Site which will be excavated "in the dry" could still potentially have significant amounts of water in the waste and sediments. Sediments can be pumped with a range of technologies using compression, pneumatic piston, screw, eddy, and paste pump technologies among others; the sediment is pumped at a very high solids content as opposed to traditional impeller based pumps that can only handle between 10-15% solids. Of the different types of pumps, some can handle waste material which is 60-70% solids. There also are options for in-line stabilization, which allow for sediments to be solidified and transported in a short amount of time while binding contaminants within the sediments, and the stabilized sediments could be pumped directly into trucks or barges. While the water used to slurry pumped material would require dewatering, there are methods to both reduce the amount treated and the footprint of the water treatment facilities. These and other technologies should be considered by Respondents in preparing the 100% RD materials handling approach and potential access contingency plans, with documentation provided in the 100% RD of Respondents' evaluation.

To the extent the design does retain trucking as a design element, because of the likely overlap in schedule with the I-10 work, the RD should provide direct input from TxDOT on the bridge design and its updated plans for bridge. The RD should also identify, with coordination with TxDOT, the haul routes to be used in the vicinity of the Site due to the high level of traffic anticipated during the RA. This includes delivery of materials to the project as well as waste materials transported offsite. Maintenance of traffic plans need to also be coordinated with TxDOT and other stakeholders. At a minimum, there should be a high-level review of access roads, on/off ramps, businesses in the area, TxDOT concurrent construction activities, etc. to ensure they are capable of handling and amenable to the anticipated trucking needed to support the RA. The design and specifications should also be clear that this will be an on-going task and have requirements for contingency plans to be incorporated to allow for mitigation of issues due to conflicts arising between the two projects' requirements.

Barge Protection

Summary of Relevant Notice Deficiency: The 90% RD does not provide a plan for, or specifications or performance metrics related to, protection of the BMP from barge impacts, even though acknowledging the potential for damage to the BMP from barge strikes and describing potential barge strikes as a "technical uncertainty" in the implementation of the RD.

Respondents' Plan states at Section 3.8.2 that they will include further evaluation and design of barge protection systems that reflect the conditions of the BMP in the river in response to the serious deficiency in the Notice. However, both in the Plan and in Respondents' April 3, 2024, Barge Protection Memo – Supplement to Plan, Respondents' approach to barge impact protection is focused on what Respondents consider as the most likely barge strike scenarios, and not the potential for a strike in potential extreme conditions. Respondents state this is a reasonable approach instead of a design based on compounding several parameters with a low probability

of occurrence, e.g. largest barge in the vicinity of the BMP, higher velocity of flow, loss of engine control etc. to define the design criteria for the BMP.

While the Notice cites incidences of barges striking the I-10 bridge as evidence of a potential for collision with the BMP, Respondents state that unlike the piers of the I-10 bridge, the BMP is not located directly in the navigational waterways, and according to the Plan, the BMP should not be in the direct path of a head-on impact if there is a loss of engine control during typical navigation. The 90% RD also evaluated the impact of unintentional strike from one of the largest barges utilizing the 95th percentile velocity of the river water, instead of maximum velocities. Respondents assumed that if a barge loses engine control or disconnects from the mooring, it may drift toward the BMP with the river flow, and such a strike could cause localized damage to the BMP, but a global failure or collapse of the BMP according to Respondents is unlikely.

Supplemental EPA Comment After Review of Plan: While the Plan provides for evaluation and design of mitigation measures to address the potential for barge strikes, Respondents' analysis did not evaluate a barge impact in extreme weather or flow conditions. Respondents' arguments that the BMP is not located directly in the navigational waterway is not persuasive. This area of the San Jacinto River has a history of barges hitting the Site cap (Tropical Storm Imelda 2019) and the adjacent I-10 bridge during storms; storm conditions are more turbulent, more erratic, and likely will have faster stream velocities, with the potential for mechanical problems because of stressed systems during a storm – all increasing the likelihood of a strike.

Respondents' April 2024 Barge Protection Memo states that it uses conservative assumptions to calculate potential barge impact energy and force because Respondents used impact calculations for bridge piers, which have a smaller profile than the BMP, and also because their calculations ignore the energy absorbed by the barge. However, Respondents' evaluation of the potential energy from a barge strike uses as the impact speed the 95th percentile velocities for river flow from Respondents' Hydrodynamic Model, which is 2.2 feet per second (ft/s), estimated by Respondents to be equivalent to stream flow from a 10-year flood with the BMP in place (this assumes the barge is drifting with the current). Respondents' use of 95th percentile velocities from a modeled 10-year flood for their evaluation is not consistent with the most recent actual incidence of barges impacting the I-10 bridge and the Site during the flooding associated with Tropical Storm Imelda, which was not a 10-year flood. According to Appendix C of the Plan, "BMP Scour Protection," Respondents stated that they used observations of river velocities during Tropical Storm Imelda for purposes of developing scour protection; together with other data, this resulted in approximate peak velocities during Imelda of 4-5 ft/s. Respondents also should incorporate this velocity data into the barge impact analysis.

The EPA remains concerned with the sufficiency of this evaluation because 1) it does not model an extreme scenario, such as a 500-year flood with maximum stream velocities (instead of the modeled 95th percentile velocities) or use observed data from Tropical Storm Imelda; 2) the EPA also questions use of the 2.2 ft/s velocity estimate because, for the recent late January 2024 high-water event on the San Jacinto River for which the Sheldon gage showed river levels of approximately 13 feet or a moderate flood stage, the actual – not modeled – river flow velocity data collected at the Site showed velocities of over 4 ft/s, as documented in Respondents' monthly report. The Site velocity data for the last several monthly reports also shows multiple events with river velocities substantially in excess of 2.2 ft/s, which, according to Respondents, is the river velocity of a 2-year flood in current conditions without the BMP in place (the barge impact modeling considered the presence of the BMP). This calls into question the accuracy of 2.2 ft/s as representative of stream flows in more common flood events, including a 2-year flood (Respondents state that the river velocity in current conditions for a 10-year storm is even lower, at 1.45 ft/s). The discrepancy in the measured and simulated maximum current speeds (4 ft/s compared to 2.2 ft/s) indicates that Respondents' hydrodynamic model was most likely not calibrated using measured currents in proximity to the Site where the cap is to be installed. Respondents should set up their model to simulate the period of time when the currents were being measured (at least January and February 2024) and then use the data to calibrate their model. Respondents

should provide cumulative Site velocity data in an appendix to the 100% RD, as well as continuing to submit monthly reports with velocity data. This data should be provided both as the raw Site data and the calculated river velocities based on that raw data.

As stated elsewhere in the EPA's comments on the 90% RD, the 100% RD should model a rain induced, 500-year flood as part of their revised Hydrodynamic Model to evaluate protectiveness of the design. This information would be used to design of mitigation measures, because a 500-year, rain-induced flood event would be expected to require stronger and taller protections from potential barge strikes due to the higher water levels and faster flood-induced currents.

The mitigation measure designed in the April 2024 Barge Protection Memo is a barrier wall 20 to 25 feet from the exterior wall of the BMP on the north and east sides of the BMP. Particularly on the east side of the BMP, this could constitute a significant obstruction of the navigation channel. However, the USACE has noted that protection along the eastern portion of the BMP, where the flow is not directly into the BMP, is less likely to be necessary and therefore these protective structures should not need to encroach upon the main channel of the river. Respondents should evaluate appropriate alternatives which minimize intrusion on the navigation channel. Additionally, the proposed barge protection footprint may also impact the TxDOT I-10 bridge design, particularly as section 4 appears to overlap where TxDOT has shared bridge protective structures will be placed. Respondents need to coordinate with all relevant stakeholders regarding proposed barge protection measures.

The 100% RD should include discussion of how the 12ft elevation for the barge impact protection was selected and how it is protective, including a discussion of the selected depth of pile driving.

Scour on the BMP Exterior

Summary of Relevant Notice Deficiency: The 90% RD does not provide a plan for, or specifications or performance metrics related to, protection of the BMP from potential scour on the exterior of the BMP, while acknowledging the potential for structural damage to the BMP from scour.

Supplemental EPA Comment After Review of Plan: Appendix C to the Plan, a technical memorandum dated January 25, 2024, on BMP Scour Protection, provides information on the type and size of material to be used for scour protection. Drawings included in Appendix C depict the areas on the exterior of the BMP for placement of riprap, with detailed drawings to be included as part of the RD. The design drawing should provide scour protection materials and placement information relative to modelled flow pattern, including calculations showing retention of silts and clays providing support to the wall.

The 100% RD also should include plans and specifications providing for regular monitoring and inspection of the scour protection riprap, especially after every high-water event.

The scour protection discussed in Appendix C to the Plan is based on Respondents' current hydrodynamic model. As discussed under Hydrodynamic Modeling below, Respondents' current hydrodynamic model does not use maximum bed shear stresses, but instead uses 95^{th} percentile values; however, maximum bed shear stresses should be used 1) to evaluate the potential for river flow to create scour around the BMP, and 2) to calculate shear stresses to inform armoring or reinforcement at the base of the cofferdam. While Respondents have considered higher stream velocities for purposes of exterior scour protection, Respondents' scour protection should be re-evaluated in accordance with changes to the hydrodynamic model.

BMP Removal/Site Restoration

Summary of Relevant Notice Deficiency: The 90% RD is seriously deficient because it lacks complete plans, procedures, specifications and/or performance metrics for removal of the BMP and restoration of the Site upon completion of the project. Critical work is left to the Remedial Contractor, which may create uncertainty affecting biddability.

In Section 3.10.2 of the Plan, Respondents state that they will include Remedial Contractor specifications for removal of the BMP while still maintaining some flexibility as to not dictate the Remedial Contractor's means and methods. Regarding the end-state of the project, Respondents state they provided additional restoration drawings to TxDOT detailing the proposed sloping after the removal of the BMP, based on the end-state evaluation in their hydrodynamic model. Respondents also state that the Hydrodynamic Modelling Report considered shear stress and velocities in the end-state condition, and that the end-state condition was simulated by a change in bathymetry in the model to account for removal of the BMP; the revised bathymetry based on the excavated area; and the shoreline embankment to be included as part of restoration. The Plan also states that, based on their modeling, erosion and scour protection will be added for the soil embankment along the southern edge of the impoundment. The Plan adds that TxDOT stated the planned alignment of the BMP does not conflict with the current design of the I-10 bridge replacement project and the southern wall of the BMP (to be installed on the TxDOT ROW) could be left in place and cut below ground surface as a measure to maintain slope stability for the shoreline.

Supplemental EPA Comment After Review of Plan – BMP Removal: The EPA Notice expressed concern about the potential scope of operations necessary to remove the BMP. While subsequent discussions with TxDOT indicate that the BMP may be substantially left in place on the TxDOT right-of-way at the completion of the remediation, this has not been the position of the Port of Houston Authority (POHA) regarding the portion of the BMP within the river. Respondents state in the Plan that they will add contractor specifications to address BMP removal while not dictating contractor means and methods, but the EPA continues to be concerned because Respondents have not provided an evaluation of whether BMP removal can be successful. The 90% RD qualifies whether the BMP can or will be removed, stating the BMP may be cut at the mudline or left in place (although POHA has stated from the beginning that they want it removed); that additional discussions with stakeholders on the issue may take place; and that the BMP will be removed if safe. Respondents also do not address whether there are BMP design choices that need to be considered to allow for or facilitate the BMP's removal.

The Plan states that specifications will be added for removal of the BMP; the Remedial Contractor specifications to be developed by Respondents should discuss the requirements for the removal of the BMP to guide the Remedial Contractor in the method selection, sequencing and decommissioning activities. The specifications must address concerns regarding how the removal of the wall fill, as well as the removal of the sheet piles, will be conducted in a manner that minimizes potential for disturbance of sediments in the river.

The removal of the wall may be difficult and sufficient guidance must be provided to the Remedial Contactor in the specifications. The cost to demobilize this massive wall structure is likely to be substantial, and the equipment and personnel required should be estimated. The sheet pile walls cannot be cut down to the mudline until all of the interior materials are removed, which includes the bracing and fill. How will the fill be removed and how will it be dispositioned? Is there a potential which should be addressed for the sheet pile walls to collapse or break when the fill/bracing is removed? Contingency plans also will be necessary if a storm occurs during the BMP removal process. How these issues are addressed will affect the biddability of the project.

Supplemental EPA Comment After Review of Plan: Respondents state in the Plan that they have been in discussion with all stakeholders during the development of the RD. However, there are stakeholders with concerns which are not specifically addressed, including POHA, which has stated the BMP needs to be removed from the river. The 100% RD should provide details of coordination with all stakeholders.

Supplemental EPA Comment After Review of Plan – End-State and Protection of Other Structures:
The EPA has emphasized throughout the design process that the end-state of the Site after completion of remediation must be protective of nearby structures, including the I-10 bridge and its protective structures. While the Plan and Respondents' statements at the February meeting indicate that the additional restoration drawings provided to TxDOT and Respondents' previous hydrodynamic modeling fully address these concerns about the project's end-state, the EPA does not agree. The 90% RD states that upon completion of remediation, and with the exception of the southern side of the impoundment and the NW Corner dredged area, Respondents will not backfill the excavation area where, by Respondents' calculations, approximately 188,000 – 234,000 cubic yards of material will be removed. The failure to backfill the excavation (with the exception of the proposed embankment and NW Corner dredged area to prevent heave) may affect the stability of other adjacent properties, shore stability, pipelines or nearby fleeting operations. The EPA has continuing concerns about the possibility for the unfilled excavation to destabilize the proposed embankment designed to address potential scour from the project's end-state. Additionally, the selected remedy for the nearby Sand Separation Area is Monitored Natural Recovery, and it is not clear if the Respondents modeled the effect of the proposed end-state on the Sand Separation Area and verified that it will not affect the remedy. The 100% RD should provide additional information regarding these concerns, and how the adjoining stakeholders' requirements are being met.

As discussed in the Notice, Respondents did not provide adequate supporting information demonstrating how the proposed sloping would remain stable in the long-term after removal of the BMP and continue to remain protective of the bridge and its protection structures. The EPA's review of the Hydrodynamic Report indicates that the PRPs revised the bathymetry in the model to account for the embankment when they modelled the end-state, and they then designed additional armoring to account for scour and erosion revealed in the modeling. However, the PRPs did not conduct a complete sedimentation study to evaluate the potential depth and amount of scour, and also did not model potential effects of the end-state and scour on the long-term protectiveness of the proposed armored embankment. Additional information should be provided to show that the proposed embankment will remain stable and protective of the bridge and other structures, in particular through the information about depth and amount of scour which would have been provided by a complete sedimentation study; consideration of conducting modeling of the long-term stability of the embankment with the proposed armoring in place; and consideration of whether it is protective in a potential 500-year flood event to ensure its long-term protectiveness. Respondents should model a 500-year flood to inform several design issues, and these should include the potential effects and long-term protectiveness of the Site's end-state on all nearby structures in addition to the I-10 bridge.

Section 5.6.5 Excavation Area Restoration of the June 90% RD also includes the possibility of utilizing "recycled TCRA armored cap rock, clean berm material, and/or clean imported sand or aggregate for restoration activities in lieu of disposing of these clean materials." It is not clear whether the Restoration Plan drawings, either as provided in the 90% RD or later to TxDOT, depict the final bathymetry for the rest of the Northern Impoundment (in addition to the proposed embankment), including any fill or cover as discussed in Section 5.6.5. The 100% RD should include a plan for what the future bathymetry will look like upon completion of excavation and removal of the BMP. Based on Section 5.6.5 of the 90% RD, it seems like the area may be used as a repository of clean materials without a particular plan on how to grade them except for along the southern edge, and how to prevent future erosion of any clean materials placed in this area. Any proposed fill materials also must be suitable for their intended use and meet the requirements of TxDOT and other property owners on whose property fill is placed, as well as any regulatory requirements.

Insufficient Supporting Information and Overall Lack of Detail

Summary of Relevant Notice Deficiency: *Insufficient Supporting Information and Overall Lack of Detail. The 90% RD does not provide sufficient detail, explanation, documentation, and support for some design decisions, conclusions and factual statements, and is generally overly conceptual and not adequately developed for a 90% design. This affects the EPA's ability to review the document, but inadequate supporting information also affects the biddability and constructability of the RD.*

This deficiency applied to several issues:

Vibration Analysis. *An updated vibration study was not included in the 90% RD, despite the significant change to a double sheet-pile cofferdam wall. Given the importance of this issue, additional support and explanation should have been provided for this conclusion, especially because: 1) the design of the 90% RD moved the BMP closer to I-10 than the previous design; 2) Respondents indicate that they may not have obtained structural information on the foundation of the current I-10 bridge; and 3) vibrations may impact pipelines, which has not been evaluated.*

Section 3.12.1.1.1 of the Respondent's Plan states that the vibration analysis report will be updated to reflect the new conditions for the BMP, and the updated report will address the potential effects on the I-10 bridge and Exxon pipelines in the area.

Supplemental EPA Comment After Review of Plan: As-built drawings of the existing I-10 bridge foundations should be considered in the vibration analysis. Refer to the TxDOT section of the EPA's comments for additional comments regarding providing a plan for monitoring for vibrations during the RA and suggestions on wall installation, including potential alternatives for installing the wall which create less vibration.

Additionally, Respondents should reconsider the following 30% RD comment if the updated analysis shows vibration may be a concern, especially when evaluating wall types to reduce the footprint of the southern portion of the BMP in the TxDOT ROW: "The vibration analysis which provided the acceleration inputs for slope stability analysis assumed the user of an impact hammer. Why was the use of a vibratory hammer not considered in evaluation as it tends to generate lower PPV values based on published literature? The use of vibratory hammer and other means to minimize the vibrations resulting from pile driving operation could change the input, output, and conclusions of the slope stability analysis."

Waste Volume Estimates. *In the 90% RD, "Respondents have provided inconsistent waste volume totals for the Northern Impoundment"; "Respondents have not provided sufficient technical detail to support their estimated waste volumes"; and there is a "lack of documented and consistent waste material volumes" and explanation as to "their relation to other volumes of material to be excavated and reused."*

Section 3.12.1.2.1 of the Respondents' Plan states that Respondents will update waste volumes for the entire Site using the revised excavation surfaces. However, the serious deficiency identified in the EPA's Notice was not limited to the inconsistent totals of waste volumes provided in the 90% RD, or that the totals were based on Respondents' SWAC methodology; the EPA was also concerned that Respondents did not provide their waste volume calculations and other technical detail to support the waste volume totals for the Site, including the five Site area volume totals included in Drawing C-19, in order allow the EPA to check and reproduce those totals.

Supplemental EPA Comment After Review of Plan: When Respondents update the waste volumes for the entire Site using the revised excavation surfaces in compliance with the ROD, Respondents should include calculations supporting each total. The calculations and information supporting the waste volume totals should

clearly identify volumes of material to be excavated, in comparison to volumes to be disposed of off-site (if different); the excavation boundaries for each area (both lateral and vertical); and whether Respondents' waste volume totals include approximately 25,000 cubic yards of potentially unimpacted material from the historic central and southern berm, which the 90% RD says will be excavated for potential reuse. Additionally, Figure 3-5 shows the area for which armored cap material is intended to be reused, and there is a large portion of the northwest portion of the Site which is not included. The design waste volume totals should distinguish between the volumes of TCRA cap material vs the volumes of the underlying waste.

Residuals Management. *The 90% RD did not provide sufficient detail regarding residuals management approaches for the EPA's review, nor the full evaluation discussed in the EPA's September 28, 2022 letter." In summary, the 90% RD 1) Did not provide a full evaluation of the residuals created during dredging operations in the Northwest Corner to determine what needs to be in place to meet the criteria; 2) Did not address BMPs to limit the spread of contact water and potential residuals; 3)Did not provide details on how residuals in contact water would be handled in a storm or overtopping event; 4) Did not include contact water generated during dredging when designing the water treatment system.*

Section 3.12.1.3.1 of the Respondents' Plan states that they will develop a Residuals Management Plan that evaluates estimated residuals to be generated and provide details regarding consideration of residual management approaches described in EPA's September 28, 2022, letter. The Respondents' Plan also states they will update contractor specifications regarding management of residuals based on the Residual Management Plan, and define the measures to be implemented to address the spread of contact water and the residuals, with further details of the measures to be taken to secure the Site should an overtopping of the BMP or other high-water event occur. Lastly, the Respondent's Plan states the wastewater treatment system design "will be modified, as necessary, to include additional clarification/filtration components and operations for treating the wastewater streams with potential high sediment loading that will be generated during dredging, residuals management, and placement of the residual management layer."

Supplemental EPA Comment After Review of Plan: Since no specifics were given regarding residuals management approaches in the Respondents' Plan, the EPA will review the Residuals Management Plan and associated contractor specifications and emergency plans when provided in the 100% RD. When evaluating additional clarification/filtration components and operations for treating the wastewater streams with potential high sediment loading, Respondents should evaluate areas of the treatment plant that may bottleneck, and design to address this. For example, more granular activated carbon may need be added to the treatment system to treat these high sediment streams.

Overtopping in Dredged Areas. *The NWC 90% RD provides no support for Respondents' conclusion in the NWC 90% RD that "[u]nder a dredging scenario, there are no controls that could be implemented to prevent a release if uncontrolled overtopping of the BMP occurred." Respondents do not document that any mitigation strategies were evaluated.*

The Respondents' Plan provides no response to this deficiency.

Supplemental EPA Comment After Review of Plan: Respondents should evaluate and provide for high-water/overtopping contingency planning and mitigation measures for area(s) being excavated through mechanical dredging. This is discussed above in the EPA's additional comments regarding BMP Elevation/Seasonal Excavation. This evaluation, as well as the adequacy of the measures considered and selected, should be documented in the 100% RD.

Design Loads. *The Site is located in FEMA special flood hazard area (Zone AE). The EPA Notice questions the support for the June 90% RD statement that "[s]ince the excavation is planned to be completed seasonally*

(November to April) outside the period during which there is a greater risk of flooding events and it is anticipated that the structure will be flooded with river water during the non-excavation season, FEMA flood loads were not considered for the design of the BMP." The clear indication of Respondents' statement is that FEMA flood loads should be considered if the BMP is not flooded during high-water events, even if they occur during the excavation season.

Respondents' Plan does not address the rationale for when or if FEMA flood loads should be considered in the BMP design loads, and whether intentional flooding during high-water events is necessary to address FEMA flood loads in the design The Plan instead claims that 1) intentional flooding of the BMP is not required for the BMP's structural integrity (Section 3.7.2 of the Plan); 2) intentional flooding would "decrease differential pressures across the wall further increasing the factor of safety against compromising the BMP structural integrity"(Section 3.7.2 of the Plan); and 3) Respondents will be developing "specific procedures that will clearly define the requirements for monitoring the river levels and specific metrics, such as named tropical storm events, to define when mitigation measures are to be implemented including controlled flooding of the BMP "(Section 3.12.1.4.1 of the Plan).

Supplemental EPA Comment After Review of Plan: The RD must be clear if intentional flooding of the BMP during high-water events is required for its structural stability in order to address FEMA flood loads, and even if not required, an evaluation/quantification of the extent to which intentional flooding provides an additional factor of safety in light of FEMA flood loads or other considerations. The RD should also provide an explanation of FEMA flood loads generally and the additional forces they might exert on the BMP, and how this is addressed by intentionally flooding the BMP.

TCRA Cap and Historic Berm Reuse. *Remediation at the Site will require removing the temporary RCRA cap. Section 5.2 Re-use of TCRA Armored Cap and Historic Berm Material proposes the reuse of all cap rock material and some historic berm material at the Site, during or after the remedial action. Additional information should have been added in this section to explain how the boundaries of the historical berm and the cap rock reuse area were derived; this would have informed the EPA's review of the sampling procedures for the berm material. For example, because it has not been established that the historic berm material within the proposed boundary is completely free of contamination exceeding the cleanup level, and it may be used on-site for cover and other purposes, the proposed one sample per 1,000 cubic yards may not be sufficient.*

Section 3.12.1.5.1 of the Plan states that Respondents will include additional information on how the boundaries of the historical berm material and TCRA armored cap (cap) rock reuse area were developed. It will also provide additional plans and details of how the cap will be removed to prevent damaging the underlying geotextile and geomembrane in the process. Once the rock is removed, the additional plans will provide options to either reuse the rock around the site or dispose of the cap rock at an off-site landfill. These options will include information related to sampling and staging of cap rock on-site.

Supplemental EPA Comment After Review of Plan: While 02 61 14 (Materials Handling and Transportation) of the Design Specifications in Appendix H provides for the Remedial Contractor to develop a Materials Handling and On-Site Transportation Plan to prevent the spread of contamination during remediation, the 100% RD should provide additional information and metrics regarding this important issue both in the design report and in the specifications, including addressing the following: potential options for where the rock and berm material could be stored once removed (TxDOT has stated that it will not allow storage on its ROW, but the Plan states that the next deliverable will provide information about staging cap rock "on-site") the handling of contaminated materials and the use of demarcation zones, scrub out areas, and any other potential pathways for contamination that could be utilized or considered to mitigate potential for cross contamination of stockpiled materials, such as the armored cap material, inner berm soils and post-excavation surfaces, once these are demonstrated to be clean; measures that will be taken to ensure contaminated materials stored in

the mixing areas do not contact underlying armored cap material or clean excavation surfaces; and procedures to prevent the spread of contamination by excavators, trucks and other equipment as they drive over the TCRA Cap rock and also over previously remediated areas, including through rain and potentially wet conditions of the dewatered river bottom. The specifications also call for fill, aggregate and woven geotextile for temporary access roads, but more information should be provided in the design report to ensure that there are sufficient safeguards to prevent the spread of contamination during remedial construction activities. Respondents also should strongly consider requiring field staff to verify and document that the underlying geotextile and or/geomembrane is both present, and not torn or punctured as cap rock is removed for reuse. Sampling frequency of the material that is planned to be reused at the Site should address the uncertainty regarding the proposed berm boundaries. Discussion of berm boundaries should include the proposed boundary of the additional northern section added to the original berm footprint.

Figure 3-5 indicates that Respondents are not intending to reuse cap rock from the Site's Northwest Corner, but the design drawings included with the 90% RD do not appear to have been updated to include this information, and the NWC 90% RD has several references to potential reuse of rock in that area. No samples of rock from the Northwest Corner were taken for the Armored Cap Material Treatability Testing which addressed potential contamination of the cap rock, presumably because no geotextile was present. Therefore, the conclusion of Section 3.7 of the June 90% RD that "these results support the proposed reuse of the existing armor cap material" would not appear to apply to rock in that Northwest Corner. In addition, Respondents should provide drawings identifying where geotextile associated with the TCRA cap is present on-site, clearly identifying where geotextile was placed in the original cap construction and where geotextile was added subsequently in certain repairs, distinguishing each repair area and noting the date (does not include the added ACBM).

If rock in areas without geotextile cannot be reused and must be disposed of, this should be clearly identified in the design drawings and waste volume calculations because this would affect bidding on the project. In determining the potential for reuse of the TCRA cap rock, Respondents should increase the frequency of rock sampling where geotextile is not present or is not completely intact.

Sufficiency of Geotechnical Information for Revised Wall Alignment. *Considering the impact should the BMP wall fail, Respondents should explain why the geotechnical data presented in the 90% RD is sufficient for the BMP final design, especially given the new alignment for the BMP since much of the geotechnical data was collected.*

As stated in Section 3.12.1.6.1 of the Plan, the Respondents believe the geotechnical data present in the 90% RD is sufficient for the BMP design as 16 deep geotechnical drilled borings have been conducted across the Site and there were Cone Penetration Tests (CPT) soundings during the SDI along the current proposed BMP alignment (13 total SDI CPTs according to the Geotechnical Engineering Report,(Appendix B of the June 90% RD, Section 5, with 11 CPTs along the revised BMP alignment).

Supplemental EPA Comment After Review of Plan: The EPA did not identify any CPT soundings or geotechnical borings within the 90% RD revised alignment of the southern BMP wall which is closest to the TxDOT bridge. For the CPT soundings within the remaining sections of the revised BMP alignment, it is not clear that the depth of the CPT tests was below the bottom elevation of the cofferdam wall or at the seat of the settlement, which should have been considered due to the projected duration of the project. Additionally, the excavation surfaces in the Plan have been modified to address all waste above the ROD cleanup level, which may mean modifications to the wall depth are required in order to allow for deeper excavation. The 100% RD should provide additional information explaining the sufficiency of the geotechnical investigation to support the revised BMP alignment and depth.

Hydrodynamic Modeling. *The 90% RD hydrodynamic model and associated Hydrodynamic Modelling Report lacked sufficient technical detail and information to support the assumptions used in the hydrodynamic model, therefore creating questions about its limitations and the use of its conclusions in the 90% RD.*
The Plan states that "[t]he Hydrodynamic model is appropriate for its intended use," and, regarding additional information and support requested in the Notice, that "such technical details can be included" in a revised RD (Section 3.12.1.8.1 of the Plan). However, the Plan does not provide basic information about the model sufficient to address the specific concerns identified in the Notice.

The supporting information requested is not just minor "technical detail" but is required to review the adequacy of the model, which used to inform several critical components of the RD. For example, Respondents state that they considered waves in the design (but not necessarily the model), concluding that significant waves were unlikely to be generated at the Site and apparently not considering them further in the model; however, Respondents do not identify the wind speeds evaluated for considering the potential effect of wind-generated waves. Respondents also state in the Plan that they evaluated storm surge in the model, but do not specify what level storms generated the surge evaluated (tropical? Category 1? Category 2?). If Respondents' model failed to take into account wind waves and storm surge generated by more severe tropical storms, this could be a major defect in the model for considering any extreme events.

Supplemental EPA Comment After Review of Plan: Respondents should provide the information responsive to the EPA comments on the 90% RD Hydrodynamic Modelling Report (Appendix F) in a revised Hydrodynamic Modeling Report for the 100% RD. The relevant EPA comments on hydrodynamic modeling include the EPA comments in the Notice, the related supplemental comments in this document, the additional EPA comments on the 90% RD which were not specifically included in the Notice, and the Stakeholder Comments. The EPA requires the additional information discussed in the comments in order to review whether Respondents' modeling is adequate to support its many uses in the RD. The identified modeling issues could have a significant impact on the design, particularly because they affect the model's conclusions on potential maximum scour associated with the project and its end-state, but Respondents failed to provide the necessary technical information which would allow any final determinations on the adequacy of how these modeling issues have been addressed. After the EPA's review of the 100% RD Hydrodynamic Modeling Report, the EPA may determine that additional modeling is required to adequately inform the RD.

The Plan did not provide a response to the Notice deficiency requiring additional information and support justifying the selection of the three scenarios that were simulated (i.e., high flow events with return periods of 2, 10 and 100 years). Respondents have provided no justification of their decision to model only 2, 10 and 100-year floods or explained how modeling these less extreme events is protective. The EPA also has considered the number of 500-year floods in the last decade in this area; the need to ensure the stability of the BMP if the equivalent of a 500-year flood were to occur during remediation; the reported depths of scour which occurred during the October 1994 flood; and the need for protectiveness of the project end-state for years into the future. For these reasons, the 100% RD should model a rain induced, 500-year flood as part of the revised Hydrodynamic Model.

Wind Waves. The effect of wind waves, both on bed shear stresses as well as potential overtopping of the cofferdam during simulated flood events, are not simulated in the modeling study. Waves will be the largest during the simulated flood events and storm surge events when the water depths and winds are largest, so the combined wave- and current-induced bed shear stresses should have been calculated during the extreme events that were modeled. If Respondents believe it was not necessary to include the effect of waves, then they should provide the analyses they performed to quantify that wave-induced bed shear stresses are

insignificant compared to current-induced stresses; as part of the analyses to be provided, Respondents should identify the wind speeds evaluated in reaching the conclusion that the potential impact of wind-generated waves is not significant.

Storm Surge. Describe how the "water surface boundary conditions that simulates the propagation of a surge wave from Biscayne Bay into the San Jacinto River area" were generated as well as the magnitude of hurricane that generated this synthetic storm surge.

Simulations of Flooding. Figures that depict the maximum extents of the flood plain included in the model grid that were inundated during the simulated river floods and storm surges should be included in the report.
Use of 95th Values of Bed Shear Stresses. The statement "the 95th percentile values were deemed more appropriate for comparison between different modelled scenarios and conditions since they are more representative of a global effect rather than very localized areas as would result on the use of maximum values" is confusing considering the stated purpose of the modeling (copied below).

> "The model was used to evaluate the potential for river flow to create scour around the BMP, barge impact velocities in load calculations, the BMP's potential effects on the surrounding floodplain, shear stresses after remedial excavation was completed, and the BMP's effects, during and after remediation, on the TxDOT I-10 bridge."

This statement is confusing because maximum bed shear stresses should be used 1) to "evaluate the potential for river flow to create scour around the BMP", and 2) to "calculate shear stresses to inform armoring or reinforcement at the base of the cofferdam" instead of values that "are more representative of a global effect". Use of maximum bed shear stresses is supported by GHD's statement that the maximum values are more representative of very localized areas such as at the base of the cofferdam.

Use of the 95th percentile values is appropriate for some stated model purposes, specifically for the purpose of evaluating "the BMP's potential effects on the surrounding floodplain," but it is not appropriate for other purposes such as evaluating the potential for scour around the BMP and informing armoring or reinforcement at the base of the BMP.

Sedimentation Analysis. Respondents performed only a qualitative-based sedimentation study for the Site; Respondents state in the Plan that a sediment transport modeling study /complete sedimentation study was not performed since it was not a goal of the modeling to estimate how much and how deep erosion would be in proximity to the BMP. As discussed in the Notice, while the hydrodynamic model will indicate whether erosion is likely to occur in an area, a complete sedimentation study would provide more information about how much and how deep the erosion might be expected to be. A complete sedimentation study should have been conducted if there is a concern about exposure and transport of high levels of buried contaminants of concern that could potentially happen due to the magnitude of erosion that would occur during extreme flood and storm surge events. The selected remedy for the nearby Sand Separation Area is Monitored Natural Recovery; a complete sedimentation study would provide additional information about the depth and amount of potential erosion from the implementation of the project and its end-state which could affect the remedy for the Sand Separation Area. Sediment transport modeling, in addition to hydrodynamic modeling, would also help account for the different aspects of the area following completion of remedial excavation activities, which will be changed dramatically from the pre-excavation conditions and should be properly modeled to allow for incorporation into the final end-state requirements of the design. For example, the modeling performed by Respondents showed the potential for erosion of the embankment they intend to build on the southern side of

the impoundment; while Respondents addressed this finding by the addition of rip-rap on the embankment, a complete sedimentation study would provide more information about the depth and amount of potential scour to use in designing the amount and placement of the rip-rap; it could also have been used to determine the long-term stability of the proposed armored embankment (as noted above, however, Respondents do not appear to have conducted any modeling of the embankment with the designed rip-rap protection in place).

A technical justification should be provided for the failure to perform a sediment transport modeling study/complete sedimentation study, including a discussion of how issues which it would have informed are being otherwise addressed.

Additional EPA Comments on the Pre-Final 90% Remedial Design – Northern Impoundment

April 18, 2024

I. Pre-Final 90% Remedial Design – Northern Impoundment submitted June 27, 2022

1. Section 2.3.5.2 Surficial Sediments Geotechnical Properties

A brief explanation of the sampling objectives for the geotechnical analysis of the deposited surficial sediment and how this relates to the Remedial Design (RD) should be provided. This discussion should provide the results of the geotechnical investigation or a clear reference to where the results are available for review.

2. Section 3.3.5.2 Solidification Results and Conclusions

The solidification test results are not presented for the different alternative analysis that were mentioned as being run in the lab. The brief summary of these results needs to be presented to provide the design team and future contractors to assist with their evaluation of possible dewatering, solidification, and stabilization activities.

3. Section 3.3.5.2 Solidification Results and Conclusions

The solidification tests data should be provided as they are needed to show the RC and disposal facilities what strength, permeability, and type of reagent would be coming to their disposal location. This is a baseline test that should be performed in any sediment project that includes removing and transporting wet (potentially impacted) sediments. Also, they provide the contractor with the cost implications if the lower doses did not perform well.

4. Section 2.4 PDI and SDI Conclusions and Recommendations

In the first paragraph of this section the use of the word depth is inappropriate as it appears to indicate that elevation is being referred to, not depth below ground surface or a variable water surface. The wording should be changed so that distances to be excavated or referred to in terms of depth to be excavated and not up to elevations.

5. Section 2.4 PDI and SDI Conclusions and Recommendations

At the end of the first full paragraph in this section, add “and water drawdown” after “planned excavation depth”.

6. Section 3.4.2.3.1 Filtration Pilot Test Results

This section states that based on the observed relationship between turbidity and TSS, turbidity levels can be used as an indication of the TSS concentration, but no figure or table was provided demonstarting this site-specific correlation. Additionally, the section states that the TSS/turbidity relationship is used to indicate that the dioxin and furan concentrations are below the ML. A better explanation of this relationship needs to be provided and the intended use of this information during filtration pilot testing and RA implementation, as the turbidity/TSS relationship is not an adequate substitute for analysis of dioxins and furans in determining compliance. The text should be clear that an analysis will still be performed on the samples for dioxins and furans.

7. Section 5.1 Remedial Design Background

In the 2nd paragraph on Page 38 of this section more clarity is needed. Does Figure 5-A shows area at risk of hydraulic heave if excavated in the dry? Explain this concept. Is the mentioned “additional feet of excavation” the thickness of waste that could be safely excavated below the proposed excavation elevation? Or is it depth below the lowest segment of core identified to be above 30 ng/kg? Also please clarify for the areas shown in white whether the safety factor is less than 1.25 for the proposed removal or is the segment of the core above 30 ng/kg?

8. Section 5.1 Remedial Design Background

In 1st paragraph on Page 38 of this section, three areas of risk for hydraulic heave are identified outside of the northwest corner area of the site. For these areas, what elevation the water level would need to be maintained to prevent hydraulic heave in order to remove or mitigate the risk of hydraulic heave during removal of waste in those small areas? Also, how much backfill would be required to be added to the site if the water level was pumped down for further excavation in the dry after backfilling?

9. Section 5.2 Remedial Approach – Seasonal Excavation, and Top of Wall Elevation

There is no discussion or apparent consideration for the effect of wind waves and vessel wakes as potential contributing factors in any overtopping events. Inclusion of discussion of these topics as well as consideration of them in the wall height selection for the design is required for EPA's review.

10. Section 5.2 Remedial Approach – BMP Alignment and Lateral Excavation Extent

Will the soil buttress be capped or armored to protect it from erosions should a flooding event occur that results in over-topping of the BMP?

11. Section 5.2 Remedial Approach – Season Excavation and Top of Wall Elevations

The design does not present or discuss the ranges of slopes that we will result from the excavation of the waste within the BMP, how these slopes will be managed and what media will be used to cover/cap those exposed, not only upon completion of excavation activities, but also during periods of no site activities.

12. Section 5.2 Remedial Approach, Figure 5-4

Clarify what the contours shown on this figure are showing and, if they are proposed excavation contours, the elevations for those contours need to be presented on the figure well.

13. Section 5.2 Remedial Approach – Excavation Methodology & Water Management

There is a minimum water elevation specified above the soft sediments where the main pumping to the river will cease and the pumping to the proposed water treatment plant will begin. Additionally, the design doesn't address how this minimum water elevation would be determined for areas that have sloped bottoms in which contaminated material is or could be present on the sloped surfaces or excavated side walls.

14. Section 5.2 Remedial Approach – Re-Use of TCRA Armored Cap and Historic Berm Material

The design states "The locations of the historic berm and the TCRA armored cap rock planned for re-use are shown on Figure 3-5." The 100% should provide a discussion regarding the TCRA cap in the northwest portion of the site where the TCRA cap will not be reused, including the ACBM.

15. Section 5.3.2 Excavation Season and BMP

The current design documents appear to show protection against flooding at the top of wall elevation; however, during a severe storm or a hurricane it is expected large waves would spill over the wall and possibly erode the support berm. Have wave fetch and proposed freeboard for wave overtopping been considered in the design storm protection provided by the wall? The quantity of dewatering and water treatment contributed by overtopping should be included in the volume calculations. The design should also include design features that ensure protection of the internal support fill from erosion due to overtopping (i.e. internal ditch system).

16. Section 5.3.2 Excavation Season and BMP Height

The design does not indicate if consideration has been given to measures to keep the wall intact during a severe storm to protect the excavations from river scour and prevent release of contaminated soils from within the barrier.

17. Section 5.3.3 Geotechnical Conditions
It is not clearly indicated if the clayey deposits that are discussed in Item 3 on Page 48 are being identified as the Beaumont Clay.

18. Section 5.4.2 Northern Impoundment Preparation and Layout
While the EPA understands that the Respondents have not secured access to all property that they feel is required to implement the design, the design is lacking information concerning the total footprint that the design would require for the implementation of the Remedial Action (water treatment equipment, spoils processing, contractor laydown, etc.). This information would allow for evaluation of alternative solutions or mitigation of potential issues that could result in delays and possible redesigns if they are left until contractor selection to be resolved.

This would allow for a better evaluation of potential conflicts besides placement of the ROW and multiple use of the ROW for trucking. Furthermore, this would allow identification of potential design limitations that should be reviewed for alternatives to mitigate the impacts to the RA implementation or that would render the design un-implementable, that could allow the design to progress and be implemented.

19. Section 5.5.3.4 Scour
The last paragraph of this section states that modeling results showed decreasing velocities adjacent to the I-10 bridge structure, but then follows in the next sentence with a statement that flows increased. This statement needs to be clarified as to the results of the modeling.

20. Section 5.5.5.1 Failure Modes and Section 5.5.5.2 Safety Factors; Appendix I Section 5.5.5.1 Failure Modes and Section 5.5.5.2 Safety Factors
The review of the design appears to indicate that the wall is susceptible to progressive failure by successive failure of adjacent tie rods due to a material defect, unusual/extreme loading, or a barge strike if unequally distributed to adjacent tie rods. The design should consider the potential for progressive tie rod failure with possible fill loss in the wall design. The design does not present information concerning potential alternative wall structures, such as a cellular cofferdam, that offer greater stability relative to progressive failure if the existing design is suspectable to a progressive failure.

21. Section 5.6.2 Excavation Methodology
With the design is based on excavation occurring in a mostly dewatered area within the BMP, failure of the wall puts working personnel in danger and sufficient plans and observation systems must be in-place to monitor wall movement or impending heave failures. The design does discuss the potential for heave, but no discussion of wall failure. The design should provide a plan or requirements that a remedial contractor will need to incorporate into a plan to protect personnel safety using instrumentation, observations, and emergency action plans to address wall distress, heave failure, seep formation, loose barge alarms, and severe weather.

22. Section 5.6.2.1 Cell Dewatering
They should be re-titled **Site Dewatering** to prevent confusion with Cell Dewatering since cells do not appear to be a portion of the current design.

23. Section 5.6.2.3 Excavation Procedures
This section in general lacks specific details that are common in a 90% design. Most of the language is more consistent with a design/build project where the selected contractor is expected to propose ways and means on how they intend to accomplish the required activities. In this case, due to the nature of the work and the difficulties that the Respondents have presented it would make it difficult to successfully engage a contractor to implement the RD without extensive additional design development and schedule delays. The 100% should

include detail about the construction sequencing, types of equipment being used on site, handling and re-handling of excavated sediments, processes for dewatering/solidification/stabilization before transport, in field testing procedures to ensure quality of sediments being transported, cycle times, demarcation procedures, decontamination procedures, transport quality control and assurance on haul roads and other main roadways.

24. Section 5.6.2.3 Excavation Procedures

Additional information should be provided in this section on how waste material handling onsite will be conducted in a manner to prevent spreading of any contaminated or potentially contaminated materials onto the armored cap or areas of the excavation that have been confirmed clean, where accumulated rainwater would be collected and discharged to the river without treatment. Also, this section states that waste material that does not have free liquids and does not need solidification may be loaded directly to the haul truck for disposal; please add an explanation of how field staff will determine if the waste material needs solidification or not (e.g. paint filter test). In addition, Figure 5-B indicates that some waste materials that require excavation are under the access road and the ramp into the BMP, this portion of the waste was not addressed in the design. Please explain how and when these materials are going to be excavated and removed from the BMP for offsite transport.

25. Section 5.6.5 Excavation Area Restoration

While there are "no post-excavation restoration measures identified or required as part of the ROD,", there must be a plan on what the future bathymetry would look like upon completion of excavation and removal of the BMP. Based on this limited section, it seems like the area may be used as a repository of clean materials without a particular plan on how to grade them except for along the south edge, and how to prevent future erosion of any clean materials placed in this area.

26. Section 5.7.1

The EPA in accordance with RCRA requires that classification of waste occurs at the point of generation (i.e when the waste is excavated) and before it is mixed or treated with solidification material, which should not be confused with analytical data the receiving facilities requires/requests for the waste after it has been mixed/treated to allow them to have a profile of the material in the state that they would receive it for disposal. It should be clear in the discussion if the additional testing that was conducted during the treatability study was of the primary waste or treated material when it is stated that "*results of the treatability testing indicate that the waste material from the Northern Impoundment is non-hazardous*" and its eligibility for disposal as a Class-II non-hazardous waste.

27. Section 5.8 Water Management

Based on the discussion in this section as well as information provided in **Table 5-3 Water Treatment Basis of Sizing** and **Section 5.8.2 Treatment System Design** the projected 24-hour contact water generation volumes appear to be more than the capacity of the system to handle. Are there other locations for the water to go that are not accounted for in the design that would result in the volume of contact water to be less and more in line with the designed capacity of the treatment system? Please clarify the basis of the calculations as updated for the 100% RD and comparison of projected volumes to the treatment system capacity to clearly show influent sources and volumes, as well as other potential pathways that the contact water could be handled.

28. Section 5.8.1.4 Water Volume and Storage

This section needs to provide additional discussion on the methods that will be taken to segregate contact water from non-contact water. This may be discussed in other sections or an appendix to the design but should be discussed here so that it is clear what the design criteria are and how they will be met to minimize cross contamination.

29. Section 5.8.2 Treatment System Design- Bag/Cartridge Filtration

Respondents should consider alternate methods or additional steps in the water treatment process so as not to create a hinderance to designing a remedy that meets the requirements of the ROD. Such items for consideration should include, but not be limited to, bulk water removal, storage, chemical addition, bulk solids removal, and sludge dewatering. All of these should have potential alternatives that could provide for less limitations on the water treatment system both in the quality of the water treated, time for treatment, and footprint required. For example, some of these systems (e.g., Del Total Clean SandCat, or 3000+) can get the slurry down to 38 micron at a speed of 3,000 gpm, then the remaining fines can be flocked and sent through smaller dewatering operations. Another example is to use a plate & frame press for dewatering. This method is a bit slower but will remove down to 1 micron all in one step. A potential option for material handling is to stabilize the sediments wet either with an injected slurry Portland or SAP (super absorbent polymer). These will lock in the small fines and prevent future leaching from the material after disposal.

30. Section 5.8.2 Treatment System Design- Bag/Cartridge Filtration

This section states that during the operation of the water treatment system, 5 micron bag filters may be tested on a side-stream to evaluate if they can be used in place of the 1 micron filters. Please note that EPA's February 18, 2020 correspondence (included in Appendix D-1 of this report) indicated that EPA's determination that the Minimum Level for dioxins/furans could be used to demonstrate compliance with the Texas Surface Water Quality Standards is contingent on the water treatment facility using a 1 micron final filtration step in the water treatment process.

31. Section 5.8.4 Compliance Monitoring

Modify this section to explain the steps to be taken if analyses at the point of discharge indicate that effluent has not met discharge criteria for a regulated parameter, as laid out in Section 5.5.4 of the Final 100% RD for the Southern Impoundment dated April 19, 2021, which states "If analyses at the point of discharge indicate that effluent has not met discharge criteria for a regulated parameter, the EPA will be notified immediately and the system will then be shut down and/or effluent may be recirculated to the contact water storage tank(s), and additional performance checks may be performed on the treatment system, including but not limited to, checks and appropriate modifications with respect to chemical dose, checking to determine whether GAC and/or filter media and bag filters should be replaced, etc. Contingency measures may also include, but are not limited to, increased monitoring and notifications."

32. Section 5.9 Monitoring and Controls

The design does not provide supporting calculation(s) used to support the assumption that seepage/infiltration through and under the BMP and upwelling from the bottom of the excavation would be negligible. The design also does not provide specifications or guidance for the use of instrumentation to measure seepage collected to verify this assertion after dewatering and during excavation.

33. Section 5.11.1.2 Effects of Undefined Excavation Limits on the BMP Design

As the design has progressed, TxDOT has provided updated design drawings that show the TxDOT ROW and TxDOT's planned use and end state for the ROW. The design should be updated to account for this information and steps take to evaluate the impact of these on the design and incorporate changes to the design to mitigate the impacts to the BMP design and implementation.

34. Section 5.11.1.2 Effects of Undefined Excavation Limits on the BMP Design

An analysis of the uncertainty of the depth of contamination and an over-excavation allowance should have been considered in the schedule. This uncertainty in depth of contamination also poses questions regarding the use of area-wide averages for target clean-up levels as well as proposing to leave continuous contamination above the target clean-up level.

35. Section 5.11.2 BMP Alignment
Details need to be provided on conditions that could impact the installation of the BMP such as high water or wind conditions, or what steps would be taken to mitigate potential issues to the installation.

36. Section 5.11.2 BMP Alignment
The design is lacking on requirements for protection of the BMP. Additional information needs to be provided to determine which sides of the BMP need protection and the requirements that the protective structures would need to meet, including any related to the active shipping channel to the east of the site.

37. Section 5.11.2.1 Access to Property for Water Treatment System
A potential issue identified by the design is potential lack of space to place and maintain the proposed water treatment system. There appears to be no consideration of alternative locations or placement strategies (such as mounting it on barges) or design changes to the overall operation, as well as the water treatment system design that could result in a smaller or more manageable footprint for the water treatment system.

38. Section 5.11.3.1 Impacts on the Community and Environment
Concerns were raised as part of the design regarding the potential for distractions being created by the Site removal activities for drivers on Interstate 10. It should be noted that there is a high likelihood that the I-10 bridge replacement project would be going on at the same time so the potential for distractions would already be present and not just limited to the removal activities. However, there are several common technologies/design features that can be implemented such as screens to mitigate the potential distractions resulting from the removal activities.

Appendix F – Hydrodynamic Modeling Report

39. General Comment
The hydrodynamic modeling should include modeling of 500-year flood, given the history of multiple "500-year" floods in the area within the last 10 years, and associated barge strikes and scour from storms. This will require GHD to expand the model grid for EFDC, as well as modeling runoff from the watershed into the San Jacinto River and Houston Ship Channel using a surface water runoff model such as HSPF. The 500-year analysis should be considered as part of the wall design (height of wall/pressure on wall/scour risk, etc.); end-state analysis; evaluating potential impacts from barge strikes; scour; and emergency/contingency plans.

40. Section 1.2 Site Description, Figure 2
Add "Light" before "Blue" in the caption of this figure to clearly identify the are in question.

41. Section 2.4 Flow Data, Table 2
Which of the sets of streamflow data given in this table were used as the discharge boundary conditions in the RFDC model?

42. Section 2.5 Lake Houston Data
How were the Lake Houston waste levels described in this paragraph used in the model? Where any corrections made to them, and if so what were those corrections and how were they applied.

43. Section 3.2 Model Setup
The report states "the hydrodynamics model uses the parameterization and kinetics from the calibrated (previously developed) models by Anchor QEA." Hydrodynamic calibrations are specific to the physical dimensions of the model grid, among other things. Since the model grid cell dimensions and bathymetry have been changed, the assumption that the hydrodynamic calibration parameters would hold for the new grid should be verified by direct comparison of water surface elevations and velocities in the calibrated model.

44. Section 3.2 Model Setup
In the first paragraph change "Cartesian and orthogonal horizontal grid" to "a combined Cartesian and orthogonal-curvilinear grid."

45. Section 4.1 Cofferdam Effects on the Floodplain
What were the bottom elevations for the two stations that were chosen to compare the results from the model?

46. Section 4.2.1 Sedimentation Study with Cofferdam Analysis
The report is not clear on what model output is used to generate the 95th percentile shear stresses and velocities. Are these statistics calculated from all model cells shown in Figure 22 over the full 30-day period? If so, we would recommend focusing on the peak flow period (the peak 1-hr flow period would seem relevant for erosion) at just a few key locations.

47. Section 4.2.1 Sedimentation Study with Cofferdam Analysis
In the second paragraph change "Figure 22" to "Figure 23."

48. Section 4.2.1 Sedimentation Study with Cofferdam Analysis
Please explain why the bathymetry model did not take into account the designs specified modifications to the access road to the site. The model should be corrected and re-run to account for the impacts of these changes.

49. Section 4.2.1 Sedimentation Study with Cofferdam Analysis
A more in-depth discussion of the differences in the shear stresses between the "existing conditions" and "with cofferdam" conditions for all three of the modeled storm events should be given.

50. Section 4.2.1 Sedimentation Study with Cofferdam Analysis
In the second paragraph on Page 23, change "right next to" to "right next to the".

51. Section 4.2.1 Sedimentation Study with Cofferdam Analysis
Explain why "a sudden large increase" in the velocities "right next to the cofferdam wall itself" occurs.

52. Section 4.2.1 Sedimentation Study with Cofferdam Analysis
Explain how the limited sedimentation analysis that was performed in this study has been taken into account for the design of the cofferdam.

53. Section 4.2.1 Sedimentation Study with Cofferdam Analysis and Section 4.2.2 End-State Conditions Analysis Tables 8 through 15
It is counter-intuitive that the 95% maximum shear stress and velocities decline as one goes from a 2-year to a 100-year flood event. In the past, sediment erosion in this area has been associated with extreme flood events, and Appendix F does not provide an adequate explanation for the apparent contradiction of documented erosion and the model results. Could this be because the number of active "wet" model cells increases at higher flows? If so, then the 95th percentile is not really the relevant metric to look at, and the comparison needs to be made at specific key locations. Or is it due to backwater effects from Buffalo Bayou flooding? Although a flood event in the San Jacinto watershed is also likely to produce high flows in the Buffalo Bayou watershed, it does not follow that a 100-year flood flow in the San Jacinto would correspond to a 100-year flood flow in Buffalo Bayou. If that assumption was used in the scenario boundary conditions, it would produce unrealistically high backwater conditions and thereby reduce velocities. GHD should perform some sensitivity analysis on boundary conditions, and to simulate actual historical peak flow events.

54. Section 4.2.2 End-State Conditions Analysis
This section states that the model simulations were used to analyze the resulting sedimentation, however it does not appear that this was performed. It is stated previously the analysis was limited to a qualitative study. Please clarify whether the analysis was performed, and if so, the results of that analysis and how they are incorporated into the design.

55. Section 4.2.2 End-State Conditions Analysis
On page 25, in the second paragraph change "Table 12 and Tables 13" to "Table 12 and Table 13".

56. Section 4.2.2 End-State Conditions Analysis
Please indicate that on Page 24, in the third paragraph that the maximum values of the shear stress are for the 2-year storm.

57. Section 4.2.2 End-State Conditions Analysis, Figure 30
It is hard to detect the circulation pattern that is supposed to be shown in this figure. Velocity vectors should be added to aid in interpretation. Additionally, the sentence in the fourth line of the second paragraph on page 27 appears to be missing at least one word. Please review and correct.

58. Section 5.2 Sedimentation Analysis - Cofferdam
Explain why the difference (1.84 Pa) in the maximum value of the 95th percentile shear stress is so large.

Appendix I - BMP Structural Design Report

59. Section 3.0 Design Parameters
The design does not consider the possibility of failure due to waves spilling over the cofferdam and its effect on lowering the actual storm protection provided by the wall. It is recommended that a calculation of wave height and freeboard on BMP be calculated, and the effect of extreme storm protection be updated to evaluate this mechanism.

60. Section 3.1 In-Situ Soil Parameters
The design does not determine if soils at the mudline will lose strength due to cyclic wave action during a hurricane and therefore does not determine if an adjustment to the calculation of cofferdam stability to account for reduced soil strength during extreme events is required.

61. Attachment 2.1
It is not clear from the provided information what soil properties were estimated and/or laboratory tested to include in the soil properties calculation. This information would help explain selection of fill material source and properties as well as providing an explanation of the reason Young's Modulus is significantly different from Beaumont Sand.

62. Attachment 2.2 Section 3.2.1.1.4
It appears that the C1 Drained Model Results were include twice, please clarify and update if required.

Sand Separation Area (SSA)

63. SSA Boundary
The SAA was approximated based on historic photos. However, the results of the remedial design investigation should be used to further define the boundaries of this area. The MNR plan references the "beach area," and discusses samples taken in this area. The shoreline varies depending on the background map, and the shoreline changes over time, and may not be the same shoreline from historical photos. An additional analysis of shoreline

changes in the SSA through time based on historical aerial/satellite images should be conducted and presented in the 100% RD. This information should also be presented in an updated figure that includes the locations of the SSA borings from the RI and PDI-2. Section 6.1.4 SSA Conclusions should be updated to include any additional conclusions about shoreline change as it relates to interpreted erosion/deposition over time in the SSA. The MNR plan should be clear regarding the boundary of the SSA area and whether the area applies to the beach area. Appendix G, Figure C 2 shows the SSA boundary extending past the labeled top of bank. Updates to the revised SSA boundary should be made throughout all design drawing documents.

64. Appendix J - MNR Plan - Section 6 – Monitoring Program - Sample Locations and Data Evaluation
The MNR plan proposes an arithmetic mean concentration of the nine composite samples from the entire SSA area be used determine if the remedy is protective. However, of the nine locations sampled, 5 of the samples did not show contamination. These sampling results should inform the area to be sampled as part of ongoing MNR, but not be used for averaging SSA concentration levels. The Feasibility Study report states that MNR would be used to reduce the concentration to sediment PRG (30 ng/kg TEQDF,M) in the SSA area, which suggests that MNR should focus on areas in the SSA with concentrations greater than the PRG considering the fact that the mean TEQDF,M concentration in the SSA has been below 30 ng/kg since 2010 before ROD was issued (Section 6.5 in the plan). The approach proposed in the 30% design focused MNR monitoring on the area around SJSSA06, SJSSA08, and SJNE032 with dioxin concentrations greater than 30 ng/kg TEQDF,M. The polygons on Figure 1 which are already below 30 ng/kg TEQDF,M in all depth intervals may be monitored at lower frequency to ensure that those areas remain below the cleanup level, but those clean areas should not be averaged with the locations of known contamination. The 100% RD should propose a sampling plan consistent with these comments.

65. MNA Plan - Section 6.3 – Monitoring Program - Sampling Frequency
The 90% RD proposes that monitoring of the SSA will be discontinued if the mean concentration of samples collected in the SSA is below 30 ng/kg TEQ for two consecutive years after submission of the Remedial Action Completion Report for the Northern Impoundment. Two (2) sampling events are proposed in the Plan. EPA does not agree that this sampling will show whether the remedy is protective, and requires sampling to continue until, at a minimum, the first Five Year Review, where EPA can evaluate all sampling results and plans.

66. Appendix J - Attachment 7 - Section 2.1 Background
The sentence “Results of the sampling event indicate that the SSA has generally been depositional since the mid-1960s” is not fully supported by the results of the Lead-210 sampling which showed deposition at 4 locations, erosion at one location, and variable erosion/deposition at 4 locations. Please revise to be consistent with Section 6.1.4 of the 90% RD.

67. Appendix J - Attachment 7 – Figures 1 and 2
The 100% RD should include revised Figures 1 and 2, which were not included in the original submission. These figures were provided to EPA for review on December 5, 2024.

68. Main Report - Section 6.1.4 SSA Conclusions – Sand Separation Area
Was erosion modeling performed on the SSA, in particular the shoreline? Has it has been observed that there is increased fleeting activities in the area of the SSA that could be affecting erosion and deposition?

69. Appendix J Attachment 7
Include figures 1 and 2 that were not included in this attachment.

70. Additional Figure

The 100% RD should include an updated figure showing the RI and PDI-2 sediment sampling locations in and near the SSA with a visual representation of dioxin concentrations at depth intervals, and a table summarizing the dioxin results from those samples, as provide at EPA's request during review of the 90% RD.

II. Pre-Final 90% Remedial Design - Northern Impoundment - Northwest Corner Component submitted November 8, 2022

71. 5.12.2.2 Northwest Corner Challenges – Risk from Flooding

The risk from flooding evaluation should consider the same potential for effects on areas using dry excavation versus having the area filled with water during an overtopping of the cofferdam wall. Once an overtopping event occurs, the water should provide a buffer from the potential turbid effects of the impacted sediments. The dry excavation could potentially cause a more turbid environment on the inside of the cofferdam because of the waterfall effect between the high water and lower dry excavation areas. This scour effect could potentially erode the proposed newly placed protective clean fill layer. It may also take a longer period of time to bring in clean fill to cover the exposed sections of excavation areas in the dry versus dropping the suspended sediments out of the water column in areas being dredged.

72. 5.12.2.2 Northwest Corner Challenges – Risk from Flooding

An additional consideration in mitigating the risk of mobilizing sediment in an overtopping event should be the evaluation of the addition of flocking agents to the water. The risk of a release during an overtopping event could be mitigated by quickly dropping the suspended sediments out of the water column, especially if the entire excavation was being performed in a containment that was flooded to average river depths. Once a storm system has been identified, it should not take long to drop the suspended sediments out of the water column and consolidate them on the bottom. This would provide a protective water layer to help prevent the scouring effect during an overtopping event, without the risk of impacted sediments being removed from the cofferdam area.

73. 5.12.2.2 Northwest Corner Challenges – Working Season

The design specifies that the excavation will occur in seasons (November to April) over approximately 7 years. The changes in the design from the 30% RD submittal to both portions of the 90% RD submittal have either removed features designed to support the excavation season approach (e.g. flood gates) or have gaps in the design that would be required to support this schedule. It should also be noted that this phased approach does not appear to match the industry standard for marine construction in the area where work is conducted year-round. Furthermore, the working season approach appears to be more based on the design as submitted (e.g. wall height, sediment removal methods, potential flooding, etc.).

74. 5.12.2.2 Northwest Corner Challenges – Risk from Flooding

The design does not provide clear direction for environmental controls and procedures for the wastewater treatment plant during storm events. The RD should include the basis for design of the plans and procedures to prevent releases from the wastewater treatment plant during storm events, as well as guidance or procedures for treating water in the containment prior to an event.

75. 5.12.2.2 Northwest Corner Challenges – Increased Excavation Depth and Volume

The design as presented does not accommodate the potential need to excavation to a greater depth. The objective of the design is clearly defined by the ROD as the removal off all the contaminated material 30ng/kg, and it has also been discussed that the design should accommodate the ability to perform over-excavation to a greater depth if required based on post confirmation excavation sampling. The design makes no provision for this to be implemented and simply uses the limitations of the design itself as the reasoning for not being able to perform the over excavation.

76. 5.12.3.2 Northwest Corner Challenges – Schedule

This section discusses the potential need to extend the schedule to 7 years or more due to the amount of waste requiring excavation, as well as citing potential access issues due to planned TxDOT bridge update project. Additionally, the section discusses possible delays that could occur due to having to dredge portions of the site, as well as schedule delays that could be caused by the need to cap portions of the site between excavation seasons and having to uncap them for the next season. Finally, treatment of water within the BMP is discussed as a possible source of uncertainty schedule issues and possible cause of schedule delays. The entire premise of this section is based on the concept that the design cannot effectively meet the requirements of the remedy, yet no discussion is made as to possible modifications or considerations that can be made to mitigate these impacts.

Several options could have been considered to mitigate these issues from potentially causing scheduling impacts on the project. Consideration could have been given to more extensive use of excavating through the water column and using a marine based approach. Logistically, using a marine based approach could help with the pinch point of the common access road to the site, and simplify the coordination with TxDOT. Alternative sediment handling methodologies should also have been explored.

77. 5.12.3.2 Northwest Corner Challenges – Water Treatment

The challenges presented by the Respondents do not provide consideration of methods or design modifications that could mitigate the challenges presented. Consider the different solutions to removing suspended sediments from the water column within the BMP after the dredging operation has been completed. The contaminants are mostly adhered to the sediments and not as much in the dissolve phase. Consider the removal of the sediments from the water column by either mechanical or chemical means. These methods are proven in this type of work and should be considered BMPs for any dredging operations.

Optimizing treatment of the water by using mechanical and/or chemical means of solidification before going to the WWTP could increase the efficiency of the WWTP. This could not only be used with the turbid waters during dredging, but also handling of water as part of the dredging of the sediments and the remaining water once the sediment removal is complete. Such an example of mechanical means would be the use of something similar to a del total clean, plate frame presses, hydrocyclones, or similar equipment that can quickly dewater the dredged sediments and the suspended sediments remaining.

Additionally, controls for use within the BMP to segregate and manage sediment impacted waters resulting from removal activities should have been considered as well. Bubble curtains within the dredge area could be used to provide a mechanical means to drop the sediment out of suspension in the water column and minimize it being spread outside the current excavation area. Another example would be a chemical means to drop the suspended sediments out of the water column such as alum and pelletized activated carbon (PAC). This has been shown in publications to work very quickly and efficiently. Once the sediment has been removed from the water column, the water treatment process then would be more straightforward.

<u>Appendix B-1 Northwest Corner Hydraulic Heave Evaluation</u>

78. Section 1.3 Geology

It is unclear how the conclusion of gravelly sand being connected to Beaumont Sands or the Chicot Aquifer was derived. Later in the report it is also indicated that the Beaumont Sands are potentially hydraulically connected to the deeper sand layer. The basis for this statement is unclear.

Appendix J – Design Drawings

79. The updated excavation boundary for the NW corner shows that the excavation area near sample location SJSB100 does not extend to the TCRA cap edge. The 100% RD should provide for removal of waste to the boundary of the TCRA cap.

III. EPA Comments Regarding TxDOT Project Coordination

EPA sent TxDOT's 90% RD comments on November 4, 2022, so that GHD could begin coordinating with TxDOT as soon as possible after the NW Corner 90% RD submittal. When transmitting the comments, EPA also included TxDOT comments from an interagency meeting on September 16, 2022. These additional comments included the following:

- TxDOT is concerned regarding the effect of 90% RD bridge alignment on proposed protective structures. TxDOT provided an aerial bridge layout showing the revised cofferdam and access road configurations, which shows an overlap of the revised cofferdam wall and TxDOT bridge protective structures.
- TxDOT is concerned regarding the access road in the TxDOT ROW being used by both TxDOT and EPA. TxDOT requested cross sections of the access road to review footprint, side slopes, etc. since they did not see them in 90% RD.
- TxDOT is concerned regarding cofferdam/BMP footprint
    - TxDOT stated 90% RD showed wall was moved further into TxDOT ROW than had previously been discussed.
    - TxDOT expressed concern that the location of the cofferdam is so close to the existing and proposed bridges, as it may not provide enough room for the demolition of the existing bridge and the construction of the new bridge.
    - TxDOT asked EPA to look into thinning the footprint up as much as possible.

During a conference call with GHD, EPA, TxDOT, and Respondents on August 16, 2023, some of the topics from the 90% RD comments and the transmittal email were discussed again.

- TxDOT confirmed that their previously shared diagrams showing the locations of the bridge protection structures were still relevant, and there is still an overlap of the protective structures and the cofferdam wall.
- TxDOT expressed that the final sloped embankment should be "a permanent slope and not something that can be scoured out." TxDOT also stated GHD needs to consider loading of the riprap berms on the final slope.
- TxDOT agreed that the Southern wall may be cut instead of removed. Details were to be discussed.

EPA has further discussed with TxDOT its comments and concerns. In response, TxDOT has provided supporting/additional information to be addressed in the 100% RD.

Southern Cofferdam Wall in TxDOT ROW

- The 90% RD proposes a double sheet pile wall cofferdam with backfill added above existing ground all the way to the top of the sheet pile walls. The distance between sheet piles is 30'. Given that the specific section of the cofferdam is not retaining much earth (or water) behind it, TxDOT is requesting that the footprint of the cofferdam is reduced so that encroachment in TxDOT's ROW is minimized. TxDOT is specifically concerned the wall footprint will not allow them to place the cranes needed for the phase two work (demolition and construction of northernmost bridge within current bridge footprint). Since the 90% RD proposes a shelf on the inside of the wall, TxDOT believes structurally there could be a single wall, or a double wall with less fill space. Ideally TxDOT would prefer the wall to be a single wall and not in the ROW at all.

- EPA Review of Wall Type Evaluation as detailed in in the BMP Design Structural Report (Appendix I):
    - Combination Wall – The concern in the 90% RD was that it would be too difficult to drive through the hard sand layers and would create vibrations. To address this concern, consider a Giken driving machine that can install tubular walls by applying down force and rotation. A combi-wall with either pipe piles or h-piles may prove to be structurally sound given the revised wall placement. Additionally, consider the updated vibration analysis when reevaluating this wall type.
    - Cantilever Concrete Secant Pile - This method is robust and requires a lot of coordination. However, the statement of the sheet piles not being watertight for this system needs to be clarified more. Consider seem sealed piles, which are regularly used for dewatering sites and environmental cleanup sites with cofferdams. With the added layer of concrete filled reinforced piles, this option may work for being watertight. Additionally, consider the updated vibration analysis when reevaluating this wall type.
    - Double wall system – This wall type was selected for the Southern portion of the cofferdam, and is the same as the wall proposed for the remainder of the BMP. However, given the added soil buttress, this wall will now be installed on a peninsula and does not have the same external forces to compete with that the remaining wall does.

80. The 90% RD proposed a significant change by adding a soil buttress to the inside of the southern portion of the cofferdam to stabilize the wall. Therefore, because of the new wall alignment and added soil buttress, the 100% RD should re-evaluate additional wall types for the Southern portion of the BMP to minimize the necessary encroachment onto the TxDOT ROW. EPA suggests Respondents evaluate various technologies and combinations of options to address this issue. For example, given the addition of a soil buttress on the inside of the cofferdam, a single wall with reinforced stability through either struts, walers, or using a combo wall may address TxDOT's concern regarding the footprint, while adding strength and stability. The updated Vibration Analysis should be considered in the evaluation. The wall types should be evaluated in addition to those presented in Appendix I, such as a single sheet pile wall with tie backs or a berm on existing ground or other seepage barriers/walls that would serve the purpose of flood protection and soil stabilization.

81. Currently the footprint for the proposed protection riprap berms at the vicinity of the North Impoundment overlaps with the proposed cofferdam. The exact limits will be tweaked as TxDOT progresses the design. TxDOT has stated that protecting the bridge sooner rather than later is important. Respondents should further discuss the timing of the installation of the riprap with TxDOT and address this issue in the 100% RD.

Inadequate Consideration of Alternatives to Trucking

82. Although TxDOT notes transporting excavated soil exclusively by barges may not be feasible, TxDOT suggests that a contingency plan be developed in case schedules overlap. TxDOT cannot guarantee unobstructed use to the access road on the north. TxDOT believes that with coordination both projects can access the ROW, but there will be points in the schedule where they will need 100% access to the ROW. For example, when they are demolishing the old bridge and building new bridge in current bridge footprint (phase 2), they will have equipment and trucks for demo and construction. When they are placing beams, they will have multiple large cranes in the ROW, which may block access for weeks. Although TxDOT can attempt to sequence around the Superfund project, schedules can change. Therefore, TxDOT prefers a contingency plan with an alternate method of transporting the excavated material in place in case schedules coincide.

Site Restoration

83. TxDOT noted they had reviewed draft, conceptual sketches provided by GHD after the 90% RD submission, but they have given no written approval. TxDOT requests updated engineer drawings (cross-sections) with

back fill grading and rip-rap specs so that they can do their own safety analysis. TxDOT is concerned about slope stabilization protection given the hole that is proposed to be left in place. Engineering drawings should show final end state river bottom elevations.

84. To address the scenario of a double wall in the TxDOT ROW, TxDOT provided a drawing showing a typical section found in GHD's 90% design plans for the south section of the North Impoundment cofferdam with the information for the proposed stone rip rap berm (attached) This drawing also provides the specific gravity and porosity values for the proposed stone rip rap. The RD contractor should estimate the surcharge load coming from the berm for the design of the cofferdam. TxDOT has stated that "given that the south section of the cofferdam is not really retaining much earth behind it, it is very likely that the added surcharge load from the berm will not change GHD's current design. Length of sheet piles appears to be controlled by embedment into an impermeable soil layer below and not from retained earth load requirements."

85. TxDOT expects that after cleanup is complete, the sheet pile section of the cofferdam to the North (closest to TxDOT's ROW) can be cut 1ft below existing ground and any added fill used behind it removed as shown in this section. The sheet pile section to the South can be left buried under the proposed protection berm. Outside the footprints of the berms we probably want to have both sheet pile sections cut 1ft below existing ground and all added fill used in between removed."

86. Regarding the design life of the wall, TxDOT has stated that "for the section of the cofferdam within TxDOT's ROW, a marine-grade immersion coating system is applied to both sheet piles (prior to installation) from the top of the sheet pile (EL +9.0) to a depth of 15ft below existing ground (similar to what is specified in TxDOT's Spec Item 407 for steel piles). We also suggest that coating meets the requirements of NORSOK Standard M-501 Coating System No. 7."

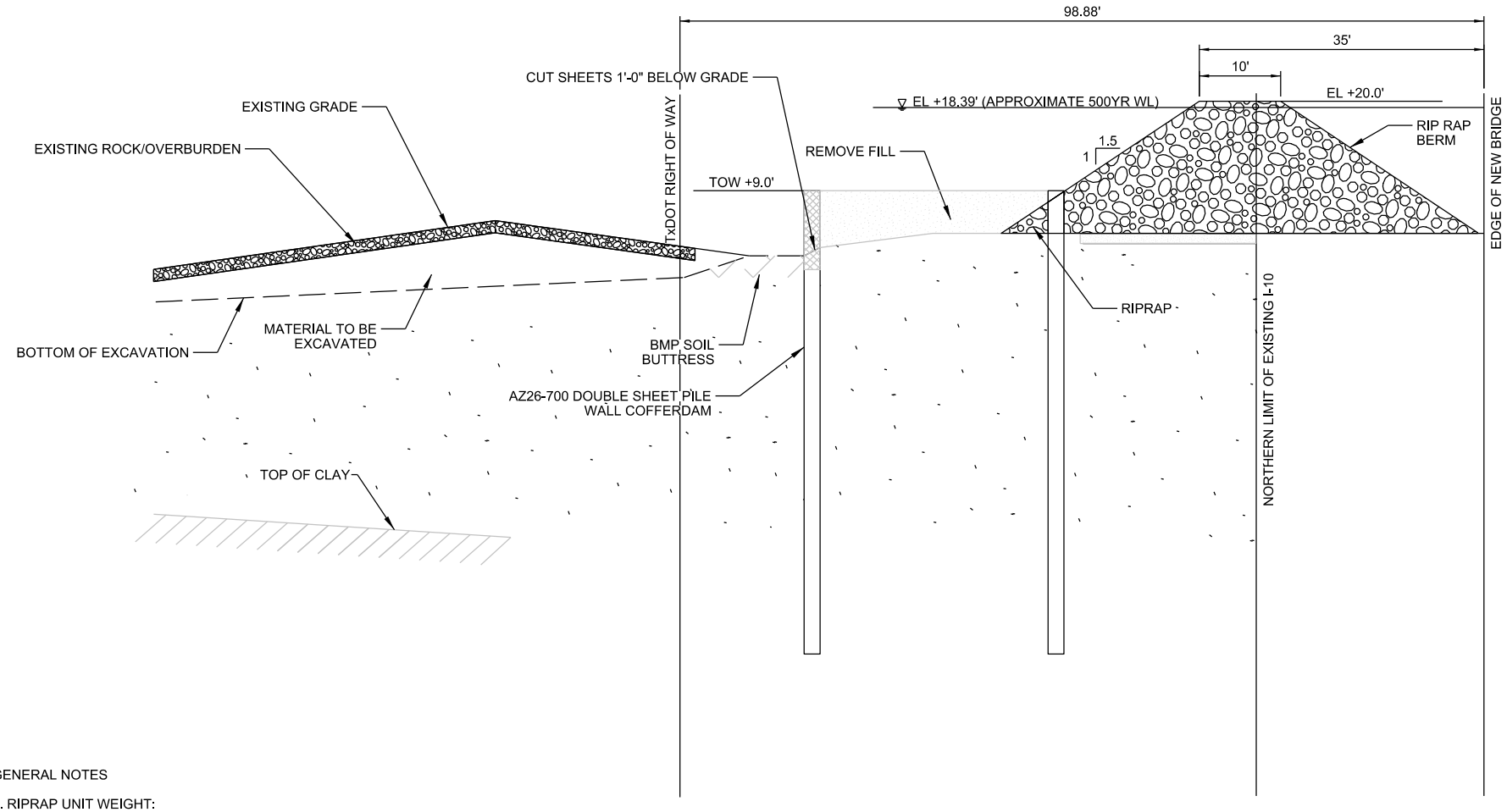
Vibration Analysis

87. Due to the proximity of the proposed cofferdam to the existing bridge foundation, TxDOT recommends a hydraulic/vibratory hammer is used (instead of an impact hammer) when driving the sheet piles for that section of the cofferdam.

88. TxDOT recommends the EPA contractor install instrumentation to monitor any vertical and horizontal movement of any structure(s) that may be affected by the placement of any piles nearby. Although there is no specific guidance, TxDOT states that there have been monitoring systems used in the recent past for TxDOT bridges.

89. As-built drawings of the existing IH 10 WBML bridge foundations should be considered in the vibration analysis.

90. TxDOT encourages ongoing communication and coordination with stakeholders to ensure a safe design. Elements of the Superfund design (BMP footprint, ROW usage, schedule conflicts, etc.) will require close coordination with TxDOT going forward during both the RD and subsequent RA phases of the project.



GENERAL NOTES

1. RIPRAP UNIT WEIGHT:
   STONE SPECIFIC GRAVITY: 2.50
   RIPRAP POROSITY: 20%

TYPICAL SECTION AT SOUTH COFFERDAM

SCALE: 1"=20'

APPROVED:	DATE: 11/08/2023	LJA PROJECT #:	REF:

LJA Engineering, Inc.

List of Other Agency Comments

Pre-Final 90% Remedial Design – Northern Impoundment submitted June 27, 2022

1. September 1, 2022 - Texas Commission on Environmental Quality (TCEQ) comments on Pre-Final 90% Remedial Design for the Northern Impoundment
2. Texas Department of Transportation (TxDOT)
    - August 25, 2022, I-10 Bridge at the San Jacinto River Letter
    - April 19, 2023, Review of Hydrodynamic Modelling Report from 90 Percent Remedial Design
3. September 1, 2022, Harris County Technical Advisory Committee (TAC) comments on San Jacinto Northern Impoundment Pre-Final 90% Remedial Design
4. August 25, 2022, Harris County Flood Control District comments on Northern Impoundment Remedial Design Report - Pre-Final 90% Submittal
5. February 25, 2022, Harris County Technical Review Team comments on the Pre-Final (90%) Remedial Design – Northern Impoundment Staged Deliverables Submittal
6. September 22, 2022, HDR comments on the Pre-Final 90% Remedial Design – Northern Impoundment on behalf of the Port of Houston Authority
7. September 1, 2022, Natural Resource Trustee comments on Pre-Final 90% Remedial Design – Northern Impoundment
8. September 1, 2022, National Oceanic and Atmospheric Administration (NOAA) comments on Pre-Final 90% Remedial Design – Northern Impoundment

Pre-Final 90% Remedial Design - Northern Impoundment - Northwest Corner Component submitted November 8, 2022

9. January 9, 2023, TCEQ comments on 90% Remedial Design for the Northwest Corner of the Northern Impoundment
10. January 9, 2023, Harris County TAC comments

Pre-Final 90% Remedial Design Supplemental Deliverables: Health and Safety Plan, Emergency Response Plan, Transportation and Off-Site Disposal Plan, Monitored Natural Recovery Plan – Sand Separation Area submitted January 17, 2022

11. March 25, 2022, TCEQ Northern Impoundment 90% Remedial Design Supplemental Deliverables
12. April 7, 2022, Harris County TAC comments
13. March 10, 2022, HDR/Port of Houston Authority Pre-Final (90%) Remedial Design - Northern Impoundment Staged Deliverables Submittal Review
14. March 25, 2022, Natural Resources Trustee comments on Attachment 9 - Monitored Natural Recovery Plan - Sand Separation Area, provided as part of Pre-Final 90% Remedial Design - Northern Impoundment

Pre-Final 90% Remedial Design Supplemental Deliverables: Field Sampling Plan and Site-Wide Monitoring Plan submitted May 31, 2022

15. July 15, 2022, TCEQ comments on Supporting Deliverables to the 90% Remedial Design for the Northern Impoundment
16. June 27, 2022, Harris County TAC comments on Jacinto River Waste Pits Pre-Final 90% Remedial Design

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

September 1, 2022

Ms. Ashley Howard
US Environmental Protection Agency, Region 6
1201 Elm Street, Suite 500
Dallas, TX 75270

Sent via email

Subject: Pre-Final 90% Remedial Design for the Northern Impoundment, San Jacinto River Waste Pits Federal Superfund Site, Highlands, Harris County, Texas

Dear Ms. Howard:

The Texas Commission on Environmental Quality (TCEQ) has reviewed the Pre-Final 90% Remedial Design for the Northern Impoundment of the San Jacinto River Waste Pits Federal Superfund site received on June 27, 2022 and has the following comments.

Section 2.3.5.2 Surficial Sediments Geotechnical Properties: Please add an explanation of the sampling objective for geotechnical analysis of the deposited surficial sediment and how this data will be used in the design.

Section 2.3.7 Summary of SDI Results: Please briefly summarize the results of the sediment and rock thickness measurement that was presented in section 2.3.5.1.

Section 3.4.1 Water Discharge Criteria: Please add a clarification of which of the calculated preliminary discharge criteria are going to be used for compliance measurement parameters during the RA, if any? If none will be used for compliance assessment during the RA, please clarify in the text that the calculated preliminary discharge criteria were only used to evaluate water treatability testing results.

3.4.2.3.1 Filtration Pilot Test Results: This section states that based on the observed relationship between turbidity and TSS, turbidity levels can be used as an indication of the TSS concentration. Please add a figure or table demonstrating this site-specific correlation.

Figure 5-B BMP Alignment and Excavation Extent: Please mark the Best Management Practice (BMP) sections with raised bench or less than 30-ft soil buttress on Figure 5-B that are described in the accompanying text. This figure should be included at higher resolution such that the symbols display clearly.

Section 5.2 Remedial Approach, Top of Wall Elevation: This section states that the +9 ft design top elevation will not eliminate the risk of overtopping and the protectiveness will be verified following receipt of modeled data from the Coastal Water Authority; please explain when the data is expected to be available and what corrective actions are planned if this design top elevation is determined to not be adequately protective during excavation season. Also, it is stated that intentionally flooding the Northern Impoundment would off-set the forces acting on the BMP and prevent uncontrolled overtopping during the off-season. Please clarify if flooding

would be limited to the already excavated area or to the whole northern impoundment within the BMP, and what is the targeted flooding water level inside the BMP?

Section 5.2 Remedial Approach, Excavation Methodology & Water Management: It is proposed that prior to excavation all the water inside the BMP will be pumped and discharged directly to the river. As previously discussed in Technical Workgroup meetings, the TCEQ is concerned that pumping near the cap surface will withdraw deposited contaminated sediment and recommends that water with high suspended solid (TSS) concentrations potentially associated with high dioxin concentrations should not be treated as river water and should not be discharged to the river without treatment.

Section 5.2 Re-use of TCRA Armored Cap and Historic Berm Material: This section proposes the reuse of cap rock material at the site during or after the Remedial Action. The TCEQ recommends that additional representative sampling of stockpiled cap rock be conducted prior to reuse to demonstrate that it does not have contaminated sediment or soil adhered to it and has not become contaminated by the process of removing the cap rock from the top of the geotextile or geomembrane. Any stockpiled cap rock that is found to be contaminated with waste material above the cleanup level should be sent for disposal rather than reused at the site. Additionally, the final sentence of this section states that locations of the historic berm and the TCRA armored cap rock planned for re-use are shown on Figure 3-5. Additional information should be added in this section to explain how the boundaries of the historical berm (in blue) and the cap rock reuse area (in green) were derived.

Section 5.3.4 Excavation Extent and BMP Alignment, Vertical Extent: This section states that the 90% RD uses an area-based average concentration site-wide approach as the design basis for the excavation contours proposed with a not-to-exceed threshold value of 300 ng/kg. Please clarify in the text that the confirmation sampling Decision Unit (DU) approach presented in the Field Sampling Plan will be followed, including in areas where the excavation target surface leaves material with dioxin/furan concentration greater than 30 ng/kg but less than 300 ng/kg. The composite sample from each ½ acre (or less) DU should include discrete sample material representative of the whole DU, including any polygons where a previous analytical boring has showed contamination over 30 ng/kg at the bottom of excavation. The TCEQ understands that the DUs shown in the Field Sampling Plan in Appendix J are conceptual and requests the opportunity to review and provide comment on the specific updated sampling plans for the DUs established by the Remedial Contractor during each excavation season.

- To minimize the risk of re-excavation after confirmation sampling, TCEQ recommends extending the target excavation depth when deepest interval targeted for excavation has very high dioxin concentrations (e.g., borings SJSB073 and SJSB074 where the deepest waste concentrations are 30,000 and 83,000 ng/kg).

- For borings where material exceeding the clean-up level is located under the proposed bottom of excavation target surface and clean material (SJSB032, SJSB048-C1, SJSB071, SJSB076, SJSB082, SJSB085, SJSB089, SJSB095, SJSB102), the TCEQ recommends that the target excavation surface be deepened to include all material above the clean-up level, consistent with the 2017 ROD requirement for “removal of all waste material that exceeds the clean-up level of 30 ng/kg regardless of depth”, or demonstrate that a representative composite sample from the affected depth interval(s) within the ½ acre (or less) DU which includes each of these borings meets the clean-up level.

Section 5.4.2 Northern Impoundment Preparation and Layout: In the final paragraph of this section, please describe measures that will be taken to ensure contaminated materials stored in the mixing areas do not contact underlying armored cap material or clean post-excavation surfaces or provide reference to the appropriate section or appendix where the information is provided.

Section 5.5.3.4 Scour: Please clarify in the last paragraph if scour protection will be applied to the whole length of BMP or just at the sections with high potential of scour risk.

Section 5.6.2.1 Cell Dewatering: Measures should be taken to minimize withdrawal of pore water from within the waste material and minimize fine sediment entrainment as the water within the BMP is pumped out prior to the start of each excavation season as discussed previously in Technical Workgroup (TWG) meetings; please update this section and the design specifications (Appendix H) to describe these measures or best management practices. TCEQ recommends that approximately the last remaining 2 feet of water that accumulates in low areas of the site should be routed through the water treatment system prior to discharge to the river. Please note that the TPDES General Permit No. TXR150000 requires appropriate controls be utilized to minimize the offsite transport of suspended sediments and other pollutants if it is necessary to pump or channel standing water from the site, and that stormwater discharges from basins or impoundments utilize outlet structures that withdraw water from the surface (Part III, Sections F.4.e and G.6).

Section 5.6.2.2 TCRA Armored Cap Removal: Additional details should be provided on how the armored cap rock will be removed in a way that minimizes risk of inclusion of any underlying waste material. Please consider requiring field staff to verify and document that the underlying geotextile and/or geomembrane is present and not torn or punctured as cap rock is removed for reuse.

Section 5.6.2.3 Excavation Procedures: Additional information should be provided in this section on how waste material handling onsite will be conducted in a manner to prevent spreading of any contaminated or potentially contaminated materials onto the armored cap or areas of the excavation that have been confirmed clean, where accumulated rainwater would be collected and discharged to the river without treatment. Also, this section states that waste material that does not have free liquids and does not need solidification may be loaded directly to the haul truck for disposal; please add an explanation of how field staff will determine if the waste material needs solidification or not (e.g. paint filter test). In addition, Figure 5-B indicates that some waste materials that require excavation are under the access road and the ramp into the BMP, this portion of the waste was not addressed in the design. Please explain how and when these materials are going to be excavated and removed from the BMP for offsite transport.

Section 5.8.1.4 Water Volume and Storage: The TCEQ has the following comments about this section.

- When the inside of the BMP is dewatered at the start of each excavation season, it is recommended that the mounded water category include pore water from within the armored cap interface with the waste material that drains laterally into surrounding topographic low.

- The BMP is expected to cut off the infiltration from river water but will not block the potential upward seepage from groundwater, please ensure that this portion of water is considered in the water volume estimate in addition to the mounded water.

- Regarding the subsection for Rainfall (1.e.), based on the BMP area and the maximum 24-hr rainfall level of 6.2 inches, the maximum 24-hr contact water generation should be 377,000 ft^3 or 2.8 M gallons, not 415,000 ft^3 and 3.1 M gallons (as is stated in Table 5-I).

- In the subsection for Equipment Decontamination Water, it is indicated that since the area is within the BMP, it is accounted for by the rainfall assumptions. Please clarify whether the water used on a daily basis to decontaminate trucks and equipment is accounted for in this calculation and provide a justification if it is not included.

- The final sentence of this section states that mounded water could be stored and treated on a batch basis. Please clarify if this planned batch discharge would include compliance sampling of the batch prior to discharge.

Section 5.8.2 Treatment System Design- Bag/Cartridge Filtration: This section states that during the operation of the water treatment system, 5 micron bag filters may be tested on a side-stream to evaluate if they can be used in place of the 1 micron filters. Please note that EPA's February 18, 2020 correspondence (included in Appendix D-1 of this report) indicated that EPA's determination that the Minimum Level for dioxins/furans could be used to demonstrate compliance with the Texas Surface Water Quality Standards is contingent on the water treatment facility using a 1 micron final filtration step in the water treatment process.

Section 5.8.4 Compliance Monitoring: Please modify this section to explain the steps to be taken if analyses at the point of discharge indicate that effluent has not met discharge criteria for a regulated parameter, as laid out in Section 5.5.4 of the Final 100% RD for the Southern Impoundment dated April 19, 2021, which states "If analyses at the point of discharge indicate that effluent has not met discharge criteria for a regulated parameter, the EPA will be notified immediately and the system will then be shut down and/or effluent may be recirculated to the contact water storage tank(s), and additional performance checks may be performed on the treatment system, including but not limited to, checks and appropriate modifications with respect to chemical dose, checking to determine whether GAC and/or filter media and bag filters should be replaced, etc. Contingency measures may also include, but are not limited to, increased monitoring and notifications."

Section 5.8.4 Compliance Monitoring- Table 5-J: It is not clear how Footnote 3 is relevant to the Minimum Frequency of Measurement in this table. Footnote 5 is not referenced in the table and appears to contradict the sample type specified for pH and TSS in the table. Please remove footnotes 3 and 5 or otherwise clarify their purpose. Also, TCEQ's July 15, 2022, comment on Table 5.1 of the Field Sampling Plan also applies to Table 5-J: the standard analytical TAT given in Table 4.4.4 of the Addendum to the Final 100% Remedial Design- Southern Impoundment submitted to EPA on June 2, 2022, is 3-5 business days for TSS, Metals, and Dioxins/Furans. Please update the analytical TAT in Table 5.1 to be consistent or provide an explanation why 3-5 days is available for the Southern Impoundment, but 10-15 days TAT is proposed for the Northern Impoundment water treatment compliance samples. TCEQ suggests that the fastest practicable TAT be chosen to minimize lag in receiving compliance results while discharge is ongoing.

Section 5.9.3 Odors: As TCEQ commented on the Site Wide Management Plan Section 3.6, if the use of odor-suppressing foams is necessary, the TCEQ suggests verifying that the foam is free of PFAS/PFOAs.

Section 5.9.4 Turbidity Controls and Monitoring: This section states that turbidity monitoring data would be collected twice per day at the start of work, and only once per day thereafter if turbidity thresholds are below the thresholds in the SWMP. Turbidity monitoring should be conducted at a time that is representative of the turbidity generated by the work, not at the commencement of the workday when BMP installation or removal is just beginning for the day. Additionally, turbidity measurements should be taken after any event that results in a disturbance of sediment (such as a boat or barge becoming grounded during site work) or when there are visual observations of increased turbidity outside of turbidity curtains containing the work area. Also, please add a figure to show the flow directions around the Northern Impoundment to support the proposed turbidity control measures in the second paragraph and mark on the figure any sections where turbidity curtain deployment is not planned. It is stated that flow is towards the impoundment at the west side of the impoundment and a turbidity curtain is not needed, will flow direction change in that area as it does in the main channel? If flow direction changes and flow may be away from the impoundment, a turbidity curtain would be needed.

Section 6.1.3.1 SSA Analytical Results: Please reference or include the figure "Figure 1: Sand Separation Area Analytical Results" submitted to the EPA in March 2022, which is relevant to this section of the 90% RD and should be added to the RD package. In that figure, please correct the vertical depth scale on borings such that the 4-6 ft bgs interval is properly labeled.

Section 6.1.4 SSA Conclusions: The TCEQ recommends additional analysis of shoreline change in the sand separation area through time based on historical aerial/satellite images be conducted and presented on "Figure 1: Sand Separation Area Analytical Results" or in a new figure that also includes the locations of the SSA borings from the RI and PDI-2. TCEQ also suggests updating this section to include any additional conclusions about shoreline change as it relates to interpreted erosion/deposition over time in the SSA.

Table 3-2: Please clarify the footnotes 1 and 2 to explain how the dioxins/furans congener concentrations listed in the "Estimated Discharge Criteria" column were calculated, and that compliance with the TSWQS will be determined based on the Minimum Level as directed by EPA. The estimated discharge criteria values in this table for dioxins/furans do not appear to correlate to the Minimum Level.

Table 5-1: The TCEQ has the following comments about this table:

- For borings where very high-concentration waste is located just above the proposed bottom of excavation target surface (such as SJSB073, SJSB074, SJSB088, SJSB092), consider whether slightly deeper excavation should be planned in these polygons (e.g. one foot into presumed clean material) to avoid delays related to re-excavation following a confirmation sample failing to meet the clean-up level.

- For borings where material exceeding the clean-up level is located just below the proposed bottom of excavation target surface (SJSB033, SJSB045-C1, SJSB049, SJSB054, SJSB055-C1, SJSB073, SJSB074, SJSB084, SJSB094, SJSB096, SJSB105), the TCEQ recommends that the excavation surface be deepened to include material above the clean-up level to avoid delays related to re-excavation following a confirmation sample failing to meet the clean-up level.

- For borings where material exceeding the clean-up level is located below the proposed bottom of excavation target surface and clean material (SJSB032, SJSB048-C1, SJSB071, SJSB076, SJSB082, SJSB085, SJSB089, SJSB095, SJSB102), the TCEQ recommends that the excavation surface be deepened to include all material above the clean-up level, consistent with the 2017 ROD requirement for "removal of all waste material that exceeds the clean-up level of 30 ng/kg regardless of depth", or demonstrate via confirmation sampling that a representative composite sample from the affected depth interval(s) within the ½ acre (or less) DU which includes each of these borings meets the clean-up level.

Table 5-2: Please add boring SJSB088 to the list under the "Further excavation would put the area at risk of Hydraulic Heave" rationale since it had a concentration of 1,800 ng/kg at -18 to -20 feet elevation. One row in this section is labeled "4" rather than a typical boring location name (i.e., SJSB0XX), please verify if this is a typographic error and correct.

Appendix B, Attachment C - Supplemental Design Investigation (SDI) Geotechnical Data Report: In Section 3.1.4, the referenced figure number is not provided. In Section 3.2, the referenced table number is not provided, and the sentence "The laboratory test results are included in Error! Reference source not found.." appears to be a referencing error. Section 4.2 also has two instances of the same referencing error.

Appendix E Use of Area-based Average Concentration:
Section 2.1.2: The TCEQ considers the sediment to fish to human exposure pathway (fish ingestion pathway) to be complete and regardless of the percentage of the total risk contributed by this pathway, does not support a deviation from the clean-up level set in the ROD.

Section 2.1.3: The TCEQ supports the clean-up level set in the ROD and notes that it is common practice to use default parameters in calculations, unless documented and verifiable site-specific data are provided to deviate from those parameters. Also, as TCEQ has previously commented, the clean-up level of 30 ng/kg results in a fish tissue PRG of 3.1 ng/kg, which is 1.33-fold higher than the DSHS dioxin fish tissue HAC of 2.33 ng/kg. As is, the clean-up level of 30 ng/kg is higher than what would be needed to address the site's contribution to the fishing advisory. Hotspot consideration could be a potential concern for fish tissue if it's a more attractive/prime habitat where they spend significantly more time.

Appendix J, Attachment 7 - Institutional Control Implementation and Assurance Plan (ICIAP):
General Comment: If material known to be above the clean-up level is left in place within the Northern Impoundment due to hydraulic heave risk or the proposed site-wide area-based averaging methodology, the TCEQ recommends that ICs be considered and implemented for the Northern Impoundment.

Section 2.1 Background: The sentence "Results of the sampling event indicate that the SSA has generally been depositional since the mid-1960s." is not fully supported by the results of the Lead-210 sampling which showed deposition at 4 locations, erosion at one location, and variable erosion/deposition at 4 locations. Please revise to be consistent with Section 6.1.4 of the 90% RD.

Section 2.4 Key Stakeholders: Please consider whether the Texas General Land Office (GLO) should be included as a stakeholder if the ICs will include areas of riverbed owned by the state.

Section 3 Planned Remedial Action Institutional Controls: This section does not contain enough detail of the proposed institutional and administrative controls for TCEQ to provide detailed comments on the proposed approach. The plan should be updated following the proposed stakeholder discussions. Additionally, for any property that will be subject to ICs and has its property deed indexed in the county's property records, the TCEQ recommends filing an IC in the relevant county property records to facilitate notification of future property owners.
Figure 1 and 2: The Table of Contents and text of the ICIAP refers to the attached Figure 1 and 2, but those figures are not provided in the ICIAP. Please provide the figures.

Please let me know if you have any questions. You can reach me at (512) 239-2505 or Katie.Delbecq@tceq.texas.gov.

Sincerely,

Katie Delbecq

Katie Delbecq, P.G., Project Manager
Superfund Section
Remediation Division
Texas Commission on Environmental Quality

KD/dl

Texas Department of Transportation

P.O. BOX 1386, HOUSTON, TEXAS 77251-1386 | 713.802.5000 | WWW.TXDOT.GOV

August 25, 2022

Ms. Ashley Howard
Remedial Project Manager
Superfund and Emergency Management Division
U.S. Environmental Protection Agency, Region 6
1201 Elm Street, Suite 500
Dallas, Texas 75270-2102

RE: Harris County
CSJ :0508-01-379
I-10 Bridge at the San Jacinto River

Dear Ms. Howard:

Per recent discussions, the Texas Department of Transportation's (TxDOT) plan to replace the I-10 bridge over the San Jacinto River has several potential conflicts with the plan by the Environmental Protection Agency (EPA) to clean up a hazardous waste site immediately adjacent to the bridge. TxDOT is considering several different types of replacement bridge with different footprints. Each of these bridge types could have different impacts on the adjacent clean-up project.

The proposed plan to impound the hazardous material site includes a 30 feet wide cofferdam surrounding the site. The proposed cofferdam extends onto TxDOT property next to the bridge. TxDOT had requested that a different, narrower wall design be utilized to minimize impacts on TxDOT property and to allow more space for the adjacent bridge construction. In our last meeting, the consultant for the EPA explained in detail why narrower wall designs were not practical. The current cofferdam wall design is now proposed to run parallel to the access road and right up against it.

This creates the following concerns:

- The schedule for the cleanup work is based on the following two (2) assumptions:

1) Uninterrupted use of the access road during the months of the cleanup work.

2) Enhancement and widening of the access road to accommodate 2-way truck traffic. The access road will need to be raised in profile as it approaches the south side of the impoundment so that the elevation meets that of the cofferdam at the entrance to the site. That means that the access road will be widened, and an embankment will need to be constructed to raise the profile.

We could not find a layout that shows the limits of the proposed embankment for the enhanced access road. TxDOT is concerned that the proposed embankment is likely to encroach under the existing bridges. We request that the construction of a temporary retaining wall all along the inside of the raised access road be considered to avoid any further encroachment in the TxDOT Right of Way (ROW). Finally, we are concerned about maintenance of the access road due to the heavy truck traffic.

Maintenance of the access road from Brookshire Street to the east should be the responsibility of the hazardous material clean up contractor.

- There is a stated concern that the simultaneous construction of the bridge will negatively affect the cleanup work schedule. The 2 projects must coordinate construction activities. There will be a need for bridge construction equipment to use the access road.

TxDOT has the following additional concerns:

- There was mention that the existing armored cap on the superfund site will be re-used and that it will be temporarily stored “at or near the North Impoundment”. We want to ask if there is intent to store the existing stone armor on TxDOT’s ROW and if so where the storage is anticipated. We would prefer that it be stored outside of TxDOT ROW.

- There is reference to a Floodplain Drainage Impact Analysis performed with the proposed cofferdam in place that looked at a 2, 10 and 100-year flood event which was submitted to the Harris County Flood Control District (HCFCD) and TxDOT. We have not received this study.

- The plan is to remove the cofferdam and restore the site. TxDOT understands that the plan is that if any piles of the cofferdam cannot be removed, they will be either cut or driven below the mudline. However, any piles left in place will likely interfere with the construction of some of the proposed bridge dolphins and with future widening of the I-10 westbound main lane bridge. We insist that all piles on the south side of the cofferdam are removed. We also request that the TxDOT access road be restored to pre-construction condition upon completion of the clean-up project (same limits as previously stated).

- The Southwest corner of the proposed cofferdam structure is over one of the Exxon pipelines and less than 25 feet from the other. The top of the sheet pile elevation is shown to be plus 9 feet and length is 60 feet. That means it tips at elevation negative 51 feet which should be able to clear the Exxon pipeline. We recommend that the clearance is confirmed by the wall designer.

- TxDOT has experienced numerous issues with barges hitting the existing I-10 bridge. With the proposed steel girder replacement option, the proposed riprap berms and one of the proposed dolphins now overlap more with the proposed cofferdam structure. TxDOT is concerned that we will not be able to properly protect all the approach bents, the first bent of the steel unit and the second bent (the one in the water) of the steel unit until the cofferdam structure is removed.

- TxDOT is concerned that a wider access road to accommodate 2-way truck traffic will result in a need to shift the I-10 westbound main lane bridge enough to miss the proposed wider access road.

- For the cable stayed bridge option, the proposed cofferdam overlaps with the foundation, bent and rock island of the proposed I-10 westbound main lane bridge. In addition, the access road will be directly under the proposed bridge. TxDOT is concerned that this will result in a need to considerably shift the I-10 westbound main lane to avoid conflicts.

- TxDOT remains concerned that the close proximity to the access road will unavoidably interfere with the bridge construction work with the cleanup work. We are concerned this will become a contested issue down the line.

- The schedule for the site remediation includes shutting down during hurricane season. This greatly increases the time to complete the clean-up operation. While worker safety is a concern, hurricanes and tropical storms of any magnitude to potentially affect the site are usually predicted well in advance which would allow the contractor time to evacuate the site. Suggesting allowing the contractor to submit an alternate bid with the ability to work continually on the site. This would tend to help mitigate some of the overlap activities with the adjacent bridge construction and might actually be cost effective due to the costs of mobilizing and demobilizing.

- TxDOT is uncertain of the relationship between the EPA and the clean-up activities. Will the contractor work for the EPA or for International Paper? TxDOT would be more amenable with a contractor who worked for the EPA rather than a private entity.

- Per previous discussions, you will need a permit to work in TxDOT ROW. We will also require a bond to insure that TxDOT ROW is not left in a damaged state after the clean-up activities.

TxDOT remains committed to working with the EPA to coordinate the clean-up activities and the bridge clean up.

We request a written response to our concerns.

Should you have any questions, please contact my office at (713) 802-5002 or via email at eliza.paul@txdot.gov.

Sincerely,

DocuSigned by:
Eliza Paul
DF6493334509439...

Eliza C. Paul, P.E.
District Engineer
Houston District

Attachments
CC: Adam C. Galland, P.E., Director of Construction, Houston District, TxDOT
Muhammad J. Elahi, P.E., Southeast Harris Area Engineer, Houston District, TxDOT
Mark D. Patterson, P.E., Transportation Engineer Supervisor, Houston District, TxDOT
Jeanne C. Javadi, P.E., Transportation Engineer, Houston District, TxDOT

DS
MP

BC: James W. Koch, P.E.
Larry W. Blackburn, P.E.

Texas Department of Transportation

MEMO

April 19, 2023

To: Mark D. Patterson, P.E.

From: Elie J. Alkhoury, P.E.

DocuSigned by:
Elie Alkhoury
1DE1847CEBA74FA...

Subject: Review of Hydrodynamic Modelling Report from 90 Percent Remedial Design
County: Harris
CSJ: 0508-01-379
I-10 at San Jacinto River: From Magnolia Street to Thompson Road

---

We have reviewed the Hydrodynamic Modelling Report for the subject project prepared by GHD Services, Inc. for the Environmental Protection Agency (EPA) and the Texas Department of Transportation (TxDOT).

In the analysis, an Environmental Fluid Dynamic Model (EFDC) of the San Jacinto River was created to assess any possible impacts from the Remedial Design for the Northern Impoundment proposed by the EPA, which includes the construction of a cofferdam with a projected design life of 7 years. The effects on the floodplain, velocity, and shear stress were evaluated in the vicinity of the I-10 bridge. The results appear to show slight increases in the velocity and shear stress near the east side of the I-10 bridge, with increases likely not exceeding 0.1 ft/s and 0.1 Pascals, respectively, compared to existing conditions. The analysis concluded that “the area conditions of the area are comparable to existing conditions.” Additionally, it was stated that “the presence of the cofferdam generally diverts the flows to the north side of the impoundment, decreasing velocities next to I-10.”

Based on this information, the effect of the cofferdam construction on I-10 appears to be negligible and does not indicate any repercussion to the I-10 bridge.

BC: Larry Blackburn, P.E.
Jeanne Javadi, P.E.
Erica Donnelly, P.E.

Harris County
Pollution Control
Harris County Pollution Control Services
Dr. Latrice Babin, Executive Director

Established in 1953

Subject: San Jacinto Northern Impoundment Pre-Final 90% Remedial Design

Background: The Northern impoundment Site consists of pulp and paper mill waste, which was placed directly north of the I-10 bridge. An area northwest of the Northern impoundment is referred to as the Sand Separation Area (SSA). The remedy selected in the Record of Decision (ROD) included removal of a portion of the existing armored cap material, removal of approximately 162,000 cubic yards (CY) of waste material exceeding 30 ng/kg of 2,3,7,8-tetrachlorinated dibenzo-p-dioxin (TCDD) toxicity equivalent (TEQ) beneath the armored cap and its stabilization for acceptance at a permitted disposal facility, Institutional Controls (ICs) to prevent dredging and anchoring at the SSA and monitored natural recovery (MNR) will be the remedy used for the SSA.

NOTE: The Remedial Design (RD) for the northwest corner is not included in this submittal due to technical impracticability associated with the hydraulic heave risks and will be addressed in a future submittal. A number has been placed before the Document Title for ease in referring to documents.

1. **Document Title: 11215702-RPT-6 - Complete - Pre-Final 90 Percent Remedial Design-Northern Impoundment**

HCTAC concerns:

– Section 3 Description of Treatability Studies performed and results.

- Characterization results indicate waste materials should meet criteria for Class II non-hazardous waste disposal; HCTAC is concerned excavated waste will be disposed of in a Type I landfill that can accept class II non-hazardous waste. The Atascocita landfill is a Type I facility that can accept municipal solid waste, special waste, and Class 2 and 3 non-hazardous industrial wastes. Class 2 waste Any individual solid waste or combination of industrial solid wastes that are not described as Hazardous, Class 1, or Class 3 per 30 TAC 335.506. Class 3 waste: Inert and essentially insoluble industrial solid waste, usually including, but not limited to, materials such as rock, brick, glass, dirt, and certain plastics and rubber, etc., that are not readily decomposable per 30 TAC 335.507.
- Some Type I landfills dispose of leachate via municipal Wastewater Treatment Plants. HCTAC is concerned that any landfills utilized for dioxin contaminated waste disposal, which send leachate to municipal Wastewater Treatment Plants for disposal, could potentially send dioxin contaminated leachate to a municipal facility unable to clean up dioxins and potentially reintroduce dioxins to the environment.
- HCTAC is concerned the waste is not hazardous and can possibly be used as cover by the receiving landfill and may impact stormwater runoff and/or transmitted via dust in the area.
- HCTAC is concerned with the purpose of the solidification tests if it is dependent on the Remedial Contractor (RC) and disposal facility, which may require their own tests.
    - HCTAC will recommend excavating all waste with concentrations greater than 30 ng/kg (See Document 1 Section 5, Section 6, and Section 10; and Documents 4, 5, 6, and 9).

  - HCTAC will recommend EPA not approve averaging of remnant contaminants unless extenuating circumstances exist (See Document 1 Section 5, and Section 10; and Documents 4 and 9).
  - HCTAC will recommend using the existent geotextile, geomembrane, and cap, be returned to the site, and cover any remaining waste, which may exceed 30 ng/kg due to extenuating circumstances (See Document 1 Section 5, and Document 4, 5, 7 and 9).
  - HCTAC will request specifics on the proposed reuse for the cap, the geotextile, and the geomembrane.
- HCTAC is concerned that the Total Suspended Solids (TSS) and Turbidity will be used instead of testing the water to determine if the dioxin and furan are below the minimum level (ML) (See Document 1 Section 5 and Document 7).
- HCTAC is concerned with the actual value used in water testing, which is supposed to be the Texas surface water quality standard (TSWQS) of 7.97 x 10-8 µg/L or 0.0797 pg/l or per the ML of the EPA-approved method 1613B which is 10 pg/l (See Document 3 and 7).

HCTAC Concerns:

– Section 4 addresses Applicable or Relevant and Appropriate Requirements (ARARs) for remedial action (RA) work.

- HCTAC is concerned with the lack of regulatory agency oversite during the performance of work at the site to verify specific actions protective of the environment are being accomplished, which is the function of permits.
  - HCTAC will request that EPA require a third-party presence during work to verify and ensure the activities performed by the RC protect the environment and human health, including those of the on-site employees.

HCTAC Concerns:

– Section 5 details the design criteria assumptions for the current Best Management Practice (BMP) wall design, waste material removal and solidification methodology, transportation and disposal, and water treatment process.

- HCTAC is concerned access has not been secured to do the proposed work.
- HCTAC will request the EPA require the RC to further evaluate the use of barges despite complicated logistics, scarcity of offloading terminals, and risk of loss or release of material during transit.
- HCTAC is concerned the congestion of marine vessels in the vicinity due to the Texas Department of Transportation (TxDOT) bridge construction would further preclude barging as an option is a pretext to delay work further.
- HCTAC is concerned that the +9 feet only apply from November to April, and the height of the water is higher from April to November (See Document 1 Section 10 and Document 7).

- HCTAC is concerned during the return from the off-season, the RC may find the BMP structure compromised due to a highwater situation, such as several barge or tree debris impacts from April to November.
    - HCTAC will request specifics on how the BMP will be evaluated before work begins in November to determine if it is still structurally sound (See Document 9).
    - HCTAC will inquire if the 30-foot-wide area between the sheet pile walls of the BMP can be used to support equipment and if barges with equipment can be docked outside the BMP in the San Jacinto River as a way to increase the work area.
- HCTAC is concerned concentrations greater than 30 ng/kg will be left in place due to the Safety Factor (SF), heave, or site-based averages (See Document 1 Section 3).
- HCTAC is concerned that impacted material, over 30 ng/kg, will be mixed with cleaner material to meet the 30 ng/kg criteria and then be put back in place and used as a fill.
    - HCTAC will recommend that excavated material be disposed of in a landfill and not be considered for reuse (See Document 7).
- HCTAC is concerned the water treatment system (WTS) design is subject to changes based on field performance.
    - HCTAC will recommend the treated effluent water be stored until sample results verify that the WTS is performing at optimum levels. HCTAC has determined a typical 30,000 BBL barge is one of the larger barges in the area at 300-ft long, 54-ft wide, or 16,200 square feet and could be used as a staging area for the WTS or to store water before or after treatment (See Document 9).
- HCTAC is concerned metals analysis will take ten business days and dioxins/furans fifteen days to analyze.
    - HCTAC will recommend in-field monitoring of TSS or turbidity in the WTS effluent (See Document 1 Section 3).
    - HCTAC will recommend that a licensed wastewater treatment operator be required to operate the WTS (See Document 7).
    - HCTAC will recommend a backup generator be available onsite to run the WTS in case of power outages and to prevent project delays due to the WTS not being in operation.
    - HCTAC will recommend the WTS be weatherized to withstand extreme weather conditions such as winter storm Yuri in February (See Document 7 and 9).
- HCTAC is concerned the estimated cy are based on sampling performed during the Pre-Design Investigations (PDI) and Supplemental Design Investigations (SDI).
- HCTAC is concerned additional sampling during the excavation may reveal additional information regarding the depth, area, concentration, and volume of contaminants.
- HCTAC is concerned the Coastal Water Authority (CWA) has not provided design information for the dam gate and modeled flow data to the EPA and GHD when asked.
    - HCTAC will recommend both organizations reach out to the board of directors, attend a meeting, or reach out to the governor of Texas and the Mayor of Houston, who appoints the board of directors.

- HCTAC will recommend the 30-foot BMP soil buttress or berm adjacent to the inside wall have some cover to prevent erosion during a storm, wind, vibration, etc. events and to protect employees from sliding debris from the berm as they excavate.

HCTAC Concerns:

– Section 6 description of the investigation activities conducted in the SSA during Pre Design Investigations and the implications of the results for the MNR.

- HCTAC is concerned about the concentrations after 2 feet; for example, SJSSA06 (4-6 ft bgs) had a concentration of 3330 ng/kg, which is significantly above the 30 ng/kg concentration (See Document 1 Section 3).
- HCTAC is concerned deposit variability could be due to alternating periods of erosion and deposition caused by boat traffic, storm events, and/or natural river flows, with the erosion causing exposure of the contaminants above 30 ng/kg (See Document 1 Section 3).

HCTAC Concerns:

– Section 7 description of how the RA may be implemented to minimize environmental impacts in accordance with the EPA's Principles for Greener Clean-Ups (EPA, 2009).

- HCTAC is concerned that carpooling is dependent on the location of the workers' homes.
- HCTAC is concerned that using a portable generator may be necessary to keep work going during power outages from winter storms.
  - To limit the footprint, HCTAC recommends consideration of barges for this contingency.
- HCTAC is concerned that using the aggregate from inside the BMP to cover the area may make the BMP unstable when trying to complete the work and create an effective cover that doesn't leave a gaping hole in the river.

HCTAC Concerns:

- Section 9 descriptions of the supporting deliverables identified in the statement of work (SOW): Health and Safety Plan (HASP), Emergency Response Plan (ERP), Field Sampling Plan (FSP), Quality Assurance Project Plan (QAPP), Site Wide Monitoring Plan (SWMP), Construction Quality Assurance/Quality Control Plan (CQA/QCP), Institutional Controls Implementation and Assurance Plan (ICIAP), Transportation and Off-Site Disposal Plan (TODP), and Monitored Natural Recovery (MNR) Plan.

- HCTAC is concerned the plans suggested the information to the RC instead of giving more guidance and definitive information, and the information which was supposed to be conveyed was left to a third party that doesn't exist yet.

HCTAC Concerns:
– Section 10 references cited reports, correspondences, and other documents.

In Table 2-6, SJSB0088 and SJSB054 show that the concentration decreases to well below 30 ng/kg, and then the concentration increases beyond 30 ng/kg after several feet. There are multiple examples of this in the table (See Document 1 Section 3).

- HCTAC is concerned there are instances where the concentration is greater than 30 ng/kg if sampled at further depths. In Table 5-1, the post-excavation surface concentration for sample SJSB073 will be 41.0 ng/kg, for SJSB095 will be 57.0 ng/kg, for SJSB074 will be 87.0 ng/kg, for SJSB047-C-1 will be 327.0 ng/kg, for SJSB096 will be 84.0 ng /kg along with several others at or below the 30 ng/kg range and the area based average concentration is 23.31 ng/kg (See Document 1 Section 3).
    - HCTAC will recommend at the end of each season, exposed surfaces be covered after excavation with the geomembrane and/or cap (See Document 7).

Figure 5-3 shows the water surface elevations from November to April from 1996 to 2019. In 1998, 2002, 2003, 2009, and 2016 the water was above the 9 ft elevation proposed for the BMP (See Document 1 Section 5).

- HCTAC will recommend the BMP height above water be reconsidered to 10 feet to reduce the risk of water intrusion during the working season.

2. **Document Title: 11215702-RPT-6 - App B – Complete**

HCTAC Concerns:

- HCTAC is concerned that section 3.2 is missing information. “The laboratory test results are included in **Error! Reference source not found**. Results of the laboratory testing were used to confirm site soil logging and are discussed in the relevant subsurface conditions in Section 4.” Section 4.2 is also missing information. “The results for Atterberg Limits determination conducted on five samples of the clay deposit is summarized in Table 5-3 and presented in **Error! Reference source not found.** Atterberg limit results show a liquid limit in the range of 27 to 55 percent, and a plasticity index of 13 to 38 percent, indicating medium to high plasticity clay.”
- HCTAC is concerned Table 1A, 1B is presented without labeling the different columns for the terms used in the two equations.

3. **Document Title: 11215702-RPT-6 - App D – Complete**

HCTAC Concerns:

- HCTAC is concerned a 500-year flood event study was not conducted despite HCFCD requesting it to be performed, and the TXDOT may also benefit from this study.
- HCTAC is concerned the Environmental Fluid Dynamic Model (EFDC) values don’t change across the transect numbers while the HEC-RAS values do.
- HCTAC is concerned about a Louisiana-licensed engineer signing off on work performed in Texas.
- HCTAC is concerned that this is the 90% design, and there are foreseeable changes in the future since the EFDC for the TXDOT is considered a draft subject to modification in the future.

- During the review of the 100% documents for the south impoundment, the documents stated several times that changes to the documents may be made by the RC. HCTAC is concerned this statement will be repeated in the northern impoundment documents causing further delay in the cleanup process.
- HCTAC is concerned that the modeling doesn't consider recent environmental climate changes encountered in the last 15 years and encourages more recent data to be used.
- Based on the review of the data presented, HCTAC is concerned the velocity, and shear stress differences with and without the cofferdam may cause problems to the 1-10 structures.

4. **Document Title: 11215702-RPT-6 - App E - Complete**

HCTAC Concerns:

- HCTAC is concerned the surface weighted average concentration (SWAC) cleanup was accepted by the EPA and Technical Working Group (TWG) on November 16, 2021, instead of the point-by-point method (See Document 1 Section 3).
- HCTAC is concerned with unforeseen future activities at the site. For instance, right now, exposure is based on the ingestion of fish consuming the sediment; the future exposure may be different. For example, the site was once above the water but is now below the water due to subsidence.
- HCTAC is concerned the SWAC doesn't consider higher concentrations below the surface which could potentially be exposed in the future (See Document 1 Section 3).
- HCTAC is concerned that if the excavated area is not covered, the potential for ingestion remains. Additionally, the incidental ingestion of sediment and sediment direct contact is not eliminated, especially since people who fish drop anchors and fishing lines which may drag along the bottom and, when pulled up, expose recreational fishing children to the sediment and possible ingestion (See Document 1 Section 3).

5. **Document Title: 11215702-RPT-6 - App F - Complete**

HCTAC Concerns:

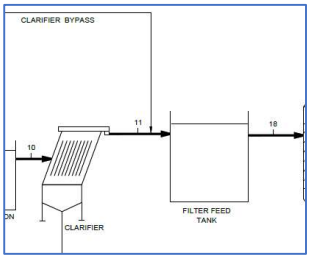
- HCTAC is concerned this will continue to be an exposure pathway by sediment consuming fish which are later eaten by people, contaminated sediment, which is dermally absorbed, or sediment ingested by people (See Document 1 Section 3).
    - HCTAC will recommend signage be put in place and checked frequently, making the public aware of the presence of the site and the contaminants.
- HCTAC is concerned the mean lower low water (MLLW) datum from 1983 to 2001 was used, but the tidal data dates were from 2010 to 2020 and verified from January 6, 1998, to September 16, 2021.
    - HCTAC will recommend more recent data be used and compared with older data and the more conservative be used for modeling.
- HCTAC is concerned there was missing wind data from September 18, 2008, to June 8, 2010.

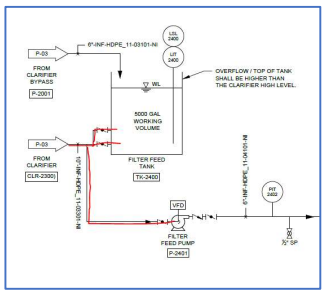
- HCTAC is concerned floodplain modeling for the 500-year flood event was requested by HCFCD and was not conducted.
- HCTAC is concerned the letters and information sent to the HCFCD and TXDOT were presented, but the responses, comments, or concerns from these or other organizations were not presented.

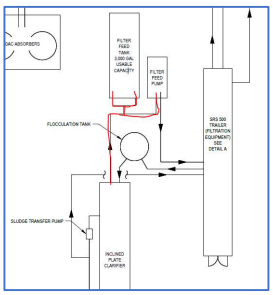
6. **Document Title: 11215702-RPT-6 – App G – Complete**

HCTAC Concerns:

- HCTAC is concerned that according to the C-08 drawing, the bench will only be placed on the C-2 section and wonders why a bench is not used in other locations.
- HCTAC is concerned that according to drawing C-22, the only areas which will be restored or reseeded are at or near the right-of-way (ROW) in the southern area near I-10.
- HCTAC is concerned drawing P-03 shows a clarifier bypass after the influent tanks, and drawing P-04 shows the flow from the clarifier bypass entering the filter feed tank, but the flow from the clarifier has the option to enter the filter feed tank or to go directly to the multimedia filter. Drawing P-06 doesn't show the clarifier bypass entering the filter feed tank or filter feed pump, and the flow from the clarifier can enter the filter feed tank or the filter feed pump.
    - HCTAC will recommend specifics on what situations would allow for the clarifier to be bypassed be provided.
- HCTAC is concerned there is no direct line from the filter feed tank that is not mixing with the flow from the clarifier via the same pipe.
- HCTAC is concerned the filter feed pump is not connected directly to the filter feed tank without using the piping from the clarifier.







7. **Document Title: 11215702-RPT-6 - App H - Complete**

HCTAC Concerns:

- HCTAC is concerned that the work description doesn't mention the onsite sampling being done to verify the concentrations of the excavated material and that the field sampling plan is only mentioned for the WTS.
    - HCTAC will recommend sampling being performed as excavation is being conducted be mentioned in the design specifications documents (See Document 1 Section 3).
- The Flood Contingency Plan (FCP) states to take action if the river is above 10 feet; however, the wall is only 9 feet (See Document 1 Section 5).
- HCTAC is concerned that since the work is to be conducted outside of hurricane season and the possibility of a winter storm can be encountered during the excavation period (See Document 1 Section 5).
    - HCTAC will recommend acid and caustic be included on page 25.
- HCTAC is concerned that over-excavating may cause problems such as hydraulic heave and should be mentioned as a potentially dangerous situation; the only time heave is mentioned is while driving the piles.
- HCTAC is concerned about the sampling needed to verify the concentrations of the material removed and left in place during excavation.
- HCTAC is concerned that excavated material may be used as part of the berm or in the space between the sheet piles (See Document 1 Section 5).
    - HCTAC was under the belief a geomembrane would not be placed over the site at the completion of the project with the exception of the area near the ROW (See Document 1 Section 10).
- HCTAC is concerned the hammer blows to the sheet piles may cause vibrations which could affect the surrounding area.
- The document states the sealant will be the one the factory recommends. HCTAC is concerned the sealant discussed in previous documents said it may be affected by the environment.
- HCTAC is concerned if the WTS is not working correctly, dioxin/furan may be reintroduced into the river.
    - HCTAC will recommend an alarm system be in place to sound if the turbidity or TSS exceeds a certain amount correlated back to the dioxin/furan concentration (See Document 1 Section 3).
- HCTAC is concerned on page 170 regarding how the following statement is to be accomplished and requests clarification, "Minimize TSS transferred from the excavation to the WTS."
- HCTAC is concerned several times throughout the document the license of the engineer, installer, TSDF, and driver is referenced, but the license of the operator for the WTS is not specified (See Document 1 Section 5).

8. **Document Title: 11215702-RPT-6 - App I - Complete**

HCTAC Concerns:

- HCTAC is concerned if the wind load also considered the effect of the wind on waves since the wind can cause waves.
    - HCTAC will request clarification on whether wave load was factored in on the calculations.
- HCTAC is concerned barge impact would occur during a storm where the winds are high and causing waves; therefore, the load from wind, waves, and barges should be calculated.
- HCTAC is concerned if the SF allows for multiple tie-rods failures.
- HCTAC is concerned the fill between the two sheet pile walls will retain some water and if the water will be removed at the start of the season.

9. **Document Title: 11215702-RPT-6 - App J – Complete**

HCTAC Concerns:

- HCTAC is concerned with the purpose of having the 90% HASP, ERP, and other plans if the RC and subcontractors will write their own.
- HCTAC is concerned the RC and subcontractor will submit a HASP, ERP, and other plans which need to be reviewed, which will further delay the accomplishment of the work.
- HCTAC is concerned if air monitors at the site will measure contaminants or just dust, which could potentially carry contaminants.
- HCTAC is concerned the specifics of the air monitoring plan will be developed by the RC, and the SWMP lists items for the RC to consider.
- HCTAC is concerned with the exposure of dioxin and furan dust-containing contaminants that the workers may be exposed to and who will be setting the threshold limits, which could be toxic to employees and the public, and HCTAC is questioning if the Permissible exposure limit of 15 mg/cubic 8 hr TWA takes into account the dioxin and furan.
- HCTAC is concerned with the exposure of dioxin/furan contaminants in the air, which may be released during excavation. Currently, the HASP has recommendations but not requirements.
    - HCTAC will recommend the workers and community are protected.
    - HCTAC will recommend more specific and definitive guidance to be included in the HASP.
- HCTAC is concerned nutria around the San Jacinto River can also be a rodent of concern.
- The SWMP describes procedures for monitoring and leaves many items to the discretion of the RC, and HCTAC is concerned without proper guidance, the RC may not fully address the issues such as dust which contains dioxins and furans, adequate stormwater management procedures, turbidity mitigation, and odor control.
- HCTAC is concerned that persons will be designated to perform crucial functions such as stormwater inspections and prefers third-party oversight from organizations who understand the ramifications of contaminated stormwater entering the river.
- HCTAC is concerned the manner used to determine the turbidity threshold is not clear and requests specifics regarding investigating and addressing the sources of turbidity.
- HCTAC is concerned some plans seem to offer a lot of guidance while others are lacking.

- As part of the TWG, HCTAC will request to be included in the project meetings where the EPA and TCEQ are in attendance.
- HCTAC will recommend all meetings, except for the daily progress meetings, have minutes prepared and distributed to all attendees and to the members of the TWG.

- Regarding the SSA, HCTAC is concerned the contaminants are being left in place in an area of sand and being left to chance that deposition is going to keep them in place (See Document 1 Section 3).
- HCTAC is concerned SSA sampling will be done every few years for 20 years and then determine if MNR has been effective.
- HCTAC is concerned the remaining contaminants will go downstream and find their way into the environment and humans (See Document 1 Section 3).
- HCTAC is concerned since the waste is not considered hazardous, what kind of DOT signage will be required on the transport vehicle.
- HCTAC is concerned with the lack of information in the TODP, due to the disposal facility and RC being unknown.
- HCTAC is concerned decision unit was never mentioned in the ROD (See Document 10).

10. <u>Document Title: 20220803 SJRWP Memo to File</u>

HCTAC Concerns:

- HCTAC is concerned that without the presentation of information for the removal of the solid waste and waste suspended in the water column behind a cofferdam, it is difficult to make comments. However, if this method would allow for the removal of all the waste down to 30 ng/kg without leaving hot spots or submerged waste in deeper layers then HCTAC' concerns are addressed.
- HCTAC is concerned, and as the EPA has stated, based on the dynamic river environment, the danger of repeated storms and associated flooding, the history of cap maintenance and repairs, and the toxicity and persistence of the contamination, leaving contaminants above the 30 ng/kg risks the potential of future exposure to the environment and human health (See Document 9).

Harris County
Pollution Control
Harris County Pollution Control Services
Dr. Latrice Babin, Executive Director

Established in 1953

Subject: Parson's Comments on 90% design northern impoundment

Section 3.3.5.2

- The solidification test results are only briefly summarized, and no data are shown. Because this testing impacts the potential for dioxin dispersal during off-site transport, i.e., liquids leaking from trucks, we believe that solidification is not something that should just be left to be worked out on-the-fly during remedial activities only between the remedial contractor and disposal facility. Please share testing data and provide the procedures that the remedial contractor will follow prior to the RA to verify that wastes are sufficiently stabilized for transportation and disposal without contaminating other media.

Section 5.2

- The design is reliant on continuing access via the IH-10 frontage road ROW and an on-site logistical support area. In other sediment remediation projects, such as the Hudson River dredging, it has been necessary to transport excavated sediments by barge to an off-site support area for processing. We suggest that back-up plans be formulated in case this becomes necessary. A similar comment was made previously on the 30% design (Comment 4), but it was dismissed as being impractical with minimal explanation. There should be detailed consideration of this approach. Also, direct input from TxDOT on the design and their plans for bridge update are needed.
- GHD proposes using a surface weighted average (SWAC) approach rather than point by point to achieve the goal of 30 ng/kg. The selected remedy in the ROD, alternative 6N, is described as follows: "*This alternative involves the removal of all waste material that exceeds the cleanup level of 30 ng/kg regardless of depth in the northern waste pits*." There is no provision in the ROD for leaving wastes exceeding that level, either by areal averaging or due to expense or technical difficulty. Several items proposed by GHD in this 90% design would require a ROD amendment.
- We oppose the SWAC approach for several reasons. First, it conflicts with the cleanup standard specified in the ROD. Second, because GHD included in the calculation areas not requiring excavation, such as the historic berm and areas beyond the TCRA cap, they have underestimated the average dioxin concentration of the area requiring remediation. Third, by looking only at the post-excavation surface, it ignores residual contamination exceeding the cleanup level that would be left in place deeper than the proposed post-excavation surface. GHD has not shown that it is impractical to meet the cleanup level throughout the site.

- Even if a site-wide averaging approach is deemed acceptable, we urge that no principal threat waste is allowed to remain. In areas where dioxin levels exceeding 30 ng/kg occur in locations where hydraulic heave risk limits the excavation depth, we believe that the final deepest excavation should be performed by through-water excavation. We believe that that the 30 ng/kg goal should be met on a point-by-point basis to the maximum depth of exceedance.

Section 5.2 and 5.11

- GHD identifies numerous ongoing challenges and uncertainties related to the design, such as identification and securing of appropriate property needed for logistical support, interfacing with TxDOT plans, risk of overtopping the BMP, community impacts, etc. These often seem to be presented as impediments to proceeding without providing details on how these issues will be resolved. Additional information should be provided on how these critical issues will be resolved in a timely manner to allow the project to proceed.

Table 5-1

- The proposed excavation surface is highly irregular, reflecting the high spatial variability in dioxin concentrations. The proposal has adjacent polygons being excavated to more than 10 feet difference in vertical elevation. It places too much confidence in a single core as completely representative of a quarter-acre polygon. We believe it is necessary to over-excavate to a greater extent near the periphery of polygons where the uncertainty is highest, to make sure that all waste is removed. Further, post-excavation confirmation sampling should include samples collected near the edges of the excavation polygons and on the side slopes between polygons, not just toward the centers of polygons.
- Core SJSB046-C1 has been paired with core SJSB083 to define the post-excavation surface concentration of 4.8 ng/kg at -20 ft NAVD. Yet there is virtually no similarity between the concentration profiles in the two cores, so the assumption that the concentration at -20--22 ft in core SJSB046-C1 is equal to that in core SJSB083 is faulty. The uncertainty in the vertical distribution of dioxins is large here.
- In calculating post-excavation areal average sediment concentrations, it is not appropriate to ignore deeper, more contaminated layers that would be allowed to remain in place. For example, with core SJSB078, the calculation is based on a concentration of 16 ng/kg, but there are deeper intervals at 140 and 260 ng/kg. We revised the area-based average calculations to use the highest concentration that will remain in place and calculated an areally-averaged post-excavation maximum concentration of ~86 ng/kg, almost 3x the cleanup goal of 30 ng/kg.

- In many places, such as core SJSB096, the proposed excavation surface ignores the cleanup goal of 30 ng/kg even though it could be met without technical difficulty.
- If the historic berm meets the cleanup level, as it appears based on borings, why is it being excavated and hauled to landfill? Borings SJSB029, SJSB030, SJSB031, SJSB034, and SJSB035 together account for 31,000 CY of material included in the total excavation volume. It would seem that material accounts for most of the difference between the current estimate of the volume of waste material to be removed and the ROD estimate.

Table 5-2

- The excavation rationale for soil boring locations SJSB029, SJSB030, SJSB031, SJSB034, and SJSB035 are stated to be based upon removal of all material above 30 ng/kg. But those locations did not have any material above 30 ng/kg at any depth. Please elaborate on the rationale for excavating these locations.
- We note two soil boring locations with excavation elevation rationale stated as "*based upon removal of all material above 30 ng/kg TCEQ*" that we believe are incorrect:
  a. SJGB012 only went to -7 feet, and thus was paired with core SJSB072. Core SJSB072 has concentrations exceeding 30 ng/kg below the proposed excavation and thus the rationale listed in the table is incorrect.
  b. SJSB046-C1 was paired with core SJSB083. However, given the lack of similarity to concentrations in core SJSB083 in the -15 to -20-ft depth interval, we see no evidence that the concentrations should match at -21-ft or that the stated excavation depth would remove all material above 30 ng/kg TCEQ.
- The excavation elevation rationale for the polygon represented by borings SJSB072 and SJSB078 state that further excavation would put the area at risk of hydraulic heave. Yet there is waste present at concentrations exceeding the cleanup level between the proposed excavation elevation and the hydraulic heave elevation, so the rationale does not appear to be accurate.

Section 5.6.2.1

- The plan states that at the end of each excavation season, the area within the BMP wall will be intentionally flooded to provide support for the BMP wall and prevent scour that could be caused by overtopping the BMP wall during a storm event. We did not find sufficient analysis or rationale for this procedure in the design. Can the benefits be achieved by partial flooding or does it require full flooding to river level? Can the area within the BMP wall be flooded only if and when a large flood or hurricane is approaching?

- If partial flooding is sufficient, this would reduce the amount of water inside the BMP wall that must be pumped out at the start of excavation season and reduce de-watering time for shallow waste deposits.
- This section states that "*At the end of each excavation season, the exposed slope of the excavation will be capped.*" Please provide some detail on what kind of capping measures would be used, as well as how this temporary cap will be removed and managed during the next construction season.

Section 5.6.2.3

- On what basis will the decision be made whether to use natural de-watering or solidification of excavated wastes?
- Please describe procedures for collecting and managing the water derived from de-watering wastes after excavation.
- Because waste excavation in the dry may generate particulate (dust) that may spread by wind to surfaces not considered to be in direct contact with wastes, all stormwater discharged to the river should be periodically sampled and analyzed.

Section 5.6.4 and Field Sampling Plan in Appendix J

- GHD specifies that post-excavation sampling will be done consisting of 6 to 8 samples per ½-acre dredge management unit (DMU). They specify that the samples will be composited and analyzed for compliance with 30 ng/kg criteria. Analysis should be run on each sample collected and the basis for compliance should be 30 ng/kg for each sample, not for a composite of the samples.
- Upon finding that cleanup goals are not met after excavation, over-excavation should be conservative to ensure that wastes exceeding the cleanup level are removed. Over-excavating to only the halfway point between adjacent samples is not conservative because there is no information in the spatial distribution of contamination between the discrete samples. In order to provide confidence that waste materials exceeding the cleanup goal have been removed, and avoid delays associated with additional sampling and dioxin analysis, the over-excavation should be performed over the full area to the nearest discrete sample confirmed to meet the cleanup level, not just to the halfway point between discrete samples.

Section 5.6.5

- GHD specifies that there will be no excavation restoration activities, except along the southern boundary to ensure slope stability and if necessary for placement of clean recovered cap material or other clean material. Despite the post-excavation sampling, residual risk and uncertainty remain regarding remaining surface and subsurface levels of dioxins. Therefore, it is suggested that the entire excavation area be restored with at least 6" to 12" of clean material that is resistant to erosion.

Section 5.7.1

- GHD specifies that the waste will not be TCLP hazardous based on waste characterization to date, and do not specify any further TCLP testing. TCLP analysis should be done on excavated material prior to disposal to verify that it is non-hazardous.

Section 5.8

- The 90% design proposes that, at the beginning of excavation season the impounded "river" water will be pumped out of the interior of the BMP and discharged directly to the river without treatment. Evidence suggests that dioxins and furans dissolved in porewater within the wastes (also referred to as mounded groundwater in the 90% design) will be mobile and mix into overlying water. Page 85 of the ROD states "*Samples of surface water at the site demonstrate the mobility of dioxin in the San Jacinto River environment; for example, surface water sampling conducted in July 2016 indicated that tetra-dioxin and tetra-furan both more than tripled going over the TCRA cap*." During contact water treatability testing (section 3.4.2.1), a pit was excavated in the southwest quadrant, and pore water that seeped from the waste material into the pit overnight was analyzed. Concentrations of both 2378-TCDD (66 ng/L) and 2378-TCDF (220 ng/L) were significantly elevated relative to their discharge criteria (10 ng/L). Based on the 2378-TCDD (1500 pg/L), 2378-TCDF (3900 pg/L), and TSS (3400 mg/L) concentrations in contact water produced by mixing deionized water into that excavated pit, it is possible to estimate the 2378-TCDD (440 ng/kg) and 2378-TCDF (1150 ng/kg) concentrations in waste materials from that excavation, and from which the pore water seeped into the pit. These levels are roughly 100x lower than the highest dioxin levels observed in the waste materials, suggesting that dioxin concentrations in pore water draining from other waste materials could be 100x higher than those observed in this pit, and exceed discharge criteria by a large factor.
- As the area inside the BMP is pumped out at the beginning of excavation season, the porewater from de-watering waste materials, also called mounded groundwater, will contribute to the water retained inside the BMP wall. As water levels decline, this

porewater from wastes will comprise an increasingly large proportion of the water being pumped out to the river. At some unknown point, dioxin levels are very likely to exceed discharge criteria and should not be pumped to the river without treatment.

- For these reasons, we request that analysis of the impounded water be performed prior to discharge to the river, and that continuing water sampling of discharged waters be performed daily to confirm that the water being pumped to the river is below the minimum level (ML) for dioxin/furan concentrations. At a minimum, this should be done the first two years. If levels are consistently below the ML for dioxins/furans, it may be suitable to reduce or remove this monitoring requirement in future years.
- In many places there is a sharp change in dioxin concentrations between depth intervals. For example, in core SJSB073, the concentration of the -7 to -9 ft interval is 83,000 ng/kg, and that of the -9 to -11 ft interval is 41 ng/kg. Given that neither the exact geometry of the waste deposit nor the position of the excavator bucket is seldom precisely known to better than a few inches, it is a typical practice to over-dredge by one-half foot as a safety factor to achieve the required depth. We encourage adoption of this practice.

Section 5.8.4 Table 5-J

- Note 3 seems to suggest that total suspended solids (TSS) levels will be monitored in place of dioxins and furans. Please confirm that dioxins and furans will still be measured and reported in effluent on at least a weekly basis while discharging. Also, if possible, we suggest that flow be monitored and totalized continuously.

Section 5.9.4 and Sitewide Monitoring

- GHD specifies that they will monitor for turbidity during BMP installation and removal once or twice per day. This is insufficient to monitor for potential issues that may be associated with specific construction activities and should be revised to include continuous turbidity monitoring with thresholds and specific responses. Also, it is specified that turbidity curtains will only extend to the midpoint of the water column. The curtains should be extended to close to the river bottom, or justification provided regarding why the midpoint is appropriate and sufficient.

Section 5.11.2

- GHD specifies that, even with the BMP height set to the historic high-water level, the risk of overtopping during high water events remains a significant uncertainty. If this is the

case, consideration should be given to increasing the height of the BMP to further reduce this risk.

Section 5.11.1.2 (p.82)

- We were unable to reproduce the estimate that excavating to the full depth of remedial target would generate an additional 46,000 cubic yards (CY) of waste material. Our estimate was ~33,000 CY. Please share the calculations for the stated volume.

Section 6.1

- While most of the Sand Separation Area proved to be near or below the cleanup level, and appropriate for monitored natural recovery, the 4-6 ft interval at Station SJSSA06 was 3330 ng/kg, almost an order of magnitude higher than the highest levels measured prior to the ROD, and an order of magnitude higher than the 300 ng/kg criteria for principal threat waste. Although only present in a small area, this is highly contaminated dioxin waste material that presents ongoing risk. It should be removed after additional sampling to define its vertical and lateral extent. The low levels of Pb-210 indicate this is likely old material, but the dioxin concentrations have apparently not attenuated much, which implies that monitored natural recovery may not work for this deposit.
- The radio-isotope data only indicated sediment deposition was occurring at the outer periphery sites (SJSSA-01, -02, -04, and -07) of the sand separation area, where dioxin levels are already low. In samples where the dioxin levels were above cleanup levels, sediment deposition was not evident, implying that MNA may not be effective.

Appendix E – Section 2.

- Area-based averages are appropriate when the ROD expresses the cleanup target as an area-based average. Leaving waste above the cleanup level inside the northern impoundment footprint is counter to the remedy selected in the ROD and would appear to require a modification to the ROD.
- GHD states that "estimates of risk are based on exposures to conservative estimates of the average concentrations of a chemical." In some cases, this is true, but often it is the maximum or highest concentration exposure that is of greater concern.

Appendix E – Appendix E – Section 2.1.3

- While GHD calls EPA's selected biota-sediment accumulation factor (BSAF) "erroneous", the BSAF applied in the remedy was actually much lower than values measured in this

- system. The median BSAFs for 2378-TCDD in the Houston Ship Channel/San Jacinto River system were 0.39 for hardhead catfish filets, and 0.58 for blue crabs (Dean et al, 2009). Although clearly the fish and crabs are mobile organisms, dioxin concentrations in catfish and crab in this system do exhibit strong spatial variations of more than an order of magnitude across the system, and peak spatial tissue concentrations correlated to peak sediment concentrations (Suarez et al, 2005). After lipid content, the sediment concentration at the same site where the fish were caught was the best predictor of 2378-TCDD concentrations in fish tissue (Dean et al, 2009). These observations indicate that these fish and crabs do have a local range where their primary exposure occurs, although the spatial extent of that range is not known.
- We further note that the sediment-based quality target to meet water quality standards calculated for the TCEQ-sponsored Total Maximum Daily Load project addressing dioxins in the Houston Ship Channel system was 115 ng TEQ/kg organic carbon (University of Houston and Parsons, 2007). For sediment with 2% organic carbon, which is typical in this system, this would translate to a concentration of roughly 2 ng TEQ/kg sediment. In other words, to meet Texas water quality standards for protecting public health for consumption of fish tissue would require a concentration more than 10 times lower than the cleanup level. Thus, we do not believe the 30 ng TEQ /kg cleanup level is excessively protective.

Appendix E – Section 2.4.1

- The excavation strategy says that "*a not-to-exceed value lower than 300 ng/kg was applied to the extent practicable.*" It implies that excavating below their hydraulic heave safety depth marks the deepest extent that excavation is practicable. If we assume that excavation in the dry may not be practicable below that depth (although we have questions about some of the geotechnical assumptions and calculations related to that safe hydraulic heave depth), they have not considered that excavation of material at greater depths through water could be practicable. This is the same process that will be required in the northwest corner.

Appendix F – Section 3.2

- The report states "*the hydrodynamics model uses the parameterization and kinetics from the calibrated (previously developed) models by Anchor* QEA." Hydrodynamic calibrations are specific to the physical dimensions of the model grid, among other things. Since the model grid cell dimensions and bathymetry have been changed, the assumption that the

hydrodynamic calibration parameters would hold for the new grid should be verified by direct comparison of water surface elevations and velocities in the calibrated model.

Appendix F – Section 4.2.1

- The report is not clear on what model output is used to generate the 95th percentile shear stresses and velocities. Are these statistics calculated from all model cells shown in Figure 22 over the full 30-day period? If so, we would recommend focusing on the peak flow period (the peak 1-hr flow period would seem relevant for erosion) at just a few key locations.

Appendix F – Tables 8-15

- It is curious and counter-intuitive that the 95% maximum shear stress and velocities decline as one goes from a 2-year to a 100-year flood event. In the past, sediment erosion in this area has been associated with extreme flood events. Could that be because the number of active "wet" model cells increases at higher flows? If so, then the 95th percentile is not really the relevant metric to look at, and the comparison needs to be made at specific key locations. Or is it due to backwater effects from Buffalo Bayou flooding? Although a flood event in the San Jacinto watershed is also likely to produce high flows in the Buffalo Bayou watershed, it does not follow that a 100-year flood flow in the San Jacinto would correspond to a 100-year flood flow in Buffalo Bayou. If that assumption was used in the scenario boundary conditions, it would produce unrealistically high backwater conditions and thereby reduce velocities. It would be useful to perform some sensitivity analysis on boundary conditions, and to simulate actual historical peak flow events.

Prior Harris County Comment 2B.

- Previously Harris County commented "*The extent of exceedances of cleanup levels on the western side has not been delineated. An assumption has been made that the western extent of the capped area defines the western extent of removal. Consistent with prior comments, further delineation of the extent of contamination, even if it extends beyond the capped area should be completed, or a technical valid discussion regarding why they do not believe there is contamination beyond the extent of the cap should be provided. Data shows some extremely high levels in this area and should be removed.*" GHD responded "*The remedy, as described in the EPA ROD, only requires excavation of material within the TCRA cap.*" Regardless of what is specified in the ROD, this contamination represents an environmental risk. Clarification is requested from USEPA on how this risk will be addressed.

Previously submitted comments not addressed

Appendix B - Geotechnical Section 5.2.2.1

- The report should provide details on how the design unit weights were selected. The unit weight data for the sediment layer shows a quite a bit of scatter. Most of the measured unit weights are above the design value used in the analysis. It may be prudent to have multiple layers within the sediment layer to account for this variation in unit weight – a single value between elevation -10 and -40 and potentially two layers above elevation -10.

Appendix B - Geotechnical Section 5.2.3

- A piezometric water level of +1.5 feet was assumed in many of the cases that did not meet the desirable safety factor. No explanation was provided on why this piezometric elevation was selected versus the -2 feet used in other cases, which was based on measured water levels in SJMW016.

Appendix B - Geotechnical Section 5.2.3

- The assumption that the water level in sand lenses is the same as that at the top of the Beaumont sand layer needs justification. Are the sand lenses assumed to be under artesian pressure? What thickness of sand lenses should be considered to be a concern for bottom heave at the elevation subgrade?

Section 6 Table 1A

- SJSB047 – the presumed Beaumont Sand layer is essentially non-plastic silt with over 90% fines.
- SJSB057 – this boring does not match the elevations and thicknesses of Beaumont clay and Beaumont sand layers.
- SJGB019 – boring log describes a very soft moist clayey layer at a depth of 35 feet where the analysis considered to be Beaumont sand.
- SJGB020 – boring log describes a stiff clay layer at a depth of 32 feet where the analysis considered to be Beaumont sand.

References:

Dean, K.E., M.P. Suarez, H.S. Rifai, R.M. Palachek, and L. Koenig. 2009. Bioaccumulation of polychlorinated dibenzodioxins and dibenzofurans in catfish and crabs along an estuarine salinity and contamination gradient. *Environ. Toxicol. Chem*. 28(11): 2307-2317.

Suarez, M.P., H.S. Rifai, R.M. Palachek, K.E. Dean, and L. Koenig. 2005. Polychlorinated dibenzo-p-dioxins and dibenzofurans in Houston Ship Channel tissue and sediment. *Environ. Eng. Sci.* 22(6): 891- 906.

University of Houston, and Parsons Water and Infrastructure. 2007. Total Maximum Daily Loads for Dioxins in the Houston Ship Channel. Quarterly Report No. 3. May 2007. Available at https://www.tceq.texas.gov/downloads/water-quality/tmdl/houston-ship-galveston-bay-fish-consumption-assessment-26/26-dioxin-quarterly-report-may-2007.pdf

MEMORANDUM

DATE: August 25, 2022

TO: Latrice Babin, PhD
Executive Director, Harris County Pollution Control Board

FROM: B. Krishna "Kris" Goparaju, Ph.D., P.E.
Geotechnical Program Manager

RE: Northern Impoundment Remedial Design Report-Prefinal 90% Submittal
Report No.: 11215702-Howard-28 Dated June 27, 2022
HCFCD – Review Comments

HCFCD has completed review of the relevant sections of the above report including the background, remedial design approach, objectives of the design, basis of design, design criteria, assumptions made therein for the implementation of BMP Wall, Excavation Procedure Appendix and various appendices including Appendix-B (Geotechnical Report), Appendix-G (Design Drawing Package) and Appendix-I (BMP Structural Design Report). The review is mainly focused on underlying Geotechnical aspects of the report.

Based on our review, the overall the report is lacking adequacy in Geotechnical design aspects of the BMP wall. My comments are specific to the regulatory and technical acceptance criteria per HCFCD Policy Criteria and Procedure Manual (October 2018) Geotechnical Guidelines Manual (12-31-2021) and applicable ASTM Standards as noted below.

General Comments

- Most or all the borings and sampling methods appear to be performed for environmental study purpose or EPA-centric as demonstrated by the sampling procedures and frequency of sampling which are not adequate for Geotechnical engineering applications. It should be noted that Sampling and laboratory testing procedures for Geotechnical design purposes are significantly different from Environmental Procedures.

- In many cases it is observed that even clay samples are obtained using Split Spoon procedure resulting in highly disturbed samples and are not suitable for strength determination for BMP Wall design. Classification of soil samples does not appear to be as per applicable ASTM standards for engineering purpose.

  Specific issues associated with this remark and its implications on the BMP Wall Design are noted further below.

- The Designer has performed analyses addressing the potential leakage of water through the BMP sheeting interlocks and has concluded that the site sediments and recommended interlock sealants will seal the interlocks, thus preventing leakage of water through the interlocks. HCFCD disagrees with this conclusion and believes that due to the head differential across the sheeting (i.e. landward towards the river), seepage will occur through the sheeting interlocks resulting in continued saturation of the sediments located immediately adjacent to the interior of the BMP.

- Because of the saturation of the sediments at the time of dewatering within the BMP, and the potential continued saturation of the sediments adjacent to the interior portion of the BMP, it is expected that the sediments adjacent to the BMP will likely experience slope stability failures which, at some locations along the BMP, could result in about a 30-foot BMP stickup and an 18-foot BMP embedment. In the documents reviewed, there was no evidence that the slope stability of the sediments adjacent to the interior of the BMP has been analyzed for the rapid drawdown condition which would occur during the Northern Impoundment dewatering, or for the long-term condition. Furthermore, the BMP has not been analyzed for stability to ensure functional performance, if a slope stability failure were to occur in the sediments adjacent to the interior of the BMP.

- As the project has progressed, the proposed BMP location has been revised. From the information provided, it appears that no sampled borings have been drilled/sampled at the current BMP alignment; the only data provided at the current BMP location is based on CPT's. Considering the impact it might have should the BMP Wall fail, It is important to base the BMP final design on geotechnical data obtained from geotechnical borings drilled/sampled along the final BMP alignment.

- In general, the HCFCD considers that an insufficient number of borings has been drilled deep enough to adequately analyze and complete the remedial design.

- In the BMP design, it is noted that deflections of up to 10-inches are predicted. However, no mention is made anywhere in the report if this is a reasonable design deflection, which allows satisfactory performance of BMP Wall.

- The structural design of the BMP includes the assumption that the friction angle, phi', of the sediments (alluvium) is equal to 26 degrees, the phi' of the fat clays is equal to 28 degrees, and the phi' of the clayey sands is equal to 37 degrees. Based on local experience with soils in Harris County, HCFCD believes the suggested effective friction angle values are overestimated, especially given the riverine environment associated with the project.

- In the analysis of the potential failure of the alluvium due to vibrations caused by pile driving, it was assumed that the alluvium friction angle, phi', would equal 30 degrees which is also believed as excessively high.

- Since most borings are concentrated within and around the impoundment area, additional Geotechnical borings will be needed for the analysis and design of BMP Wall based on applicable standards. HCFCD recommends that the frequency of Geotechnical borings be at a distance not exceeding 500 feet, drilled and sampled to the bottom of Beaumont Clay and at least 3 times the width of BMP wall into the sand layer below the Beaumont Clay layer.

Comments on Appendix B, June 27, 2022, Geotechnical Engineering Report by Ardaman & Associates

- Attachment C consists of handwritten boring logs with no supporting laboratory testing data other than soil classifications based on visual observations. Providing handwritten boring logs without supporting laboratory testing data is not considered to be accepted practice and can lead to unsupported conclusions, especially for Geotechnical engineering applications.
- Harris County is generally considered to be a no-seismic zone. Although interesting, Section 1.5 "Seismic Site Class" does not appear to contribute to any recommendations for the remedial design.
- The drilling and sampling methods, boring layout/depths, and soil classifications do not comply with HCFCD Geotechnical Guideline requirements.
- Laboratory testing was not performed per HCFCD Geotechnical Guideline requirements.

Comments on Appendix B, June 27, 2022, Supplemental Design Investigation – Geotechnical Data Report by GHD

- The drilling and sampling methods, boring layout/depths, and soil classifications do not comply with HCFCD Geotechnical Guideline requirements.
- Laboratory testing was not performed per HCFCD Geotechnical Guideline requirements.
- From the information provided, it appears that no sampled borings have been drilled/sampled at the current BMP alignment, and the only data provided at the current BMP alignment is based on CPT's. For a project of this magnitude and significance, it becomes mandatory to base the BMP final design on geotechnical data obtained from geotechnical borings drilled/sampled along the final BMP alignment as per applicable ASTM standards.

- The report conclusion is that there are portions of the northwest corner of the Northern Impoundment where there is a risk of hydraulic heave occurring when the site is dewatered. However, no recommendation is provided on concepts that may be used to remediate these portions of the site.

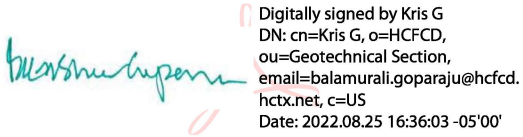
Appendix G June 27, 2022, Design Drawing Package - Pre-Final 90% Remedial Design

- Drawing Sheet C-14 shows a 2.3 (H):1.0 (V) slope inclination in the alluvium adjacent to the interior of the BMP. The Reviewer believes that this slope inclination will likely fail in both the rapid drawdown and long-term conditions.
- Drawing Sheet C-16 shows a 2.5 (H):1.0 (V) slope inclination in the alluvium adjacent to the interior of the BMP. The Reviewer believes that this slope inclination will likely fail in both the rapid drawdown and long-term conditions.
- Failure of the alluvium slopes noted above may have impact on the overall stability and functional performance of the BMP Wall.
- The stability of the BMP Wall was evaluated at numerous stations including three cross-sections (C2, C6 and C7) which were deemed to be critical due to their height and/or location. The HCFCD could not identify the results of any global stability analyses of the BMP Wall on either the river side or inland side. The critical cross-section(s) for global stability analyses, particularly on the river side, may be different from those identified as C2, C6 and C7. If such analyses are available, the Reviewer would appreciate an opportunity to review the results and criteria for selection of the cross-section(s).

Appendix I June 14, 2022, BMP Structural Design Report

- Some of the soil shear strengths shown in Section 2.4.5 are excessively high and should be revised while considering the existing state of engineering practice for Harris County Clays.
- The hydraulic conductivity for the Beaumont Clay presented in Section 2.4.8 is not representative of the hydraulic conductivity generally measured in the Beaumont Clay within Harris County.
- In Section 7.2, it is stated that the “Beaumont Clay is considered as impervious.” The reviewer does not agree with this statement and requests evidence that this statement if correct.

For any questions or further information, HCFCD Geotechnical Program Manager may be reached at the contact information.



B. Krishna "Kris" Goparaju, Ph.D., P.E.
Geotechnical Program Manager,
Harris County Flood Control District
Phone: 346-286-4123; email: Balamurali.goparaju@hcfcd.hctx.net

HARRIS COUNTY TECHNICAL REVIEW TEAM COMMENTS ON THE PRE-FINAL (90%) REMEDIAL DESIGN – NORTHERN IMPOUNDMENT STAGED DELIVERABLES SUBMITTAL

COMMENTS ON HYDRAULIC HEAVE REPORT

1. A piezometric water level of 1.5 feet was used in 5 out of 6 cases in Table 1A where a less than desirable (1.25) factor of safety was reported. No explanation was provided on why this piezometric elevation was selected for these cases versus the 2 feet used in many other cases. The rationale for this assumption should be provided.

Aquifer Piezo Elevation (ft)	FS (Total)	FS (Effective)
-2	1.63	5.76
1.5	1.25	1.78
-2	1.63	6.04
-2	1.58	4.72
1.5	1.36	2.38
-2	1.81	31.70
-2	1.25	1.73
1.5	0.89	0.79
-2	1.51	3.63
1.5	1.17	1.50
1.5	0.78	0.62
-2	1.18	1.47
-2	1.51	3.79
-2	1.51	3.57
1.5	1.21	1.62
-2	1.52	3.96
-2	1.32	2.01
-2	1.52	3.68
1.5	1.18	1.52
-2		

Figure – Excerpt from Hydraulic Heave Report (Snippets from Table 1)

2. The analysis used water level in the Beaumont Sand (BS) layer as El. -2 based on monitoring data at two piezometer locations. The report should indicate if these piezometers were slotted within the Beaumont Sand layer or the intermediate sand lenses within Beaumont Clay (BC) layer. Neither of these monitoring wells were located in the vicinity of the northwest corner of the impoundment area. Justification should be provided on why the data from these piezometer is representative for conditions within northwest area.

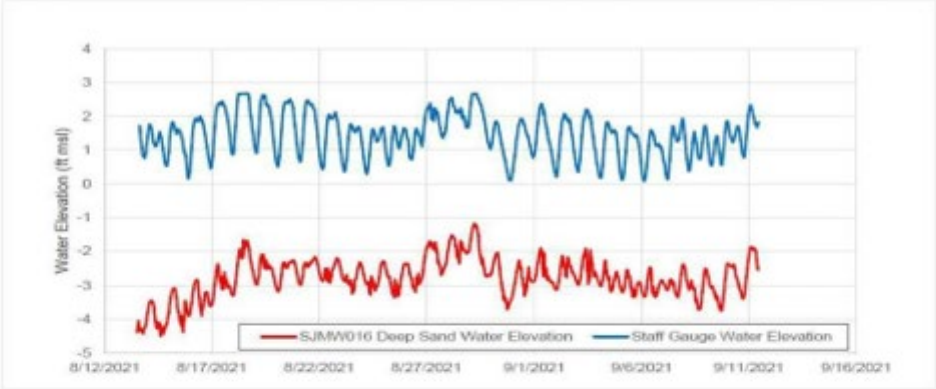


Figure – Excerpt from Hydraulic Heave Report (Piezometric Data at SJMW016)

3. The assumption that the water level in sand lenses to be the same as that assumed at the top of the Beaumont Sand layer needs justification. Are the sand layers also under artesian pressure? What thickness of these layers should be considered to be a concern for bottom heave at the excavation subgrade?

4. The following test borings were reported as locations which would result in a less than desirable factor of safety. However based on a review of these borings the BS layer was not identified at the reported depths. See attached boring logs. Please clarify

    a. Boring SJSB047 – The BS layer is essentially non plastic silt with over 90 percent fines. Not sure if this layer is under artesian pressure.
    b. Boring SJSB057 – Unable to match the elevations and thicknesses of BC and BS layers.
    c. Boring SJGB019 – Boring described a very soft moist clayey silt layer at a depth of 35 feet where analysis considered Beaumont Sand layer.
    d. Boring SJGB020 – Boring described a stiff clay at a depth of 32 feet where analysis considered Beaumont Sand layer.

5. The unit weight data for sediment layer shows a quite a bit of scatter. The unit weights are well below the design value used in the analysis. It may be prudent to have multiple layers within the sediment layer to account for this variation in unit weight – a single value between El. -10 and EL. -40 and potentially two layers above El. -10.

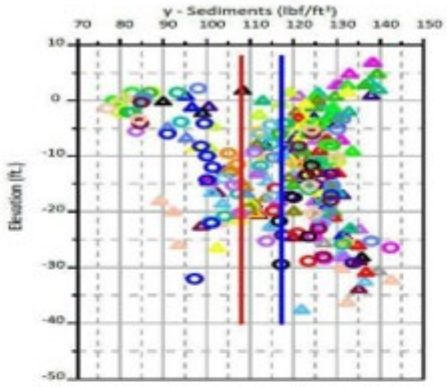


Figure – Excerpt from Hydraulic Heave Report (Sediment Unit Weight)

6. The report should provide details on how the design unit weight was selected in comparison with the mean value.

7. A majority of the cases analyzed meet the desired factor of safety (FS) values. The cases showing less than desired FS value have used a higher piezometric water level in analysis. Additionally, some of the cases can be considered to be OK by observation when we have total FS of 1.18 and effective FS of 1.53 (or total of 1.24 and effective of 1.71).

FS (Total)	FS (Effective)
1.24	1.71
1.51	3.63
1.17	1.50
0.78	0.62
1.18	1.47
1.51	3.79
1.51	3.57
1.21	1.62
1.52	3.96
1.32	2.01
1.52	3.68
1.18	1.52

Figure – Excerpt from Hydraulic Heave Report (Snippets from Table 1)

¶

ANCHOR QEA

SOIL BORING LOG

CLIENT/PROJECT NAME: San Jacinto PDI Investigation
PROJECT NUMBER: 180557-01.01
GEOLOGIST/ENGINEER: ~~Casey Jenisch~~ Sam Giarratano
DRILLING CONTRACTOR: Cascade Drilling
DRILLING METHOD: Sonic
HOLE DIAMETER: 6 inches
BORING # SJGB019
DATE BEGAN 12/2
DATE COMPLETED 12/3/18
TOTAL DEPTH ~~62~~ 57'
PAGE 1 OF 3
SAMPLING METHOD 3 in. by 2 ft

Field location of boring
Water depth to TOB: 20'
Water depth to MI: 16'

SAMPLING METHOD	BLOW COUNTS (140-Lb Hammer)	SAMPLE ID	RECOVERY (ft recovered/ft driven)	DEPTH SAMPLED	DEPTH IN FEET	SOIL GROUP SYMBOL (USCS)	LITHOLOGIC DESCRIPTION Den., moist., color, minor, MAJOR CONSTITUENT, Non-Soil
SS	3 WOH WOH WOH	SJGB019-601 SL0847 1225	0.1	0-2 ~~0-2~~ (20-22)	1		Rock in catch, no sample recovered. Very loose sand (grey) with dark ~~brown~~
SS	WOH	SJGB019-602 SL0848 1245	0.4	4-6' 24-26	5		Rock in catch, minimal recovery. Very soft dark grey CLAY w/ silt
SS	WOH	SJGB019-603 SL0849 ~~1255~~ 1300	.7	~~8-10'~~ ~~26-28~~ 28-30	7		Casing fell under own weight to 10', sample depth actual 8'-10' Very soft dark grey moist CLAY Catcher forced inside of SS.
SS	WOH 5	SJGB019-604 SL0850 1325	2.0	~~10-12~~ 13-15 33-35	11		Casing sunk under weight, 33' casing, 33' hole Very soft, moist, dark grey silty CLAY @13.6' grades to loose grey, medium Silty SAND with clay laminations
~~ST~~	~~PUSH~~	~~SJGB019-604 SL0851~~	~~50~~	~~35-37~~			
ST	PUSH	SJGB019-604 ~~SL0851~~ 1345		15-17 ~~35-37~~	16		No Sample recovered, hit rock or gravel? Next Shelby. Sheared off bolts

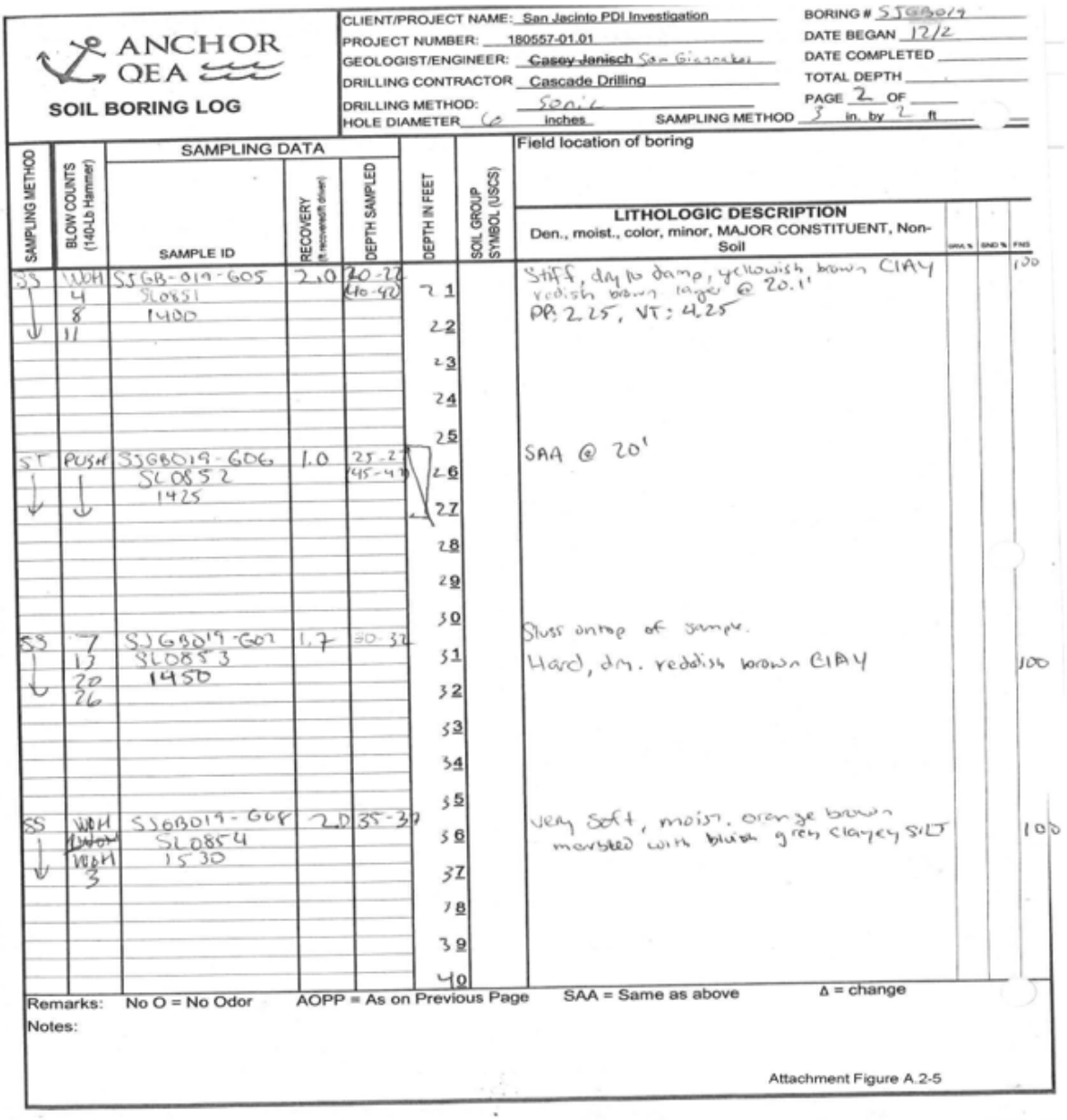
100 100 100 60 40

Remarks: No O = No Odor AOPP = As on Previous Page SAA = Same as above Δ = change

Notes:

Attachment Figure A.2-4

¶



ANCHOR QEA

SOIL BORING LOG

CLIENT/PROJECT NAME: San Jacinto PDI Investigation
PROJECT NUMBER: 180557-01.01
GEOLOGIST/ENGINEER: ~~Casey Janisch~~ Sam Giacoubi
DRILLING CONTRACTOR: Cascade Drilling
DRILLING METHOD: Sonic
HOLE DIAMETER: 6 inches
SAMPLING METHOD: 3 in. by 2 ft

BORING # SJGB019
DATE BEGAN 12/2
DATE COMPLETED
TOTAL DEPTH
PAGE 2 OF

Field location of boring

SAMPLING METHOD	BLOW COUNTS (140-Lb Hammer)	SAMPLE ID	RECOVERY (ft recovered/ft driven)	DEPTH SAMPLED	DEPTH IN FEET	SOIL GROUP SYMBOL (USCS)	LITHOLOGIC DESCRIPTION Den., moist., color, minor, MAJOR CONSTITUENT, Non-Soil	SAA %	SAND %	FINES
SS	WOH	SJGB-019-G05	2.0	20-22	21		Stiff, dry to damp, yellowish brown CLAY			100
	4	SL0851		40-42	22		reddish brown tinge @ 20.1'			
	8	1400			23		PP: 2.25, VT: 4.25			
	11				24					
					25					
ST	PUSH	SJGB019-G06	1.0	25-27	26		SAA @ 20'			
		SL0852		45-47	27					
		1425			28					
					29					
					30		Slight change of sample.			
SS	7	SJGB019-G07	1.7	30-32	31		Hard, dry. reddish brown CLAY			100
	17	SL0853			32					
	20	1450			33					
	26				34					
					35					
SS	WOH	SJGB019-G08	2.0	35-37	36		Very soft, moist, orange brown			100
	~~WOH~~	SL0854			37		mottled with blue grey clayey SILT			
	WOH	1530			38					
	3				39					
					40					

Remarks: No O = No Odor AOPP = As on Previous Page SAA = Same as above Δ = change
Notes:

Attachment Figure A.2-5

ANCHOR QEA

SOIL BORING LOG

CLIENT/PROJECT NAME: San Jacinto PDI Investigation
PROJECT NUMBER: 180557-01.01
GEOLOGIST/ENGINEER: ~~Casey Jonisch~~ Sam Ginnaker
DRILLING CONTRACTOR: Cascade Drilling
DRILLING METHOD: Soni-
HOLE DIAMETER: 6 inches
BORING #: SJGB019
DATE BEGAN: 12/2
DATE COMPLETED: 12/3
TOTAL DEPTH: 62' 57'
PAGE: 3 OF 3
SAMPLING METHOD: in. by ft

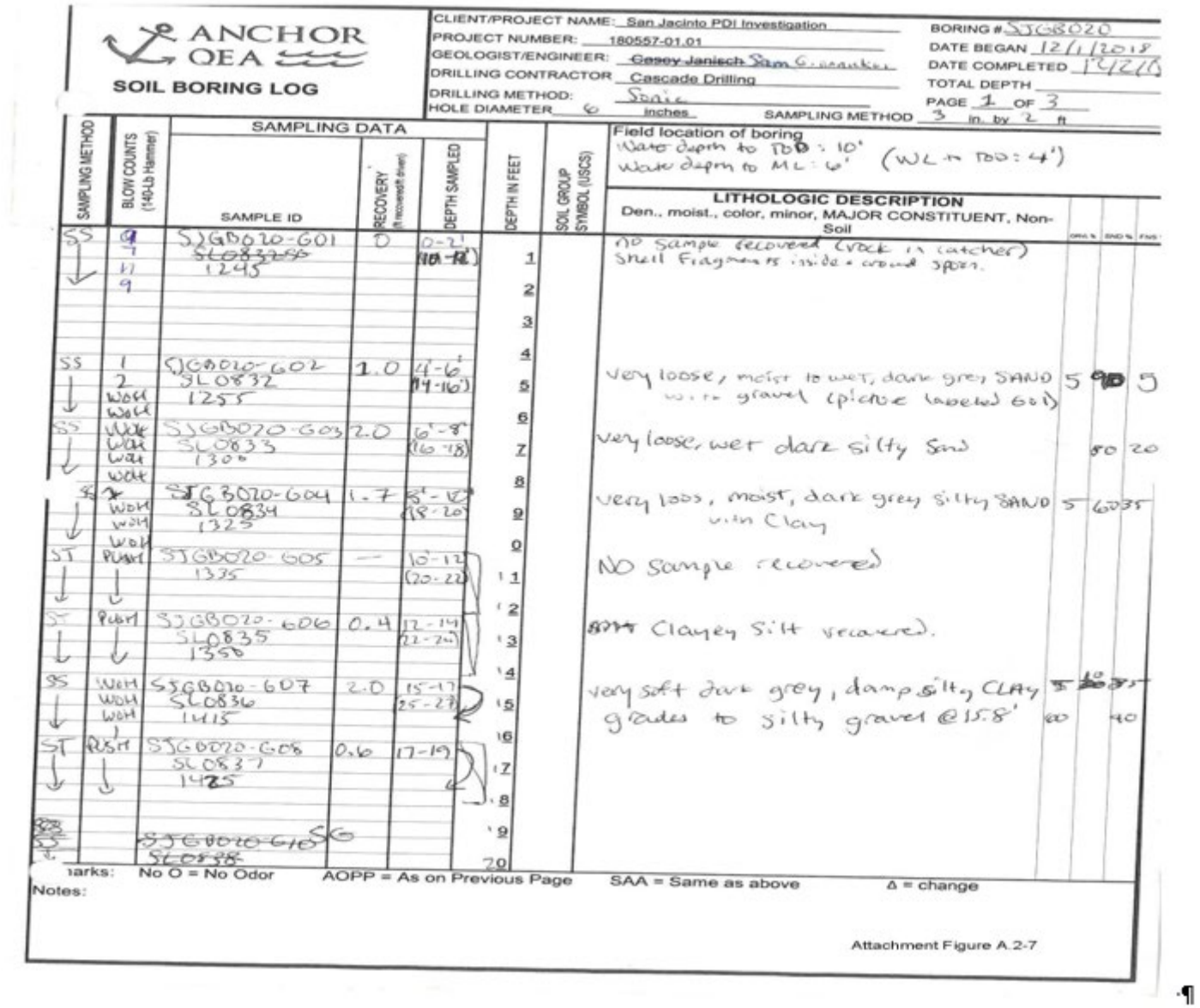
Field location of boring

SAMPLING METHOD	BLOW COUNTS (140-Lb Hammer)	SAMPLE ID	RECOVERY (ft recovered/ft drive)	DEPTH SAMPLED	DEPTH IN FEET	SOIL GROUP SYMBOL (USCS)	LITHOLOGIC DESCRIPTION Den., moist., color, minor, MAJOR CONSTITUENT, Non-Soil
SS	7 11 17 26	SJGB019-09 SL0855 1600	2.0	40'-42' 60-62	41 42 43 44	CL	Hard, dry, reddish brown marbled with bluish grey CLAY
ST	PUSH	SJGB019-G10 SL0856 1630	2.3	45-47' 65-67	45 46 47 48 49		SAA @ 40'
SS	6 7 10 14	SJGB019-G11 SL0857 0840	2.0	50-52	50 51 52 53 54 55		Stiff, dry to damp, light bluish grey to dark grey CLAY. Woody fragments when broken apart
SS	4 8 6 13	SJGB019-G12 SL0858 0920 915		55-57'	56 57		Stiff dark grey dry to damp CLAY grades to SILTY CLAY @56.5'
SS		SJGB019-G13 SL0859		~~60-62~~ 59'	58 59 60 61		Driller hit sand @ ~57', brought up drill head and slurry of wet sand fell out. Sample w/ approx depth taken, no SPT

Marks: No O = No Odor AOPP = As on Previous Page SAA = Same as above Δ = change

Notes: light grey sand w/ very little silt 80, 20 end of boring @ 935

Attachment Figure A.2-6



ANCHOR QEA

SOIL BORING LOG

CLIENT/PROJECT NAME: San Jacinto PDI Investigation
PROJECT NUMBER: 180557-01.01
GEOLOGIST/ENGINEER: ~~Casey Janiech~~ Sam Greuter
DRILLING CONTRACTOR: Cascade Drilling
DRILLING METHOD: Sonic
HOLE DIAMETER: 6 inches
SAMPLING METHOD: 3 in. by 2 ft

BORING # SJGB020
DATE BEGAN 12/1/2018
DATE COMPLETED 12/2/18
TOTAL DEPTH
PAGE 1 OF 3

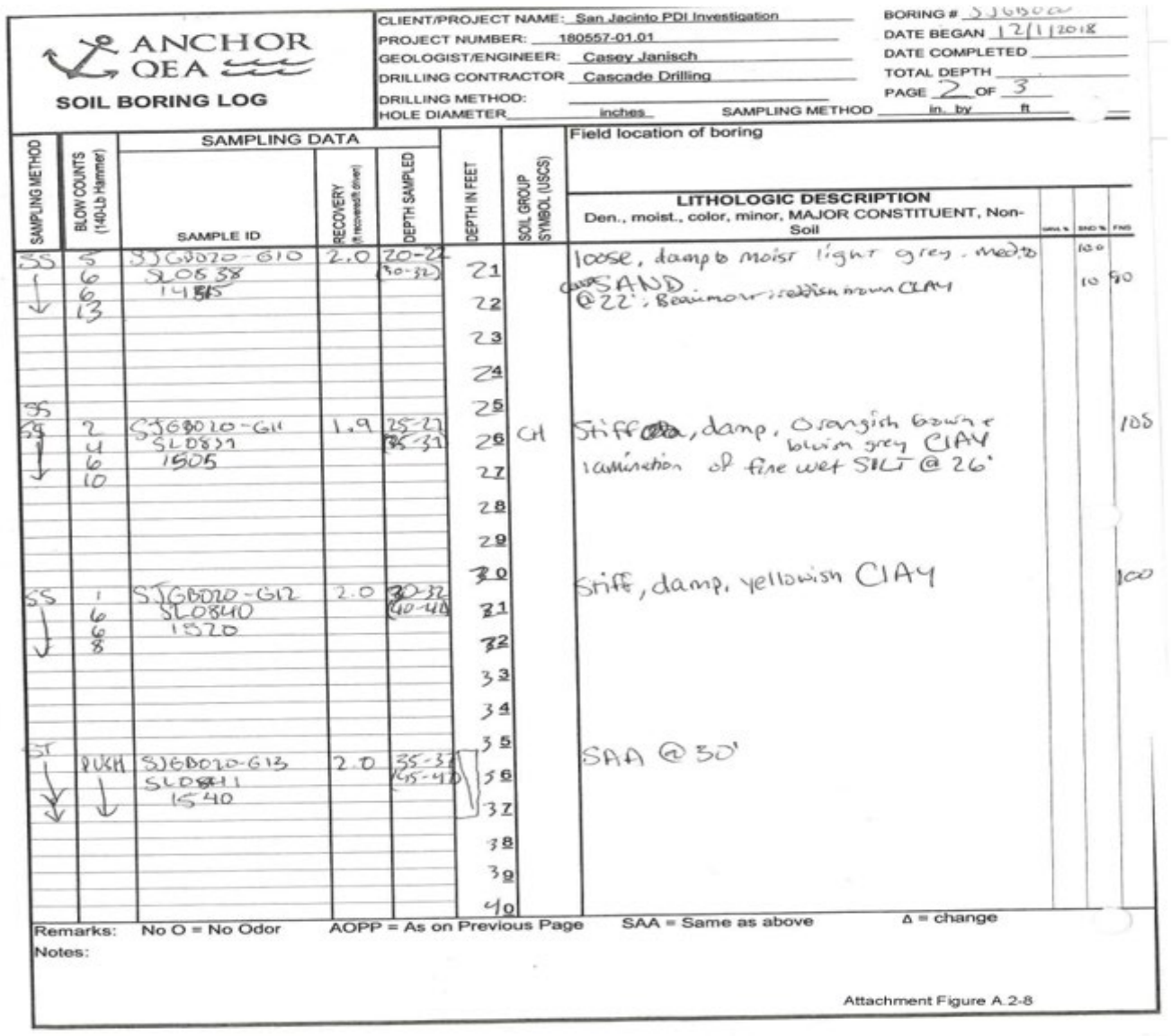
Field location of boring
Water depth to TOB: 10'
Water depth to ML: 6' (WL to TOB: 4')

SAMPLING METHOD	BLOW COUNTS (140-Lb Hammer)	SAMPLE ID	RECOVERY (ft recovered/ft driven)	DEPTH SAMPLED	DEPTH IN FEET	SOIL GROUP SYMBOL (USCS)	LITHOLOGIC DESCRIPTION Den., moist., color, minor, MAJOR CONSTITUENT, Non-Soil	GRA %	SND %	FNS %
SS	9 7 11 9	SJGB020-G01 SL0832 1245	0	0-2' (0 R)	1		No sample recovered (rock in catcher) Shell Fragments inside + around spoon.			
SS	1 2 WOH WOH	SJGB020-G02 SL0832 1255	1.0	4-6' (14-16')	5		very loose, moist to wet, dark grey SAND w. fine gravel (please labeled G01)	5	90	5
SS	WOH WOH WOH WOH	SJGB020-G03 SL0833 1300	2.0	6'-8' (16-18)	7		very loose, wet dark silty Sand		80	20
SS	WOH WOH WOH WOH	SJGB020-G04 SL0834 1325	1.7	8'-10' (18-20)	9		very loos, moist, dark grey silty SAND with Clay	5	60	35
ST	PUSH	SJGB020-G05 1335	—	10-12 (20-22)	11		NO Sample recovered			
ST	PUSH	SJGB020-G06 SL0835 1350	0.4	12-14 (22-24)	13		~~SAA~~ Clayey Silt recovered.			
SS	WOH WOH WOH	SJGB020-G07 SL0836 1415	2.0	15-17 (25-27)	15		very soft dark grey, damp silty CLAY grades to silty gravel @15.8'	5	10 60	35 40
ST	PUSH	SJGB020-G08 SL0837 1425	0.6	17-19	17					
SS		SJGB020-G10 SL0838			19					

Marks: No O = No Odor AOPP = As on Previous Page SAA = Same as above Δ = change

Notes:

Attachment Figure A.2-7



ANCHOR QEA

SOIL BORING LOG

CLIENT/PROJECT NAME: San Jacinto PDI Investigation
PROJECT NUMBER: 180557-01.01
GEOLOGIST/ENGINEER: Casey Janisch
DRILLING CONTRACTOR: Cascade Drilling
DRILLING METHOD:
HOLE DIAMETER: inches SAMPLING METHOD: in. by ft

BORING # SJGBD20
DATE BEGAN 12/1/2018
DATE COMPLETED
TOTAL DEPTH
PAGE 2 OF 3

Field location of boring

SAMPLING METHOD	BLOW COUNTS (140-Lb Hammer)	SAMPLING DATA: SAMPLE ID	RECOVERY (ft recovered/ft driven)	DEPTH SAMPLED	DEPTH IN FEET	SOIL GROUP SYMBOL (USCS)	LITHOLOGIC DESCRIPTION: Den., moist., color, minor, MAJOR CONSTITUENT, Non-Soil	GRVL %	SND %	FNS
SS	5	SJGBD20-G10	2.0	20-22	21		loose, damp to moist light grey, med to		10	
	6	SLO538		(20-32)						
	6	1485			22		@22': Beaumont; reddish brown CLAY		10	90
	13				23					
					24					
SS					25					
	2	SJGBD20-G11	1.9	25-27	26	CH	Stiff, damp, orangish brown			100
	4	SLO539		(25-32)			blueish grey CLAY			
	6	1505			27		laminations of fine wet SILT @ 26'			
	10				28					
					29					
					30					
SS	1	SJGBD20-G12	2.0	30-32	31		Stiff, damp, yellowish CLAY			100
	6	SLO540		(40-42)						
	6	1520			32					
	8				33					
					34					
ST					35					
	PUSH	SJGBD20-G13	2.0	35-37	36		SAA @ 30'			
		SLO541		(45-47)						
		1540			37					
					38					
					39					
					40					

Remarks: No O = No Odor AOPP = As on Previous Page SAA = Same as above Δ = change
Notes:

Attachment Figure A.2-8

ANCHOR QEA

SOIL BORING LOG

CLIENT/PROJECT NAME: San Jacinto PDI Investigation
PROJECT NUMBER: 180557-01.01
GEOLOGIST/ENGINEER: ~~Casey Janisch~~ Sam Gruenbaum
DRILLING CONTRACTOR: Cascade Drilling
DRILLING METHOD:
HOLE DIAMETER: inches SAMPLING METHOD: in. by ft

BORING # SJGB020
DATE BEGAN 12/11/2018
DATE COMPLETED 12/12/18
TOTAL DEPTH 62'
PAGE 3 OF 3

Field location of boring

SAMPLING METHOD	BLOW COUNTS (140-Lb Hammer)	SAMPLE ID	RECOVERY (ft recovered/ft drive)	DEPTH SAMPLED	DEPTH IN FEET	SOIL GROUP SYMBOL (USCS)	LITHOLOGIC DESCRIPTION Den., moist., color, minor, MAJOR CONSTITUENT, Non-Soil
SS	8 16 22 29	SJGB020-G14 SL0842 1620	2.0	40-42	41 42 43 44		Hard, dry, orangish brown CLAY VT: .7 PP: 4.5 tsf
ST	PUSH	SJGB020-G15 SL0843 0820 (1212)	2.3	45-47 ~~55-57~~	45 46 47 48 49		SAA @ 40'
SS	WOH 1 11	SJGB020-G16 SL0844 0840	2.0	50-52 60-62	50 51 52 53 54		SAA @ 40'
SS	9 8 12 23	SJGB020-G17 SL0845 0920	2.0	55-57	55 56 57		very stiff, dry to damp, greenish gray CLAY @ 56.3' grades to Silty CLAY
SS		SSGB020-G18 SL0846 0950		60'-62'	~~58~~ 60 ~~59~~ 62		SAA @ 56' End of boring @ 1000

Marks: No O = No Odor AOPP = As on Previous Page SAA = Same as above Δ = change
Notes:

Attachment Figure A.2-9

San Jacinto Waste Pits
San Jacinto, TX

GHD Services, Inc.
5551 Corporate Blvd. Suite 200
Baton Rouge, LA 70808

LOG OF SOIL BORING SJSB047-G

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 18-2876
Date:
Logged by: Stephen Saller
Driller: TWE
Rig: CME Truck on Barge

Location: Lat. 29° 47' 38.5" Long. 95° 3' 41.9"
Ground Surface Elevation: -3.4 (ft., NAVD 88)

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Wet Unit Weight (pcf)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Percent Passing #200 Sieve	Elev. (ft.)	Soil Type	Description
			0 b/f		31					97	-3.4		Loose brown SILT (ML)
			0 b/f		37								
	5		0 b/f		43					94	-8.4		
			0 b/f										Soft brown SANDY LEAN CLAY (CLs)
			0 b/f		30					70			
	10		0 b/f		39		39	20	19	74	-13.4		
			0 b/f		64								Soft brown FAT CLAY (CH)
	15		1 b/f 0-0-1		58					97	-18.4		
			0.25 (P)	0.29 t=6.6	38	99	79	24	55	66			Soft gray SANDY FAT CLAY (CHs)
	20										-23.4		
	25		2.50 (P)	1.44 t=8.3	20	136	42	18	24	73	-28.4		Stiff gray LEAN CLAY (CL) w/ sand
	30		1.75 (P)		16		27	21	6	60	-33.4		Stiff reddish brown SANDY SILTY CLAY (CL-ML)
	35		3.25 (P)	1.00 t=11.8	29	124	59	39	20	98	-38.4		Stiff reddish brown SILT (MH)
	40		3.00 (P)	1.73 t=13.5	31	126	74	34	40	100	-43.4		Stiff reddish brown FAT CLAY (CH)
	45		1.50 (P)	3.36 t=15.3	19	138	42	18	24	84	-48.4		Very Stiff reddish brown LEAN CLAY (CL)
	50		3.50 (P)		18		30	19	11	76	-53.4		
	55		14 b/f 8-8-6		20					93	-58.4		Medium Dense to Dense gray SILT (ML)
	60		33 b/f 12-16-17		23					92	-63.4		
	65		2 b/f 3-1-1		27		NP	NP	NP	93	-68.4		Very Loose gray SILT (ML)
	70		29 b/f 4-8-21		26					98	-73.4		Medium Dense gray SILT (ML)
	75		51 b/f 15-21-30		23					82	-78.4		Very Dense gray SILT (ML) w/ sand
	80		75 b/f 25-31-44		22					68	-83.4		Very Dense gray SANDY SILT (MLs)
	85		50 b/f 17-23-27		19		NP	NP	NP	46	-88.4		Very Dense gray SILTY SAND (SM)
	90		53 b/f 16-23-30		18					39	-93.4		
	95		65 b/f 25-35-30		18		NP	NP	NP	26	-98.4		
	100		2.00 (P)	0.33 t=35.0	21	119	73	23	50		-103.4		Stiff tan and gray FAT CLAY (CH)
	105										-108.4		Boring completed at 100 ft.

Ground Water Level Data

Boring Advancement Method
4" Dia. Rotary Wash: to 100 ft.

Boring Abandonment Method
Not Reported

Notes
t = Lateral Confining Pressure (psi).

Attachment Figure B.3-5
Strata Boundaries May Not Be Exact

San Jacinto Waste Pits
San Jacinto, TX

GHD Services, Inc.
5551 Corporate Blvd. Suite 200
Baton Rouge, LA 70808

LOG OF SOIL BORING SJSB057-G

Ardaman & Associates, Inc.

Sheet 1 of 1

File: 18-2876
Date: 11/8/19
Logged by: Stephen Saller
Driller: TWE
Rig: CME Truck on Barge

Location: Lat. 29° 47' 45.29" Long. 95° 3' 46.74"
Ground Surface Elevation: -17.1 (ft., NAVD 88)

Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Wet Unit Weight (pcf)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Percent Passing #200 Sieve	Elev. (ft.)	Soil Type	Description
▽			0 b/f		109		102	64	38	46	-17.1		Very Loose dark brown CLAYEY SAND (SC)
			2 b/f 2-1-1		94		51	24	27	28			
	5		1 b/f 0-0-1		60					18	-22.1		Very Loose brown CLAYEY SAND (SC)
			2 b/f 1-1-1		37		66	21	45	19			
			1 b/f 0-0-1		89								
	10		10 b/f 3-4-6		23					49	-27.1		Very Loose gray CLAYEY SAND (SC) w/ shell fragments
			0.50 (P)	2.29 t=3.8	20	134	66	23	43	85			Medium Dense gray SILTY SAND (SM) w/ gravel
	15		1.25 (P)		12	122					-32.1		
			3.00 (P)	2.27 t=6.6	19	134	45	16	29	68			Very Stiff gray and brown FAT CLAY (CH) w/ sand
	20										-37.1		
			2.50 (P)		18	135							Very Stiff tan SANDY LEAN CLAY (CLs)
	25										-42.1		
			3.50 (P)		28								Very Stiff reddish brown FAT CLAY (CH)
	30										-47.1		
			3.00 (P)	2.31 t=10.8	27	125	65	22	43	100			
	35										-52.1		
			3.00 (P)		26	127							
	40										-57.1		
			2.50 (P)	3.70 t=13.6	21	127	56	19	37	98			Stiff to Very Stiff gray FAT CLAY (CH)
	45										-62.1		
			1.50 (P)	1.67 t=15.0	36	125	52	19	33	98			
	50										-67.1		
			1.50 (P)		27								
	55										-72.1		
			1.00 (P)	1.49 t=20.5	24	132	52	20	32	84			w/ sand
	60										-77.1		
			77 b/f 14-21-56		19					25			Very Dense brown and gray SILTY SAND (SM)
	65										-82.1		
			65 b/f 15-21-44		23					35			Very Dense brown and gray CLAYEY SAND (SC)
	70										-87.1		
			13 b/f 4-6-7		22		23	18	5	66			Stiff gray SANDY SILTY CLAY (CL-ML)
	75										-92.1		
			87 b/f 15-55-42		20					54			Very Stiff to Hard gray SANDY LEAN CLAY (CLs)
	80										-97.1		
			66 b/f 15-33-55		20					71			
	85										-102.1		
			26 b/f 4-11-15		95		169	92	77	44			Dense gray CLAYEY SAND (SC)
	90										-107.1		
			1.50 (P)	1.67 t=32.6	26	126	41	18	23	98			Stiff gray LEAN CLAY (CL)
	95										-112.1		
			No (P)		22					99			
	100										-117.1		Boring completed at 100 ft.
	105										-122.1		

Ground Water Level Data
▽ Boring performed from barge in open water

Boring Advancement Method
4" Dia. Rotary Wash: to 100 ft.

Boring Abandonment Method
Not Reported

Notes
t = Lateral Confining Pressure (psi).

Attachment Figure B.3-8
Strata Boundaries May Not Be Exact

19-2853 18-2876.GPJ LOG01.GDT 5/27/20

277 pages total
Page numbers denoted in table of contents
Contains 2 page cover letter to EPA

Pre-Final 90% Remedial Design - Northern Impoundment

San Jacinto River Waste Pits Site
Harris County, Texas

International Paper Company &
McGinnes Industrial Maintenance Corporation

June 27, 2022

→ **The Power of Commitment**

Contents

Contents

Contents

Contents

Contents

Table index

Figure index

Appendices

HDR COMMENTS UNDER THIS LINE

	HDR Reviewer	Comment
	JLaFaso	Page 51 - Consider requisite vehicular loading on the segment of the BMP that will support truck/equipment traffic transiting to/from the excavation area
	JLaFaso	Page 51 - Given the BMP is on/touching TxDOT property, TxDOT may require evaluation of the wall using LRFD provisions as provided by AASHTO
	JLaFaso	Page 52 - High strength tie-rods have been observed to undergo/suffer from hydrogen embrittlement. Consider design with lower strength rods
	JLaFaso	Page 52 - 36 ksi is notably low for commonly available C/MC shapes. 50ksi material is fairly standard and could present savings to the design.
	JLaFaso	Page 52 - Verify the river water is pure fresh water. Common unit weight of water for design of similar structures is 64 pcf to account for temperature and salinity variation.
	JLaFaso	Page 53 - Has a general scour allowance/protection system been considered for the outer side of the BMP? Rip rap/protection scheme should be detailed and shown in the plans if needed
	JLaFaso	General - It is stated in multiple locations that the success of this project is entirely dependent on accessing/utilizing TxDOT property. There appears to be relatively minimal mention of coordination and agreement with this approach at the 90% level which could severely impact the overall approach.
	JLaFaso	Page 62, Table 5-G - 28% overstress for C4 is not insignificant. While it may not cause global instability, this barge strike damage could locally affect the BMP, reducing effectiveness and potentially putting resistance to water levels at risk.
	JLaFaso	Page 62 - Vibration Analysis: The revised BMP is substantially closer to TxDOT property compared to the 30% design. Verify the "no impact" assumption.
	JLaFaso	Page 80 - Has the decision to place tie-rods below water been vetted by a contractor(s) capable of performing this work? The size and weight of the tie rods will be difficult to maneuver and install by divers as they will have to be "threaded" through the holes in the SSP. Further, the tie-rods may have to be installed prior to backfilling the BMP. Aggregate placement on top of the rod without a closely supporting under layer could cause damage to the tie-rods which would be undetectable underwater.
	Matt Schuster	As noted in Section 2.4, "Based upon the results of this evaluation, it is not safe to excavate the material in the northwest corner to the currently known depths in the manner required by the ROD. The results of this evaluation were detailed in a Hydraulic Heave Analysis Report submitted to the EPA on December 9, 2021, (GHD, 2021i) and in a follow-up letter submitted to the EPA on December 22, 2021 (GHD, 2021j). Based upon this evaluation, excavation of the northwest corner is technically impracticable as prescribed by the ROD (i.e., “in the dry”) and that area will have to be addressed using a different remedial approach. Thus, the design for removal of the material in the northwest corner is not included in this 90% RD and will be addressed in a future RD submission." Futhermore, the report indicates that the dredging is not anticipated to happen in the wet, either. What is the current direction of the remediation at the northwest corner and how will it be integrated in with the rest of the project area design?
	Matt Schuster	As noted in Section 5.2, "Although the design for the northwest corner is not included in this 90% RD and will be addressed separately, it is important to note that the early completion of the RA in the northwest corner is critical to the overall sequencing of the project. This 90% RD has been prepared to be “implementable” as designed excluding the northwest corner, but in reality, the northwest corner would likely need to be completed in the first excavation season due to access issues and bathymetric conditions." Has there been any discussion relative to delaying excavation of the northwest corner until the end, particularly if it may require a different remediation approach?
	Matt Schuster	Section 5.5.5 highlights design of the BMP wall itself, but there is a little discussion of the berm in front of the walls and temporary slopes that will be formed to remove contaminated soils. What is the anticipated geometry for the berm and temporary slopes to remove contaminated material and have the stability of these slopes been evaluated? Given the timeframe for excavation to remove contaminated material and backfill, a short-term (and a long-term analysis in some instances) may be required considering the anticipated slopes and any construction loading. Please clarify.

	JLaFaso	Page 39 - Haul vehicles and other equipment are indicated to have to drive up to and over the BMP. The vertical vehicle pressure will transfer through the BMP fill and potentially apply bending pressure to tie rods. Has this impact been considered or additional structural members added to support this segment of BMP?
	P. Parvis	River elevation data back to 1994 was used to determine the top elevation for the BMP, but what years were the most recent data from? Very recent data (past two years) and projected increases based on near-term climate change and sea level rise (next 7 years) should be evaluated to confirm the top elevation of the BMP is sufficient.
	P. Parvis	What consideration was given to how increases in flooding the BMP wall may cause issues to the surrounding area by acting as a restriction to flow?
	P. Parvis	Was moving the material out of the area on barges evaluated as an option (as opposed to trucks), realizing this would pose its own challenges? The estimated 13,200 truck trips seems enough to evaluate alternate modes of transportation.
	P. Parvis	approximate excavation elevations." EPA may consider the requirement to complete the vertical delineation at these 3 locations where results were 194 ng/kg, 17,700 ng/kg and 5690 ng/kg (-20.4 ft.) TEQ, given how important excavation depths are relative to hydraulic heave rather than using nearby borings for vertical delineation. HDR submits that additional vertical delineation - if required - can be accomplished in the future (i.e., prior to the season when those seasonal cells are slated for remediation).
	P. Parvis	Figure 5-E - The names of the borings shown on the Hydraulic Heave Sensitivity figure should be adjusted to make more legible.
	P. Parvis	Section 5.6.5 - while there are "no post-excavation restoration measures identified or required as part of the ROD", there must be a plan on what the future bathymetry would look like upon completion of excavation and removal of the BMP. Based on this single paragraph, it seems like the area may be used as a repository of clean materials without a particular plan on how to grade them except for along the south edge, and how to prevent future erosion of any clean materials placed in this area. The letter report should clearly stated the plans for BMP maintenace and removal at the concluision of the NI remediation.
	Musso	Section 7 (Environmental Footprint) - alternate means of T&D for removed contamination, other than trucks, may be considered. Limiting idling time of trucks and using equipment operated with low sulfur-containing fuels is also a best practice to consider. Footrpint spreadsheets or Green Remediation toolkit outputs may be submitted to further identify ways in which the remedial activities can be made more sustainable.

Appendix B

Geotechnical Engineering Report

854 Pages Total

Contains 1 page cover letter

Figure / Attachment No.	Name of Figure / Attachment	PDF Page number
1	Site Plan	19
2	Regional Geology	20
3	Historical Topographic Surveys	21
4, 5, 6	Geologic Profiles	22,23,24
7, 8	Beaumont Clay Isopleths	25, 26
9	Geotechnical Soil Boring Location Plan	27
A, B, C, D, E	Denoted Below	28, 448, 673, 821, 826

TABLE OF CONTENTS

List of Tables:

List of Figures:

List of Attachments:

HDR COMMENTS AND REVISIONS UNDER THIS LINE		
	HDR Reviewer	Comment
	Matt Schuster	As noted in Section 5.3.1, "While the majority of the area outside the northwest corner does not show calculated FS below the target values, much of this area is approaching elevations that would be at risk of heave. This is important to note, given that excavation depths could increase based upon post-confirmation sampling." What is the contingency plan if the post-construction sampling shows additional excavation needs to occur and could induce heave? Will the excavation plan for the northwest corner be adopted?

Appendix E

Use of Area-Based Average Concentration to Meet Clean-Up Level

15 Pages Total

Page numbers denoted in table of contents

Appendix E - Use of Area Based Average Concentration to Meet Clean-Up Level

Provided As Part of Pre-Final 90% Remedial Design - Northern Impoundment
San Jacinto River Waste Pits Site
Harris County, Texas

International Paper Company
McGinnes Industrial Maintenance Corporation

June 27, 2022

→ **The Power of Commitment**

Contents

HDR COMMENTS AND REVISIONS UNDER THIS LINE		
	HDR Reviewer	Comment
	PP	Appendix E Section 2.4.1 Excavation Strategy - an excavation surface is discussed but no figure is provided. Was not able to locate the November 2021 TWG Meeting presentation. From the description of the approach, it sounds like Theissen polygons were used. Please provide the figures that support this appendix.
	PP	Appendix E Section 2.4.2 - one of the example sites mentions a not-to-exceed value twice that of the site-wide average. For this site, a not-to-exceed value of 10 times the site-wide average is used. Provide the rationale from the methodology (or perhaps discussions wth EPA) for selecting the 10x not-to-exceed value.

Appendix G

Design Drawing Package

59 Pages Total

Drawing sheet numbers, drawing names, and drawing locations denoted below

Drawing Sheet No.	Name of Drawing	PDF Page No.
G-01	COVER SHEET	2
C-01	OVERALL PLAN	3
C-02	EXISTING CONDITIONS	4
C-03	SSA AREA & NORTHERN IMPOUNDMENT WORKS	5
C-04	SOIL EROSION AND SEDIMENT CONTROL PLAN OVERALL	6
C-05	SOIL EROSION AND SEDIMENT CONTROL PLAN SEASONAL	7
C-06	SOIL EROSION AND SEDIMENT CONTROL PLAN DETAILS	8
C-07	PROJECT TRAFFIC CONTROL PLAN	9
C-08	EXCAVATION PLAN OVERALL	10
C-09	EXCAVATION PLAN NORTHWEST	11
C-10	EXCAVATION PLAN NORTHEAST	12
C-11	EXCAVATION PLAN SOUTHEAST	13
C-12	EXCAVATION PLAN SOUTHWEST	14
C-13	EXCAVATION SECTION 1 OF 6	15
C-14	EXCAVATION SECTION 2 OF 6	16
C-15	EXCAVATION SECTION 3 OF 6	17
C-16	EXCAVATION SECTION 4 OF 6	18
C-17	EXCAVATION SECTION 5 OF 6	19
C-18	EXCAVATION SECTION 6 OF 6	20
C-19	TYPICAL SEASONAL EXCAVATION SEQUENCING	21
C-20	TYPICAL SEASONAL EXCAVATION SEQUENCING 1 OF 2	22
C-21	TYPICAL SEASONAL EXCAVATION SEQUENCING 2 OF 2	23
C-22	RESTORATION PLAN	24
C-23	TYPICAL CONSTRUCTION SEQUENCING 1 OF 2	25
C-24	TYPICAL CONSTRUCTION SEQUENCING 2 OF 2	26
C-25	TYPICAL DETAILS 1 OF 3	27
C-26	TYPICAL DETAILS 2 OF 3	28
C-27	TYPICAL DETAILS 3 OF 3	29
C-28	PILE WALL LAYOUT PLAN	30
C-29	DOUBLE PILE WALL PLAN AND PROFILE 1 OF 4	31
C-30	DOUBLE PILE WALL PLAN AND PROFILE 2 OF 4	32
C-31	DOUBLE PILE WALL PLAN AND PROFILE 3 OF 4	33
C-32	DOUBLE PILE WALL PLAN AND PROFILE 4 OF 4	34
C-33	SOUTH WALL PLAN AND PROFILE 1 OF 2	35
C-34	SOUTH WALL PLAN AND PROFILE 2 OF 2	36
C-35	DOUBLE PILE WALL SECTIONS 1 OF 7	37
C-36	DOUBLE PILE WALL SECTIONS 2 OF 7	38
C-37	DOUBLE PILE WALL SECTIONS 3 OF 7	39
C-38	DOUBLE PILE WALL SECTIONS 4 OF 7	40
C-39	DOUBLE PILE WALL SECTIONS 5 OF 7	41
C-40	DOUBLE PILE WALL SECTIONS 6 OF 7	42
C-41	DOUBLE PILE WALL SECTIONS 7 OF 7	43
C-42	SOUTH WALL SECTIONS 1 OF 3	44
C-43	SOUTH WALL SECTIONS 2 OF 3	45
C-44	SOUTH WALL SECTIONS 3 OF 3	46
S-01	STRUCTURAL NOTES	47
S-02	STRUCTURAL LAYOUT PLAN	48
S-03	STRUCTURAL SECTIONS	49
S-04	STRUCTURAL DETAILS 1 OF 2	50
S-05	STRUCTURAL DETAILS 2 OF 2	51
P-00A	WATER TREATMENT SYSTEM PROCESS FLOW DIAGRAM SYMBOLS	52
P-00B	WATER TREATMENT SYSTEM PROCESS FLOW DIAGRAM SCHEDULES	53
P-01	WATER TREATMENT SYSTEM PROCESS FLOW DIAGRAM/ MASS BALANCE	54
P-02	WATER TREATMENT SYSTEM P&ID 1 OF 4	55
P-03	WATER TREATMENT SYSTEM P&ID 2 OF 4	56
P-04	WATER TREATMENT SYSTEM P&ID 3 OF 4	57
P-05	WATER TREATMENT SYSTEM P&ID 4 OF 4	58
P-06	SITE PLAN WATER TREATMENT SYSTEM SEASON 3-6	59

HDR COMMENTS AND REVISIONS UNDER THIS LINE

	HDR Reviewer	***Comment***
	JLaFaso	C-01 - Add a tidal Datum Chart
	JLaFaso	C-09 through C-12 - Within the excavation footprint, consider turning off existing elevations/grading for clarity.
	JLaFaso	C-13 through C12 (common) - Is the BMP inner fill to the same elevation as the top of wall?
	JLaFaso	C-13 through C-12 (common) - consider showing Tie-rods in the BMP
	JLaFaso	C-13 through C-12 (common) - recommend expanding the legend to show current/proposed excavation limits for clarity
	JLaFaso	C-13 through C-12 (common) - recommend adding legend/note what values along boring represent (i.e., concentration of contamination)
	JLaFaso	C-13 through C-12 (common) - Recommend clarifying the BMP soil buttress is existing (to remain) or to be augmented for stability
	JLaFaso	C-13 through C-12 (common) - recommend adding a note that the FOS 1.25 maximum line is the maximum permissible depth based on hydraulic heave
	JLaFaso	C-19 - recommend removing existing/prior grade for clarity once a cell has been excavated
	JLaFaso	C-22 - recommend removing prior grade once excavation has been complete
	JLaFaso	C-35 through C-44 (common) - recommend showing tie-rods
	JLaFaso	S-01 - Recommend adding critical loading criteria (max water elevations, surcharge [if any]) to this sheet.
	JLaFaso	S-01 - Recommend adding notes on the BMP fill / raised bench fill material
	JLaFaso	S-01 - Letter and Structural calculation report indicates tie-rods are 120 ksi
	JLaFaso	S-01 - recommend adding a tidal datum chart
	JLaFaso	S-01 - Specify whether there is a minimum waiting period between initial fill/rod installation to adjust/document any initial consolidation/settlement
	JLaFaso	S-03 - Detail C: Add waterline
	JLaFaso	S-03 - the duration of the project poses risk for tie-rods should they become restrained from rotation. Settlement of the supporting fill/pressure from overlying cover could induce bending stresses in the tie-rod. Intermediate supports or adequate FOS should be incorporated into the tie-rod design.
	JLaFaso	S-04 - consider shifting tie rod locations equal to the width of one Z sheet to install bolting between waler and sheets. Presently, the waler is not directly connected to the sheets.
	JLaFaso	S-05 - Detail 1: Consider providing a nominal gap between adjacent walers to allow for field adjustment and thermal expansion of the waler.
	JLaFaso	S-05 - Section B: Consider perforating the PVC to release any potential trapped water.
	JLaFaso	S-05 - Section B: consider using spherical washer & dished bearing plate to allow for nominal rotation of tie rod under possible settlement.
	JLaFaso	S-05 - Section C: Consider increasing the gap between walers. Should the tie-rod become "clamped" by the walers or splice plates, the connection will prevent rotation under settlement and could induce bending stress in the rod.
	JLaFaso	S-05 - Recommend adding a table documenting details for "Part 1, Part 2.... etc."
	JLaFaso	S-05 - Consider adding spacers (schedule 80 steel or similar) to splice connections to maintain clearance between walers.
	JLaFaso	S-04 - Suggest adding weep holes (~0.5" +/- 10' O.C.) to prevent buildup of water on the upper waler

Appendix H

Design Specifications

202 pages total

Division loactions with PDF page numbers denoted below

Division No.	Name of Division	PDF page number
00 01 10	Table of Contents	2
00 01 20	Seals	4
01 10 00	Summary	5
01 30 00	Administrative Requirements	Not Directly Listed
01 33 00	Submittal Procedures	Not Directly Listed
01 35 00	Temporary Traffic Controls	Not Directly Listed
01 35 29	Health and Safety Requirements	Not Directly Listed
01 40 00	Quality Rerquirements	Not Directly Listed
01 50 00	Temporary Facilities and Controls	Not Directly Listed
01 57 13	Temporary Soil Erosion and Sediment Controls	Not Directly Listed
01 57 19	Temporary Environmental Controls	9
01 60 00	Product Requirements	14
01 70 00	Execution and Closeout Requirements	18
01 91 00	Water Treatment Consumables	25
01 91 20	Facility Testing and Comissioning	29
02 55 00	Waste Material Solidification	35
02 61 14	Material Handling and Transportation	40
02 61 16	Off-Site Transportation and Disposal	44
22 05 53	Pipe Data Sheet- PVDF Tubing and Carrier Piping	54
23 05 53	Identification for Piping and Equipment	56
31 05 19.13	Geotextiles for Earthwork	59
31 10 00	Site Clearing	67
31 23 16	Excavation	69
31 23 19	Dewatering	75
31 23 23	Fill	81
31 36 26.16	Geomembranes	93
31 37 00	Riprap	106
31 41 16	Sheet Piles	110
32 31 13	Chail Link Fences and Gates	121
32 92 19	Seeding	Not Directly Listed
35 49 25	Turbidity Curtain	126
40 05 13	Common Work Results for Process Piping	132
40 05 33	High Density Polyethylene Process Pipe	143
40 05 51	Common Requirements for Process Valves	149
40 70 00	Instrumentation for Process Systems	156
46 07 01	Water Treatment System (WTS)	167
Attachment "A"	Process Control Narrative	197

HDR COMMENTS AND REVISIONS UNDER THIS LINE

	HDR Reviewer	Comment
	Josiah Berg	Section 01 30 00 (Administrative Requirements) missing from submittal
	Josiah Berg	Section 01 33 00 (Submital Proceedures) missing from submittal
	Josiah Berg	Section 01 35 00 (Temporary Traffic Controls) missing from submittal. Critical, based on proximity of the site (and proposed location of BMP) to the I-10 freeway, details of site entry/exit will be critical to PHA, TXDOT, and other stakeholders.
	Josiah Berg	Section 01 40 00 (Quality Requirements) missing from submittal
	Josiah Berg	Section 01 50 00 (Temporary Facilities and Controls) missing from submittal
	Josiah Berg	Section 01 57 13 (Temporary Soil Erosion and Sediment Controls) missing from submittal

Appendix I

BMP Structural Design Report

1045 Pages Total

Page Numbers Denoted in Table of Contents

Also Bookmarked in PDF

Attachment No.	Name of Attachment	PDF page number
1	Geotechnical Parameter and Data Profiles	35
2	BMP Analysis - PLAXIS Output	60
3	Structural Calculations	856
4	Northern Impoundment Preliminary Vibration Analysis	1015

BMP Structural Design Report - Northern Impoundment

San Jacinto River Waste Pits Site Harris County, Texas

International Paper Company and McGinnes Industrial Maintenance Corporation

June 14, 2022

→ **The Power of Commitment**

Contents

Contents

Table index

Figure index

Attachments

HDR COMMENTS AND REVISIONS UNDER THIS LINE

	HDR Reviewer	Comment
	Matt Schuster	The design sections (cross-section C-2, for example) indicate significant fill (greater than 10 ft) is being added when constructing the doublewalled BMP. Additionally, the alluvium sediments are characterized as normally consolidated. While we believe the Plaxis model should incorporate in consolidation settlements and secondary compression (if applicable), no discussion is included regarding the settlement resulting from the fill placement. What magnitude of settlement is anticipated and what impacts are anticipated on the internal tie rods? Additionally, has settlement of the existing (or future) TxDOT bridge foundations adjacent to the project been evaluated?
	Matt Schuster	Section 5.1 highlights 3 failure models including "Item 1: The unstable slopes may cause a deep-seated rotational failure of the entire soil mass. The slope failures are independent of the sheet pile embedment and location of the anchor system. This type of failure can be remedied by changing the geometry of the retained material or improving the soil strength." If this failure mechanism has been considered, please provide the corresponding factor of safety. Otherwise, please state why this failure mechanism is not applicable.
	JLaFaso	Attachment 3.1 - The splice plates have been analyzed for resultant shear from waler moment, however, it is not clear if the direct shear on the waler has been superimposed into this analysis of the splice plate bolt group. The splices are placed at approximately the point of zero moment, which will roughly correspond to the point of maximum shear.
	Matt Schuster	What is the basis for the "inner design water elevation" in Figure 1-2? As we understand it, the contaminated materials will generally be excavated in the dry, which we believe means that the water level will temporarily be lowered to or near the bottom of the excavation. As currently shown, the "inner design water elevation" is around El. 5 ft, which is significantly higher than the bottom of the excavation.

Appendix J

Supporting Deliverables

163 Pages Total

Attachment PDF page locations denoted below

Appendix J - Attachments

Attachment No.	Name of Attachment	PDF page number
1	Health and Safety Plan (HASP)	5
2	Emergency Response Plan (ERP)	36
3	Field Sampling Plan	54
4	Quality Assurance Project Plan	71
5	Site-Wide Monitoring Plan	99
6	Construction Quality Assurance/ Quality Control Plan	115
7	Institutional Controls Implementation and Assurance Plan	134
8	Transportation and Off-Site Disposal Plan	142
9	Monitored Natural Recovery Monitoring Plan	152

Attachment 1 - Health and Safety Plan - Northern Impoundment - Table of Contents

Contents

Attachment 1 - Health and Safety Plan - Northern Impoundment - Table of Contents (cont.)

Contents

Table index

Attachment 2 - Emergency Response Plan - Northern Impoundment - Table of Contents

Contents

Attachment 2 - Emergency Response Plan - Northern Impoundment - Table of Contents (cont.)

Contents

Attachment 3 - Field Sampling Plan - Northern Impoundment - Table of Contents

Contents

Attachment 3 - Field Sampling Plan - Northern Impoundment - Table of Contents (cont.)

Table index

Figure index

Attachment 4 - Quality Assurance Plan - Northern Impoundment - Table of Contents

Contents

Attachment 4 - Quality Assurance Plan - Northern Impoundment - Table of Contents (cont.)

Table index

Attachment 5 - Site Wide Monitoring Plan - Northern Impoundment - Table of Contents

Contents

Attachment 5 - Site Wide Monitoring Plan - Northern Impoundment - Table of Contents (cont.)

Table index

Figure index

Attachment 6 -Construction Quality Assurance/ Quality Control Plan - Northern Impoundment - Table of Contents

Contents

Table index

Attachment 7 -Institution Control Implementation and Assurance Plan - Northern Impoundment - Table of Contents

Contents

Figure index

Attachment 8 -Transportation and Off-Site Disposal Plan - Northern Impoundment - Table of Contents

Contents

Attachment 9 -Monitored Natural Recovery Monitoring Plan - Sand Separation Area - Table of Contents

Contents

Figure index

HDR COMMENTS AND REVISIONS UNDER THIS LINE		
	HDR Reviewer	Comment
	M. Musso	NI"staged" documents were reviewed prior. Many comments on these documents were related to future contractor selection. It is understood that all staged documents in this Appendix will be finalized and incorporated into the 100% RD.

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Response and Restoration
Assessment and Restoration Division
263 13th Avenue South
St. Petersburg, FL 33701

MEMORANDUM

TO: Ms. Ashley Howard
Remedial Project Manager, Superfund Division
United States Environmental Protection Agency

FROM: Susan Snyder, Ph.D., Environmental Scientist, on contract to NOAA
Michel Gielazyn, Ph.D., Regional Resource Coordinator, NOAA

SUBJECT: Natural Resource Trustee comments on Pre-Final 90% Remedial Design – Northern Impoundment, San Jacinto River Waste Pits Site, Harris County, Texas, June 27, 2022.

DATE: September 1, 2022

CC:

Stephanie Powers, NOAA	Peipey Tang, TCEQ
Anne Witherup, NOAA	Scottie Aplin, TGLO
Heather Biggs, USFWS	Allison Fischer, TGLO
Denise Ruffino USFWS	Tara Whittle, TGLO
Lisa Stevens, USFWS	Kimberly Biba, TPWD
Taylor Alexander, TCEQ	Shannon Love, TPWD
Michael Cave, TCEQ	Heather Podlipny, TPWD
Katie Delbecq, TCEQ	Angela Schrift, TPWD

The U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), writes this letter on behalf of the Natural Resource Trustees for the San Jacinto River Waste Pits Superfund Site, including the U.S. Department of the Interior U.S. Fish and Wildlife Service, Texas Commission on Environmental Quality, Texas General Land Office, and Texas Parks and Wildlife Department. The Trustees have reviewed Pre-Final 90% Remedial Design - Northern Impoundment, San Jacinto River Waste Pits Site, Harris County, Texas, June 27, 2022, prepared by GHD Services, Inc., on behalf of the International Paper Company and McGinnes Industrial Maintenance Corporation, and offer the following comments. If you have any questions, please contact Susan Snyder, Ph.D., Environmental Scientist, Lynker on contract to NOAA, at 727-420-8301, susan.snyder@noaa.gov.

1. The selected remedy in the site's Record of Decision "...involves the removal of all waste material that exceeds the cleanup level of 30 ng/kg regardless of depth in the northern waste pits." (EPA 2017). The proposed excavation surface as described in Table 5-1 of the Subject Document leaves contamination above this cleanup level at approximately one third of sampled locations within the northern impoundment (excluding the northwest corner). In a small number of locations, the proposal to leave contamination in place is likely due to risk of hydraulic heave (e.g., SJSB047-C1, SJSB088), whereas at approximately 70% of locations it's unclear why contamination above the cleanup level is proposed to remain within the impoundment at depth. For example, see samples SJSB033, SJSB048-C1, SJSB049, SJSB076, SJSB082 in Table 5-1. If contamination exceeding the cleanup value will be left in place without backfilling or capping to eliminate the exposure pathway, the Potentially Responsible Party is liable for resulting injuries to natural resources as assessed by a Natural Resource Damage Assessment under CERCLA.

2. Appendix E of the Subject Document discusses the elimination of the main pathways of exposure for human receptors and the use of a surface-weighted average concentration (SWAC) to demonstrate compliance with the cleanup level. It should be noted that SWACs are not fully protective of all ecological receptors, specifically benthic fauna that do not range over large areas.

3. Water behind the BMP wall will be pumped into the river each season to allow excavation activities to take place in a dry environment (as discussed in section 5.6.2.1 of the Subject Document). Best management practices should be used to minimize disturbance of contaminated material during dewatering, therefore, minimizing releases of contaminated water.

4. While we recognize the site's Record of Decision called for removal of contaminated media solely within the boundaries of the northern and southern impoundments, and we commend EPA's efforts to require removal of this material in the face of significant engineering and logistical challenges, we have concerns about contamination above the cleanup level being left in surface sediments at locations on site adjacent to the impoundments, as well as with the Monitored Natural Recovery plan for the site's Sand Separation Area (see Natural Resource Trustee comment memo dated March 25, 2022). Leaving contamination from the site in place, in some locations one to two orders of magnitude above the cleanup level, may result in unacceptable risks to receptors. We look forward to reviewing how Natural Resource Trustee comments made in the aforementioned memo will be incorporated into the Final 100% Remedial Design.

Additional Comments:

a. Common bottlenose dolphins (*Tursiops truncatus*) inhabit the waters adjacent to the site; therefore, we recommend the Marine Mammal Protection Act be considered during the Remedial Design process.

REFERENCES:

EPA (2017). Record of Decision, San Jacinto River Waste Pits. Harris County, Texas. EPA ID: TXN000606611. U.S. Environmental Protection Agency, Region 6. Dallas, Texas.

NOAA (March 25, 2022). Natural Resource Trustee comments on Attachment 9 – Monitored Natural Recovery Plan – Sand Separation Area, provided as part of Pre-Final 90% Remedial Design – Northern Impoundment, San Jacinto River Waste Pits Site, Harris County, Texas, January 17, 2022.

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Response and Restoration
Assessment and Restoration Division
263 13th Avenue South
St. Petersburg, FL 33701

MEMORANDUM

TO: Ms. Ashley Howard
Remedial Project Manager, Superfund Division
United States Environmental Protection Agency

FROM: Susan Snyder, Ph.D., Environmental Scientist, on contract to NOAA
Michel Gielazyn, Ph.D., Regional Resource Coordinator, NOAA

SUBJECT: NOAA comments on Pre-Final 90% Remedial Design – Northern Impoundment, San Jacinto River Waste Pits Site, Harris County, Texas, June 27, 2022.

DATE: September 1, 2022

CC:

Stephanie Powers, NOAA	Peipey Tang, TCEQ
Anne Witherup, NOAA	Scottie Aplin, TGLO
Heather Biggs, USFWS	Allison Fischer, TGLO
Denise Ruffino USFWS	Tara Whittle, TGLO
Lisa Stevens, USFWS	Kimberly Biba, TPWD
Taylor Alexander, TCEQ	Shannon Love, TPWD
Michael Cave, TCEQ	Heather Podlipny, TPWD
Katie Delbecq, TCEQ	Angela Schrift, TPWD

The U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), appreciates the opportunity to comment on Pre-Final 90% Remedial Design – Northern Impoundment, San Jacinto River Waste Pits Site, Harris County, Texas, June 27, 2022, prepared by GHD Services, Inc., on behalf of the International Paper Company and McGinnes Industrial Maintenance Corporation. If you have any questions, please contact Susan Snyder, Ph.D., Environmental Scientist, Lynker on contract to NOAA, at 727-420-8301, susan.snyder@noaa.gov.

1. Comment #1 in the Natural Resource Trustee comment memo dated September 1, 2022, expresses concern over the subject document's proposal to leave contamination in the Northern Impoundment above the cleanup value established in the site's Record of Decision (ROD; EPA 2017). In areas where excavation can safely be performed without the risk of hydraulic heave, the excavation surface should be designed such that the cleanup value is met without the use of averaging analytical results downcore or between sampling locations.

If contamination above the cleanup level established in the ROD is knowingly left in place in the Northern Impoundment, the affected area(s) need to be backfilled appropriately or capped, to provide assurance that contamination left at depth will be isolated from receptors. A long-term monitoring plan will need to be developed to ensure that the remedy will be stable, effective, and protective over the long-term.

All areas with contamination remaining above the cleanup value need to be included in the site's long-term monitoring plan. As stated in the ROD "This remedy will result in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure. Pursuant to Section 121(c) of CERCLA, statutory reviews will be conducted no less often than once every five years after the initiation of construction to ensure that the remedy is, or will be, protective of human health and the environment." The ROD section "Five-Year Review Requirements" only discusses monitoring the site's Sand Separation Area and the Southern Impoundment. However, the subject document proposes leaving hazardous substances on site within the Northern Impoundment, making it now subject to CERCLA Section 121(c)'s long term monitoring and review requirement.

REFERENCES:

EPA (2017). Record of Decision, San Jacinto River Waste Pits. Harris County, Texas. EPA ID: TXN000606611. U.S. Environmental Protection Agency, Region 6. Dallas, Texas.

NOAA (September 1, 2022). Natural Resource Trustee comments on Pre-Final 90 Remedial Design – Northern Impoundment, San Jacinto River Waste Pits Site, Harris County, Texas, June 27, 2022.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

January 9, 2023

Ms. Ashley Howard
US Environmental Protection Agency, Region 6
1201 Elm Street, Suite 500
Dallas, Texas 75270

Via email

Re: 90% Remedial Design for the Southern Impoundment, San Jacinto River Waste Pits Federal Superfund Site, Highlands, Harris County, Texas

Dear Ms. Howard:

The Texas Commission on Environmental Quality has reviewed the 90% Remedial Design for the Northwest Corner of the Northern Impoundment of the San Jacinto River Waste Pits Federal Superfund site. The TCEQ has the following comments. The EPA has indicated that the Excavation and Capping alternative is not under consideration; therefore, no comments are provided on design aspects specific to this alternative.

Section 5.12.3.2 Hydraulic Heave Evaluation: It is stated that the design river stage for the Reasonable Maximum Case was calculated based on the safe level of dry excavation calculated for the Extreme Case (+5 ft North American Vertical Datum of 1988 (NAVD88)). However, Section 5.12.3.3.2 Design River Level indicates that the Reasonable Maximum Case value was determined based on the occurrence frequency of various river stages from the hindcasted model using historical data since 1996. Please clarify how the river stage for the Reasonable Maximum Case was derived. It is TCEQ's position that using historical data is a more appropriate estimation method rather than back calculating the reasonable maximum river stage with the calculated dry excavation limit from the Extreme Case. In addition, per Appendix B-1 Section 2.1.2, the safety factor for the Reasonable Maximum Case is 1.25, not 1.15, which is the safety factor for the Extreme Case.

Section 5.12.3.2 Hydraulic Heave Evaluation: The dry excavation limit of -13 ft NAVD88 in the northwest corner was determined based on the river stage at the extreme case (+9 ft NAVD88). The TCEQ recommends that same calculation be done assuming the river stage at the Reasonable Maximum Case, +5 ft NAVD88. It may not change the decision on the dry excavation limit but will provide additional information when evaluating variances of the excavation limit.

Section 5.12.5.2.1 Cell Dewatering: Similar to the comments TCEQ made to the 90% RD for the northern impoundment submitted in September 2022, TCEQ recommends that measures be taken to minimize turbidity and resuspension of deposited sediment during pumping. In addition, it is TCEQ's position that water that remains directly on the cap as cell dewatering progresses should not be handled as river water and should be treated in the water treatment system prior to discharge.

Section 5.12.5.2.3 Dry Excavation: The TCEQ has the same comment as on Section 5.12.5.2.1 above.

Section 5.12.5.2.4 Dredging Procedures: Please explain how the minimum -9 ft water elevation to be maintained during dredging was determined.

Section 5.12.5.4 Post Dredging Confirmation Sampling: This section states that a water elevation of -9 ft NAVD88 is sufficient to compensate for removal of waste material to the identified target excavation elevations based on the existing dataset that include a maximum excavation of -28 ft NAVD88 plus an additional 2-ft overcut if necessary. Based on the calculation in Appendix B-1 Figure 6, the -9 ft water elevation may be sufficient for the maximum excavation at -28.4 ft but not sufficient for an additional 2 ft overcut at the maximum excavation or total of -30 ft excavation. Please clarify.

Appendix B-1 Northwest Corner Hydraulic Heave Evaluation

Figures 5 and 6: Please explain why safety factors were only applied to soil pressure since safety will be maintained by both overlying soil pressure and water pressure. If safety factors are only applied to a portion of the contributing pressures, the overall safety will be lower than the designated safety factor.

Figure 5: Please provide the same calculation on the maximum drawdown elevation for the Reasonable Maximum Case (river stage at 5 ft).

Figure 6: Please note that the safe water elevation calculations in Figure 6 were based on the excavation bottom at -27 ft rather than the deepest known excavation bottom at -28.4 ft in SJSB098. Please provide the safe water elevations needed for the excavation bottom at -28.4 ft.

Drawing C-49: Consistent with TCEQ's September 2022 comments on the 90% RD, it is recommended that waste material with concentrations greater than 30 ng/kg above the hydraulic heave line be removed. The material around SJSB055-C1 in this cross-section should be shown in light green (material to be excavated).

Appendix G-2

Drawings C-13, C-16, C-17, and C-49: Consistent with TCEQ's September 2022 comments on the 90% RD, it is recommended that waste material with concentrations greater than 30 ng/kg $TEQ_{DF,M}$ above the hydraulic heave line be removed. Several borings in these cross-sections should have the light green (material to be excavated) extended downward to target waste material shown in orange.

Drawing C-45: TCEQ suggests that either the fill color of the northwest area be changed to light green to be consistent with the color for material to be excavated in other portions of the site or change the legend of "Northwest corner" to "Northwest corner to be excavated".

Drawings C51-53: Please add a title to each phase to indicate major activities that will be conducted in each phase.

Appendix J-2, Supporting Deliverables:

Field Sampling Plan, Section 2.6 Sampling in Decision Units: Composite samples made from 6 to 8 discrete samples from each ½ acre decision unit (DU) are proposed. As TCEQ commented

on the 90% RD, TCEQ recommends collection of additional discrete samples to be included in each composite to be more representative of the full range of concentrations within the DU.

Field Sampling Plan Section 2.6.1.1 Sample Collection and Compositing Procedures: This section proposes that each sample core will be hand pushed to 2 ft or until refusal is met- will collection of a replacement core from an adjacent location be considered if shallow refusal is met? Representative samples from the 6-12 inch and 12-24 inch intervals at each discrete sample location should be collected.

Please let me know if you have any questions. You can reach me at (512) 239-4521 or Xiaoxia.lu@tceq.texas.gov.

Sincerely,

Xiaoxia Lu

Xiaoxia Lu, P.E., Acting Project Manager
Superfund Section
Remediation Division
Texas Commission on Environmental Quality

XL/cw

General comments:

The Harris County Technical Advisory Committee (TAC) consist of staff representing Harris County Pollution Control Services Dept; Harris County Attorney's Office; Harris County Flood Control District; and technical consultants – Parsons and Kit Professionals.

1. The TAC (hereafter referred to as We) support the EPA's request for an independent, third- party review and evaluation of the technical feasibility issues cited by the PRP group. In addition, We suggest the following (w.r.) to this position;
    a. The independent consultant be a qualified specialty engineering firm with experience in specific fields of work associated with this project (Environmental Remediation, Geotechnical, H&H, Structural etc.)
    b. In the case of Geotechnical Engineering area, the firm should be someone with familiarity, knowledge and experience in local geotechnical conditions (Harris County Area) and licensed in Texas.
    c. The firm or the engineer should be someone with familiarity and experience in both Federal and Local Standards (HCFCD and USACE) applicable.
    d. HCFCD will be pleased to assist the EPA in helping to evaluate the qualifications and experience of the Independent Firm selected for the purpose, if requested.

The ROD was clear in requiring removal of wastes exceeding 30 ng/kg TEQ, and that the long-term risk from leaving dioxins in place in this location was unacceptable. This design shows intent to leave in place sediments with dioxin TEQ concentrations of up to 1,800 ng/kg.

We support the mechanical dredging approach to remove waste-impacted materials below depths that can be safely excavated in the dry, though excavating in the dry is preferable to the extent possible.

We continue to question the data interpretation which was the basis of the hydraulic heave evaluation. We have not seen any response to our previous comments on the geotechnical report and hydraulic heave analysis. All previously submitted technical comments with reference to the Northern Impoundment Remedial Design remain a concern.

Major issues as observed specifically by the HCFCD staff presented in this matter is the quality of Geotechnical sampling and laboratory testing as noted below:

a. The data obtained and used previously and used for this design, HCFCD believes is inadequate and presents safety issues.
b. Geotechnical Borings, Sampling, Laboratory Testing and results of engineering analysis are not adequate and does not meet the standards of HCFCD, both regulatory and technical.
c. Additional Geotechnical Borings will be needed as noted in HCFCD memo previously provided.
d. Any additional Geotechnical sampling and laboratory testing required to support and verify the design should be performed preferably by an Engineer licensed in Texas and experienced in Harris County Geotechnical issues related to facilities to be installed/repaired within HCFCD ROW.

Specific Comments:

1. Section 5.12.2.2 Risk from flooding. The report states that there is a greater risk of release of wastes from inside the BMP wall to the river if the removal is done by dredging through water (to reduce risk of hydraulic heave) than if removal was done by excavation in the dry, because the excavation would be flooded if a storm is approaching. We fail to see why the risk would be more acute under the dredging alternative. The overtopping of the BMP could occur in either circumstance, and it would almost surely release contaminants. If an assumption is being made that by filling the dry excavation from the river just prior to a storm, the level of contaminants in water inside the BMP wall will be lower than under a dredging scenario, we would be interested in seeing the calculations or models that would support that.

2. Was a deeper sheet pile wall considered for the northwest corner? That might reduce risks of hydraulic heave and enable deeper excavation.

3. Section 2.1.6.4 states "The BMP included in the design will cut off the interconnection between the shallow groundwater and the river within the areas of removal." Section 2.2.7.2 indicates that the Beaumont Clay formation extends from about -30 feet NAVD88 down to -60 to -80 feet NAVD88 on the western side of the Northern Impoundment. Section 2.3.7.3 says that the compressible clay layer predominantly consisted of one layer on the west side of the northern impoundment but on the east side, this layer may be interlayered by thin occasional granular lenses. Hydraulic heave risk is due to horizontal water migration under the BMP wall through sand lenses. So why the focus on hydraulic heave on the west side when the sand lenses are only present on the east?

Appendix B-1. Hydraulic Heave Evaluation

4. Please explain clearly how the stated piezometric head difference of 1.7 feet between the Beaumont Sand and the river was calculated. The actual difference appears to be about 4 feet, based on Figure 3.

5. There is an apparent disconnect between the stated depths of the Beaumont sand described in the report and shown in the geological cross-section (Figure 1) and the actual boring logs and CPT data. Section 1.3 of the report states that the top of the Beaumont sand is at elevation -50 ft NAVD88 in boring SJGB019 and CPT SJSCPT-01, and at -54 ft NAVD88 in boring SJGB018. Yet on page 2 of Appendix B (SDI Cone Penetration Test [CPT] Results) of Appendix B (Geotechnical Engineering Report), CPT SJSCPT-01 shows the sand layer does not begin until -57 ft (datum not provided). In boring SJGB018, the sand layer is not observed until the 40-ft boring depth, which we presume to equate to roughly -60 ft NAVD88 since the top of the boring was 20 ft below the water surface. The log notes that the driller skipped from the 30-ft interval to 40-ft by mistake, skipping the 35-ft (~55-ft NAVD88) interval. In the boring log for SJGB019, the log says that hard, dry reddish-brown clay is present at the 30-32' depth of boring, which should equate to about -50 ft NAVD88 since the top of boring was at 20 ft below water level. In this boring, the sand layer was not hit until the 59-ft boring depth – or ~ 79 ft NAVD88.

6. If the boring logs are correct, and we are interpreting them correctly, the Beaumont sands were observed at elevations of 57 feet NAVD88 or greater. Thus, the thickness of the intervening impervious clay layer (Hc) is apparently being underestimated by at least 7 feet, and the effective head at the top of the sand layer is similarly mis-calculated. This would cause an underestimation of the safe excavation depth.

7. The subsurface profile shown in Figure 1 could not be confirmed with boring logs or Figure 5-1 in the main report. Final boring logs with surface elevation information should be provided for borings SJGB018 and SJGB019. Additional discrepancies that need explanations include:

    a. Boring SJB019 did not describe a gravelly sand layer below the soft clay at surface. However, the graphic profile depicts this layer. A layer of silty sand with clay laminations was described at a depth of 13.6 feet followed by a zero-recovery sample. How is this depicted as gravelly sand?

    b. Boring log for SJGB019 did not encounter a Beaumont sand layer within the Beaumont clay layer. A very soft clayey silt was encountered between depths of 35 and 40 feet. It is unclear how this layer was identified as Beaumont Sand by designers.

8. The silty fine sand layer encountered between depths of 40 and 50 feet at SJGB018 was described as “dry”. It is unclear how this dry layer can result in hydraulic heave.

9. It is unclear how the conclusion of gravelly sand being connected to Beaumont Sands or Chicot Aquifer was derived. Later in the report it is also indicated that the Beaumont Sands are potentially hydraulically connected to the deeper sand layer. The basis for this statement is unclear.

10. The authors should draw parallels between the subsurface profile at SJMW016 and the borings within NW corner. The profile at SJMW016 looks significantly different from the borings within NW corner. The hydraulic heave analysis assumes the sand layer to be under artesian pressure, but this assumption is not verified within the NW corner. The boring logs either did not encounter or reportedly encountered a dry sand layer. It is difficult to believe that there is an artesian condition existing in this location.

11. Although Figure 3 indicates that the piezometric head in the Beaumont Sand layer follows the fluctuations in the river water level the difference between two is consistently three to four feet. How was the conclusion of 0.11 feet of dampening per foot of clay made?

12. It is unclear how the 1.7 feet difference between river stage and piezometric head at EL. -50 was arrived at. The thickness of clay layer at boring SJGB018 above the sand layer is at least 40 feet. Therefore, using a 0.11 feet of head dampening per foot of clay the head difference should be 4.4 feet. The generalized profile used in Figure 5 also encountered 10 feet of soft sediment and 23 feet of Beaumont Clay.

13. For the reasonable maximum case in Figure 5, why was the uplift pressure in sand represented as (50+x)*62.4. Why use El. 0 as reference point?

14. The risk of hydraulic heave due to deep sands was not part of this evaluation. Why are the piezometers being recommended to be installed within the deeper sand?

Remedial Action Sequencing

15. The design states that the remediation of the northwest corner will be the most challenging and have the tightest schedule. Therefore, we question the wisdom of addressing the northwest corner in the first removal season. By scheduling it in the second or later season, it would benefit from lessons learned during remediation of the balance of the site. We understand the access issues that would be created if the southwest quadrant was remediated first and left as a partially flooded hole.

We believe the southeast quadrant may make more sense to address first. Alternatively, if the southwest quadrant were addressed first and then partially backfilled with clean fill, it might resolve some of the access issues in the remaining areas in following seasons. Additionally, it might ease potential schedule conflicts with IH-10 bridge replacement.

16. Recommend installation of piezometers along the inside periphery of BMP wall to monitor head pressure at the top of the Beaumont sand to serve as warning system for hydraulic heave issues, i.e., if the head approaches the weight of clay and water overlying the piezometer.

Construction Drawings

17. The construction drawings indicate an intent to leave waste materials exceeding 30 ng/kg dioxin TEQ in place at a number of points. In some cases, such as boring SJSB088, this would include material with dioxin TEQ of 1800 ng/kg. We oppose the plan to leave these materials in the riverbed.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

March 25, 2022

Ms. Ashley Howard
US Environmental Protection Agency, Region 6
1201 Elm Street, Suite 500
Dallas, TX 75270

Sent via email

Subject: Northern Impoundment 90% Remedial Design Supplemental Deliverables, San Jacinto River Waste Pits Federal Superfund Site, Channelview, Harris County, Texas

Dear Ms. Howard:

The Texas Commission on Environmental Quality (TCEQ) has reviewed the Northern Impoundment 90% Remedial Design supplemental deliverables submitted on January 17, 2022, for the San Jacinto River Waste Pits Federal Superfund Site and has the following comments.

Attachment 2 (Emergency Response Plan) Section 5: Please clarify at which storm preparation phase excavated waste material awaiting disposal (e.g., on staging pile or pad) will be secured or taken offsite for disposal. For Phase III preparation, please clarify what material (e.g., soil, aggregate, stockpiled armor rock saved from TCRA Cap) will be used to backfill?

Attachment 8 (Transportation and Off-Site Disposal Plan), Section 4.1: The TCEQ suggests that information shared verbally in the Technical Workgroup Meetings about the waste types that can be accepted at the chosen disposal facility be added (i.e., that the selected disposal facility be permitted to receive both Class 1 and Class 2 non-hazardous industrial waste).

Attachment 9 (Monitored Natural Recovery Plan- Sand Separation Area)

- **Section 5.4:** The Lavaca Bay site is provided as a case study; but it should be noted that once the performance objective was met, voluntary sediment monitoring has been ongoing since 2006 to verify that MNR is still protective and progressing at the site.

- **Sections 6.4 and 6.5:** The TCEQ believes that the MNR monitoring termination based on the arithmetic mean concentration of the nine composite samples from the entire SSA area is not appropriate. The Feasibility Study report states that MNR would be used to reduce the concentration to sediment PRG (30 ng/kg $TEQ_{DF,M}$) in the SSA area, which suggests that MNR should focus on areas in the SSA with concentrations greater than the PRG considering the fact that the mean $TEQ_{DF,M}$ concentration in the sand separation area has been below 30 ng/kg since 2010 before ROD was issued (Section 6.5 in the plan). The TCEQ supports the approach proposed in the 30% design focusing MNR monitoring on the area around SJSSA06, SJSSA08, and SJNE032 with dioxin concentrations greater than 30 ng/kg $TEQ_{DF,M.}$. The polygons on Figure 1 which are already below 30 ng/kg $TEQ_{DF,M}$ in all depth intervals may be monitored at lower frequency to ensure that those areas remain below the cleanup level, but those clean areas should not be averaged with the locations of known contamination.

Please let me know if you have any questions.

Sincerely,

Katie Delbecq

Katie Delbecq, P.G., Project Manager
Superfund Section
Remediation Division
Texas Commission on Environmental Quality

KD/dl

Harris County
Pollution Control
Harris County Pollution Control Services
Dr. Latrice Babin, Executive Director

Established in 1953

Comments on Health and Safety Plan

Section	Comment
General	Throughout this document, it appears that all active verbs have been replaced with weaker discretionary forms. For example, "will be" has been replaced with "may be", "shall" by "should", and "is recommended" for "must". We expect that this was done to allow the remediation contractors some flexibility, but what results is a plan stating that health and safety activities will be almost entirely discretionary, with the discretion exercised by unnamed persons and unnamed contractors. For example, the plan states "it is recommended that safety equipment be made available for use by Site personnel." We recommend that the active, non-discretionary verb forms be used and that any required flexibility be obtained through the revision process. The plan needs to identify the specific activities that will be performed and who is going to be responsible for each activity. The project coordinator and site supervisor need to be named.
General	The Emergency Response Plan refers to a "health and safety officer". Why are they not mentioned here?
General	As written, this plan is incomplete as it does not discuss specific hazards.
General	These plans do not appear to consider potential health and safety or emergency impacts of site activities on nearby business, residents, and recreational activity.
1.5	Who has overall responsibility for health and safety?
1.5	What qualifications are required for the site supervisor?
1.7	The site-specific training should be required.
3.1.4	Will secondary containment be required for flammable liquids?
3.2.1	Heavy equipment brought to the site should be in clean and working condition Seat belts should be provided and used on heavy equipment All overhead hazards should be identified in the JSAs.
3.2.3	Utility one-call phone number should be listed.
3.2.10	Is crane operator certification not required?
3.2.19	Will lightning detectors be required?
4.	The minimum required PPE for the site should be stated.
5.	The noise and air monitoring plan needs to be detailed here due to its impact on remediation workers. They should not be expected to consult the site wide monitoring plan.

6.3	Decontamination must be required.
Table 1	This table is one of the most important of the document, but is incomplete

Comments on Emergency Response Plan

Section	Comment
General	In many places, it appears that active verbs have been replaced with weaker discretionary forms. For example, “will be” has been replaced with “may be”, “shall” by “should”, and “is recommended” for “must”. We expect that this was done to allow the remediation contractor(s) some flexibility, but what results is a plan stating that emergency response activities will be largely discretionary, with the discretion exercised by unnamed persons. We recommend that the active, non-discretionary verb forms be used and that any required flexibility be obtained through the revision process. The plan needs to identify the specific activities that will be performed and who is going to be responsible for each activity. The site supervisor and health and safety officer need to be named.
6.	The evacuation routes from each work area need to be specified. These can be revised as the project progresses, but it is not sufficient to decide them at the time of an emergency.
Table 2	It is not clear where this table fits in.
6.2	Site compounds with high toxicity should be identified.
10.	Elements of this section also belong in the HASP.

Comments on Transportation and Off-Site Disposal Plan

Section	Comment
General	In many places, it appears that active verbs have been replaced with weaker discretionary forms. For example, “will be” has been replaced with “may be”, “shall” by “should”, and “is recommended” for “must”. We strongly recommend that the active, non-discretionary verb forms be used and that any required changes be handled through the revision process. The plan needs

	to identify the specific activities that will be performed and who is going to be responsible for each activity. The site supervisor needs to be named.
1.	The TODPs for the RC(s) should be consistent with this overall plan, which may be amended.
2.	Delegates for the generator's signatory authority should be identified in an amendment prior to work initiation.

Comments on Monitored Natural Recovery Plan

Section	Comment
General	Given that sediments within the Sand Separation Area already meet the clean-up level of 30 ng/kg $TEQ_{DF,M}$ to a depth of 60 cm, the proposed approach of two years of post-remedy-completion monitoring demonstrating compliance is reasonable.
General	The document should reference the specific reports where detailed relevant prior monitoring results can be found.
5.2	The relevance of the Beach Area is unclear. The plan says it applies to the Sand Separation Area. However, Section 5.2 discusses samples collected during the RI from the Beach Area, which is adjacent to the Sand Separation Area. Does the plan also include the Beach Area?
5.3	Section 5.3 discusses the sampling results from the 2019 Second Phase Pre-Design Investigation, but detailed results are not included. It would be very helpful to include a tag map showing the results from this investigation.
6.1	The document references Figure 6.1 but no Figure 6.1 was included in the plan.
6.5	The report states "*Five years is recommended by ESTCP (2009) as the minimum amount of time to document long-term stability of MNR as a remedy. As discussed in Sections 5.2 and 5.3, data from the RI and PDI-2 indicate that mean* $TEQ_{DF,M}$ *concentrations in the SSA have been below the clean-up level of 30 ng/kg* TEQDF,M *since 2010. With the current schedule for the Northern Impoundment RA, post-remediation monitoring is not expected to begin until approximately 2030. The two post-remediation monitoring events will provide over 20 years of sediment data for the* SSA." However, per Sections 5.2 and 5.3, the Sand Separation Area was not sampled until 2019, not 2010. The document should be revised accordingly.

Memo

Date: Thursday, March 10, 2022

Project: San Jacinto River Waste Pits Superfund Site

To: Trae Camble, Kelli Gallagher

From: Michael Musso, HDR

Subject: **Pre-Final (90%) Remedial Design - Northern Impoundment Staged Deliverables Submittal Review**

At the request of the Port of Houston HDR has reviewed the Pre-Final (90%) Remedial Design (RD) – Northern Impoundment (NI) Staged Deliverables Submittal (as downloaded pdf from the USEPA project website). Four documents, dated January 17, 2022, have been submitted by GHD on behalf of International Paper Company (IPC) and McGinnes Industrial Maintenance Corporation (MIMC), as part of the NI 90% remedial design. The following Plans were submitted by GHD and reviewed by HDR:

1. **Health and Safety Plan (HASP)**

The HASP document is labeled as Attachment 1 and is 32 pages in length. It starts on Page 4 of the PDF and contains an emergency contact list, the name and address of the nearest local hospital and is broken down into nine sections with one Table. The following is a summary of the information presented:

Section 1- Introduction – this section consists of the following sub-sections: Background, Purpose of the document, Stop Work Authority, Personnel Requirements, Project Management and Safety Responsibilities, Site HASP Amendments, and Training Requirements. **HDR notes that updates to responsibilities and personnel will likely be needed at the 100% RD stage. It is understood that when the remedial action is bid, selected subcontractors' H&S information will be coordinated and assessed by the PRP, including training and safety records (this is acknowledged in the HASP).**

Section 2 - Work Site Operations – this section consists of a bullet list proposed scope of work for the NI. **It is noted that updates to the scope of work will need to be refined based on the final approved NI remedial design.**

Section 3 - Hazard Evaluation – this section consists of a detailed evaluation of possible chemical, physical, and biological hazards that could be associated with the site during site preparation, remedial activities in the NI (handling of wastes during dredging / excavation, dewatering, and sampling), decontamination, and other activities. Hazard evaluation, communication, and best practices are included for these hazards. Sub-sections on heavy equipment safety, working near water, boating safety, and excavations (trenching, shoring) are included.

Section 4 - Personal Protective Equipment (PPE) – this section briefly notes the concept of levels of protection and the requirements for up/down grading the levels during remedial work. It is implied that levels of protection may vary across different tasks associated with the NI remediation.

Section 5 - Air Monitoring – this section describes when Air Monitoring will be implemented and what the data collected will be used for. **It is noted in this HASP section that NI air monitoring requirements are outlined in the Site-Wide Monitoring Plan (SWMP).**

Section 6 - Work Site Controls – this section details site communications, work site security, and decontamination procedures.

Section 7 – Emergency Procedures – this section describes the procedures to be followed in the instances of: Onsite Emergency; Incidents, Injuries, and Illness; emergency equipment/first aid; site evacuation; and spill and release contingencies. The Emergency Response Plan (ERP) is cross-referenced.

Section 8 – Recordkeeping – this section details information that the Site Supervisor will be responsible for collecting and documenting.

Section 9 – References – this section lists the 2018 AOC. **It is recommended that the applicable OSHA statutes noted earlier in the HASP be listed.**

HASP Comments and Notes:

- *No project specific Contacts have been provided in the Emergency Contact Sheet. It is understood that contacts- and other sections of the HASP - will be populated/updated subsequent to the 100% remedial design being accepted by EPA.*
- *Table 1 lists chemical / exposure / health criteria for dioxins and furans (main NI COCs). It is recommended that other contaminants that may be encountered (PCBs, metals, SVOCs) also be included based on RI data.*
- *Based on the current schedule for remedial action, EPA should confirm if information for COVID-19 should be added, perhaps under Sections 1.4 or 6.*
- *The HASP is generic and does not at this time provide specific detail to the approved designed which may influence the scope of the remedial action (i.e., site-specific remedial action hazard, worker safety, PPE upgrade threshold, etc.).*

2. Emergency Response Plan (ERP)

The ERP is labeled as Attachment 2 and is 19 pages in length. It contains two tables embedded in the text. The following is a summary of the information presented:

Section 1 – Introduction – This section provided a general introduction to the project and states that this plan will be updated by each Remedial Action (RA) contractor. Major incidents that may require emergency response could include severe weather, fire, explosion, chemical reaction, truck rollovers, off-Site accidents involving transport vehicles, spills or other incidents that may pose a hazard to on-Site personnel and nearby residents and/or the environment.

Section 2 – Pre-Emergency Planning – this section describes that coordination and notification procedure that will be employed during the planning stages of the RA for the NI. Outside parties are noted (USEPA, Harris County, Channelview Fire Department, National Response Center, TCEQ, Texas Railroad Commission, TxDOT, US Coast Guard, and Port Houston), and should be confirmed by EPA. It also includes an embedded *Table 1* with a list of Emergency Contacts for the Project. **A complete list of current contacts – inclusive of outside agencies and landowner – will need to be compiled and confirmed prior to remedial action.**

Section 3 Emergency Recognition and Prevention – this section describes the methods and procedures that will be employed to recognize and prevent or minimize the adverse effects of any releases of hazardous substances that could occur during NI remedial action. Emergency Recognition and Release Prevention Measures are included as sub-sections.

Section 4 – Personnel Roles - This section details the various personnel roles/responsibilities, the lines of authority, and communication/notification procedures to be followed by on-Site personnel involved in responses to incidents or emergencies. Roles of Site Supervisor, Health and Safety Officer, and On-Site Personnel are noted.

Section 5 – Severe Weather Preparation – This section describes the steps that will be taken in the event severe weather threatens the Site remediation. Includes the roles and responsibilities of the Site Supervisor and the Health and Safety Officer in preparation (Phase I – IV) for severe weather, and for returning to the Site after the event (re-entry procedure and post-severe weather site inspection). **Sequencing of NI work around hurricane seasons, as will be included in the final NI RD, can be noted in this section.**

Section 6 – Evacuation Route and Procedures – This section describes the procedures to address potential evacuation of on-Site personnel and persons in the vicinity of the work site in the instance of hazardous conditions arising out of spills/releases of substances at the work site. It provides a general guideline but does not provide specifics details as the NI remedial design and logistics are not finalized at this time. No specific routes of evacuation are provided, due to the varying nature and location of work at a given time; however, routes will be discussed during safety meetings (including changes to evacuation routes due to work activities, weather factors, and changing work conditions). An embedded Table 2 is provided that defines Minor and Major Releases. A sub-section is included for Evacuation Procedures.

Section 7 Emergency Work Site Security and Control – This section describes the different work zones (support zone, contaminant-reduction zone, and exclusion zone) and communication systems that will be used in the event of an emergency.

Section 8 – Emergency First Aid and Medical Treatment – This section gives general guidelines on providing emergency medical attention such as what immediate actions should be taken and first aid. Reference to the emergency numbers in *Table 1* is noted.

Section 9 – Emergency Alerting and Response Procedures for On-Site Incidents – This section provides general alerting and response procedures in the event of an emergency at the NI.

Section 10 Personal Protective and Emergency Equipment – This section provides generic guidelines for personal protective equipment (PPE) and emergency response/cleanup/safety equipment in the event

of an emergency. Emergency equipment noted in the Plan includes: air monitoring equipment, emergency response cleanup equipment (spills), and emergency safety equipment (air horn, additional PPE, first aid kits, fire extinguishers). Cross-references to the HASP and Site-Wide Monitoring Plan (SWMP) are included.

Section 11 – Response Follow up – this section provides a brief write-up on actions to be implemented after an emergency response/activation.

Section 12 – References – this section lists the 2018 AOC.

ERP Comments and Notes:

- *The plan is not highly site-specific (based on the final RD) and will be updated by the PRP and remedial contractors before implementation of the RA.*

3. Transportation and Off-Site Disposal Plan (TODP) – North Impoundment

The TODP is labeled as Attachment 8 and is 7 pages in length. It provides the procedures for on-Site management and loading of excavated material from the NI to be sent off-site for disposal during remedial action. It also contains the contemplated transportation routes and measures to be implemented to protect the local communities from impacts potentially associated with T&D. The TODP is divided into eight sections with one Figure. The following is a summary of the information presented:

Section 1 – Introduction – provided a summary of the responsible parties and the purpose of this plan. It also states that this plan should be used in connection with other plans (CQA/QCP, SWMP, QAPP, FSP) that will also be part of the final NI design record.

Section 2 – Roles and Responsibilities – this section broadly discusses the roles and responsibilities of those involved in the disposal activities addressed by the TODP, and should be refined / finalized by the PRP and the remedial contractors prior to mobilization to implement the remedy. Roles identified: Generator, Engineer or Implementing Party's Representative, Remedial Contractor, Transporter, and Disposal Facility.

Section 3 – Compliance with Off-Site Disposal Rule – this section establishes that the waste removed for disposal must be disposed of in compliance with CERCLA Off-Site Rule (OSR) requirements. **It is understood that EPA will review and provide comment on this section.**

Section 4 – Waste Classification Procedures – this section describes the procedures to be developed by the Remedial Contractors. Sub-section presented include: waste stream categories and disposal options; and waste sampling and classification (FSP and QAPP are cross-referenced). **It is noted that the contractors will need to identify in more detail the waste classification procedures and final (selected) disposal options with respect to the different waste streams created from the NI remedial action. This will be finalized subsequent to the final NI RD. It is understood that EPA will review and endorse the final waste profiles for the NI.**

Section 5 – On-Site Management and Loading – this section states that a plan will be developed by the remedial contactors to address the procedures for on-Site management of the Impacted Material and transportation off-Site for disposal. The plan will address truck/container and staging/loading

requirements (i.e., lining trucks and securing loads; control and mitigation of tracking waster beyond work areas). **See above comment, re: plan finalization subsequent to the final NI RD. It is recommended that waste loading / loadout areas and truck staging areas be adequately described in the final NI design. Staging / queuing of trucks waiting loadout should be minimized and kept in accordance with the amount of space available at the NI.**

Section 6 – Transportation – this section states that a plan will be developed by the remedial contractors and will address safety procedures to control access and egress to the work site by vehicles (including signage and the use of flaggers). **See above comment, re: plan finalization subsequent to the final NI RD.**

Section 7 – Document and Reporting – This section states that this plan will be developed by the remedial contractor and will document the requirements related to the management of the Wastes including Waste profiles, manifests, and waste reporting. **See above comment, re: plan finalization subsequent to the final NI RD. EPA should confirm the requirements for filing, tracking, and electronic data submittals for all waste classification data and waste disposal activities; licenses and qualifications for the transportation firms; and licenses for the selected disposal facilities.**

Section 8 – References – this section lists the literature that was referenced/consulted in the development of this TODP. **It is suggested that TCEQ guidance as related to T&D of contaminated material be considered as an addition to the references.**

TODP Comments and Notes:

- *The plan is not highly site-specific at this time and will be updated by the PRP and remedial contractors subsequent to the final NI design.*
- *The supporting plans described in Section 1 have not been submitted for review.*
- *Document does not define waste disposal facilities; however, it states that EPA approval from EPA region 6 will documented prior to off-site disposal.*
- *Numerous plans documented in this submittal will be produced by the remedial contractor and are not available in their entirety for review at this time.*
- *Figure 1 should show a detail of waste loading/loadout areas and truck staging / queuing areas. This information will be evaluated further during the NI RD.*
- *As the NI remedial action may occur over several years, the plan should acknowledge that T&D entities (transportation firms, disposal facilities) and truck routes may need to be modified over time.*

4. Monitored Natural Recovery Plan (MNRP) – Sand Separation Area

The MNRP document (Operations & Maintenance [O&M] Plan) is labeled as Attachment 9 and is 11 pages in length. It contains the technical basis of MNR for the NI's Sand Separation Area (SSA); identifies the parameters to be monitored, the number and locations at which data are to be collected, and the frequency and duration of monitoring; describes the methods for data evaluation; and defines the decision rule for evaluating the effectiveness of MNR. The MNRP is broken down into nine sections. The following is a summary of the information presented:

Section 1- Introduction – this section consists of Background (including the ROD's MNR remediation for the SAA) and the Purpose of the document (the MNRP serves as the O&M Plan for the SSA). It is also stated that this plan will be used in coordination with other NI plans (FSP, QAPP, ERP, SWMP, and Institutional Controls Implementation and Assurance Plan).

Section 2 – Roles and Responsibilities – this section broadly discusses the roles and responsibilities of those involved in the MNR: Project Manager, Project Administrator, MNR Lead, Project Scientist, Field Lead, Project Chemist, and Database Manager).

Section 3 – Regulatory Framework – This section lists the guidance documents that were consulted in the preparation of the MNR Plan. **It is recommended that EPA and TCEQ review these references and provide others if available to reflect the current state of MNR guidance.**

Section 4 – Monitored Natural Recovery – this section provided a discussion of the physical processes (deposition over time; dispersion to a lesser degree), chemical processes (adsorption and other processes; chemical transformation is not expected to be a main component for MNR for the site), and biological process (not expected to be a significant process for MNR at the site) that transform, immobilize, isolate, and/or remove contaminants in sediment until they no longer pose risk to human and/or ecological receptors. Dioxins and furans are the COCs noted.

Section 5 – Considerations in Developing the Monitoring Program – this section documents the considerations that were assessed during the development of the MNRP. It provided a summary of the ROD, the Remedial Investigation and Second Phase PDI (2019), Case study evaluations, receptor risks and the potential for future disturbance. A clean-up level for the aquatic environment of 30 ng/kg $TEQ_{DF,M}$ will be assumed for the SSA. This is based on the clean-up level for sediment for the Northern Impoundment, which the ROD identifies as being protective of both human and ecological receptors. **It is recommended that EPA and TCEQ confirm the following, as presented in the MNRP:**

- **Achievement of an arithmetic mean of 30 ng/kg TEQDF,M for samples collected throughout the SSA will be considered to be protective.**
- **Based on the Operations, Maintenance, and Monitoring Plan (OMMP) for Lavaca Bay (TX) (which provided that monitoring could be discontinued if remedial levels for mercury and polycyclic aromatic hydrocarbons were achieved for two consecutive years), this MNR Plan proposes the same provision. GHD proposes that monitoring of the SSA will be discontinued if the mean concentration of samples collected in the SSA is below 30 ng/kg TEQ for two consecutive years after submission of the Remedial Action Completion Report for the Northern Impoundment. Two (2) sampling events are proposed in the Plan.**

Section 6 – Monitoring Program – This section describes the proposed MNRP sample depths (0-15, 15-30,30-45, and 45-60 cm; compositing is proposed), analytical parameters (dioxins/furans; TOC; percent solids; grain size), sampling frequency (two sampling events following submissions of the Remedial Action Completion Report for the NI are proposed), and data evaluation. These will be used to assess the effectiveness of the MNR over time. **Figure 6-1 (polygons) was not included in the document**. It is noted that post-remediation MNR monitoring is not expected to begin until approx. 2030, based on the NI's overall schedule.

Section 7 – Adaptive Management – this section describes the systematic approach to risk management that incorporates data and information gained throughout the life of a MNR project to define paths forward (e.g., adding or deleting sample locations or depth intervals; employing enhanced MNR; applying sequestering agents to reduce bioavailability; replacing MNR with alternative remedies).

Section 8 – Reporting – this section describes the frequency of the reporting for the MNR project.

Section 9 - References – this section lists the literature that was referenced/consulted in the development of this MNRP.

MNRP Comments and Notes:

- *The supporting plans described in Section 1 have not been submitted for review except for the ERP.*
- *Figures of the SSA should be included (location with NI and channel boundaries; polygons with contemplated sample locations).*
- *EPA should confirm that dioxins / furans are the only COCs to be included in the SSA MNRP.*
- *It is understood that additional data (figures and tables) for the SSA will be provided prior to EPA review of this plan. The proposed approach for sample composting (across locations and depth intervals) should be confirmed.*

Based on the review of these four documents, HDR notes that they appear to include organization, sections, and content that is reasonable and appropriate. However, it should be noted that these plans are relatively generic in nature and will need refinement to address the site-specific aspects of the remedial action once the NI design is approved, contactor(s) have been selected, and the means and methods of NI remedial work have been finalized.

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Response and Restoration
Assessment and Restoration Division
263 13th Avenue South
St. Petersburg, FL 33701

MEMORANDUM

TO: Ms. Ashley Howard
Remedial Project Manager, Superfund Division
United States Environmental Protection Agency

FROM: Susan Snyder, Ph.D., Environmental Scientist, on contract to NOAA
Michel Gielazyn, Ph.D., Regional Resource Coordinator, NOAA

SUBJECT: Natural Resource Trustee comments on Attachment 9 - Monitored Natural Recovery Plan - Sand Separation Area, provided as part of Pre-Final 90% Remedial Design - Northern Impoundment, San Jacinto River Waste Pits Site, Harris County, Texas, January 17, 2022.

DATE: March 25, 2022

CC:

Anne Witherup, NOAA	Katie Delbecq, TCEQ
Heather Biggs, USFWS	Peipey Tang, TCEQ
Denise Ruffino USFWS	Scottie Aplin, TGLO
Lisa Stevens, USFWS	Allison Fischer, TGLO
Taylor Alexander, TCEQ	Shannon Love, TPWD
Michael Cave, TCEQ	Angela Schrift, TPWD

The U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), writes this letter on behalf of the Natural Resource Trustees for the San Jacinto River Waste Pits Superfund Site, including the U.S. Department of the Interior U.S. Fish and Wildlife Service, Texas Commission on Environmental Quality, Texas General Land Office, and Texas Parks and Wildlife Department. The Trustees have reviewed Attachment 9 - Monitored Natural Recovery Plan - Sand Separation Area, provided as Part of Pre-Final 90% Remedial Design - Northern Impoundment, San Jacinto River Waste Pits Site, Harris County, Texas, January 17, 2022, prepared by GHD Services, Inc., on behalf of the International Paper Company and McGinnes Industrial Maintenance Corporation, and offer the following comments and requests. If you have any questions, please contact Susan Snyder, Ph.D., Environmental Scientist, Lynker on contract to NOAA, at 727-420-8301, susan.snyder@noaa.gov.

While the Trustees recognize that Monitored Natural Recovery was selected as the remedy for the Sand Separation Area in the 2017 EPA Record of Decision, the Trustees have concerns about the long-term and short-term protectiveness of the Monitored Natural Recovery Plan for the Sand Separation Area, specifically, the footprint of the Sand Separation Area, historical and ongoing erosion, and leaving dioxin contamination above cleanup levels in place in a tidal environment. Note that the Trustees may consider injuries to natural resources resulting from environmental contamination as part of any future Natural Resource Damage Assessment.

1. **The proposed Monitored Natural Recovery Plan leaves dioxin contamination in site sediments at concentrations above the site's risk-based cleanup level for dioxin in sediment (30 ng/kg $TEQ_{DF,M}$). These cleanup levels were established in the Subject Document and the Record of Decision (EPA 2017) to be protective of both a recreational fisher and for ecological risk. Leaving the dioxin contamination in place may result in ecological risks to receptors.** Surface sediments at locations SJSSA06, SJNE032, and SJNE041 all have dioxin concentrations one order of magnitude above the cleanup level (105, 198, and 121 ng/kg $TEQ_{DF,M}$, respectively). Subsurface sediments at SJNE032 and SJSSA08 are also an order of magnitude above the cleanup level (maximum 349 and 109 ng/kg $TEQ_{DF,M}$ respectively), while subsurface sediments at sample SJSSA06 are two orders of magnitude above the cleanup level (maximum 3,330 ng/kg $TEQ_{DF,M}$).

2. **The Trustees recommend inclusion of sample SJNE041 in the Sand Separation Area polygon (i.e., the area to be monitored).**
   Based on preliminary mapping that NOAA conducted during the review of the Subject Document, the location of nature and extent sediment sample SJNE041 was left out of the SSA polygon. Sample SJNE041 is known to have elevated surface sediment dioxin concentrations (121 ng/kg $TEQ_{DF,M}$) and the site-specific unmixing analysis indicated it has a significant portion (25.2%) of original waste from the Northern Impoundments (Integral and Anchor 2012). In addition, site documents discuss a surface runoff pathway for dioxin contaminated soils in the upland SSA to the location of around SNJE041: "Hydrological flow paths shown in Figure 3-2 indicate that, at least currently, the topography of the upland sand separation area could generate runoff in the northerly direction in that area, resulting in transfer of waste related particulates to the surface sediments in the area of SJNE041" (Integral and Anchor 2013). The official designation of the polygon should reflect the site's nature and extent sampling.

3. **The river surrounding the Sand Separation Area is too dynamic to classify as "net deposition" and to leave contamination for dispersal or expected burial.**
   Based on aerial imagery over time, statements in site documents, and the known erosional potential of the area, it seems unlikely that the SSA is net-depositional over the long-term. Pre-Design Investigation sediment sampling results for the SSA indicate sediment deposition at 4/9 locations, variable deposition at 4/9 locations, and

erosion at 1/9 locations (GHD 2020). These results do not justify a conclusion of "net" or "majority" deposition. Considering site-specific factors including the frequent storm events, hurricanes, planned changes to water control structures up-river, boat traffic, and the adjacent barge operations, the SSA is too dynamic to assume continued sediment deposition and burial of contaminants.

4. **The Trustees recommend using the same sampling protocols as developed for the Northern Impoundment at the Sand Separation Areas.**
   The Trustees do not agree with the plan to composite and calculate an arithmetic mean, which would reduce the maximum number of 45 unique samples down to one result for each sampling event to determine success of the remedy across the entire SSA. This is not how samples from the Northern Impoundment Preliminary 30% Remedial Design (GHD 2020) are proposed to be interpreted. If samples must be composited, at a minimum, the nine unique analytical results for the nine locations of the SSA should be reported and interpreted independently.

5. **The Trustees recommend acknowledgement and discussion of the contaminated upland Sand Separation Area as a source of contamination to the submerged Sand Separation Area in Section 5.7 of the Subject Document.**
   Soil sampling has demonstrated contamination of the upland SSA with dioxins (Integral and Anchor 2012). Pre-Design Investigation sampling of the SSA documented exceedances of the cleanup goal in sediment samples at station SJSSA06 (GHD 2020), just offshore of the highest levels of dioxins measured in subsurface soils on the upland SSA (station SJTS018; Integral and Anchor 2012). The Preliminary Site Characterization Report (Integral and Anchor 2012) describes surface water flows from the majority of the upland SSA as discharging into the river, particularly along the eastern section that borders the submerged SSA polygon (see quote above in Comment 2) and aerial imagery indicates a large portion of the northeast corner of the upland SSA has eroded over time.

   This information, along with statements in the Preliminary Site Characterization Report (Integral and Anchor 2012), suggest a chronic shore-based source of contamination, along with potential for unwanted dispersion downriver.

6. **Request for figures:**
   The Trustees request additional figures to interpret the full suite of sampling results from the Sand Separation Area over time. We recommend these figures also be included for clarity in the 100% Remedial Design.

   A. Standalone Figure 1, received from EPA on March 8, 2021, was helpful, but does not include the nature and extent samples collected adjacent to the SSA (e.g., SJNE041) and does not aid in visualizing the changing shoreline over time. The Trustees request this figure be updated by adding sediment chemistry results from

samples collected adjacent to (not just within) the SSA (i.e., the results presented in Figure 5-5 of the Remedial Investigation Report [Integral and Anchor 2013]).

B. From the information provided in site documents and the use of different basemaps over time, it is very difficult to determine exactly what area surrounding, and including, the SSA was originally upland and is now submerged. This in turn makes comparing sampling locations over time very difficult. A figure that illustrates changes to the upland SSA footprint over time would help clarify exactly which areas contain dioxins above cleanup levels, both historically and currently, and depict erosional/depositional areas over time.

7. Additional Comments:

A. The Trustees do not agree that Lavaca Bay is a comparable case study due to different environmental settings (riverine vs. open-bay) and contaminants (dioxins vs. mercury) as presented in Sections 5.4 and 6.6 of the Subject Document.

B. The Trustees recommend results from the nature and extent surface sediment and sediment core samples collected in the area surrounding the SSA be presented in Section 5.2. These results were presented in both the Preliminary Site Characterization Report (Integral and Anchor 2012) and the Remedial Investigation (Integral and Anchor 2013) but are left out of the discussion of Remedial Investigation data in Section 5.2.

C. Section 1.1, sentence two, should read "EPA selected MNR as a remedy for the SSA that would protect the aquatic environment based on the relatively low concentrations of dioxins and furan in sediment in the SSA *compared to sediments in the Northern Impoundments*…" Concentrations of dioxins and furans are not relatively low when compared to established background as indicated when compared to the site's $TEQ_{DF,M}$ Reference Envelope Value (Figure 4-1a; Integral and Anchor 2013).

REFERENCES:

EPA (2017). Record of Decision, San Jacinto River Waste Pits. Harris County, Texas. EPA ID: TXN000606611. U.S. Environmental Protection Agency, Region 6. Dallas, Texas.

GHD (2020). Preliminary 30% Remedial Design - Northern Impoundment, San Jacinto River Waste Pits Site, Harris County, Texas. Prepared for: International Paper Company and McGinnes Industrial Maintenance Corporation.

Integral Consulting Inc. and Anchor QEA (2012). Preliminary Site Characterization Report, San Jacinto River Waste Pits Superfund Site, Volume I of II. Prepared for: McGinnes Industrial Maintenance Corporation, International Paper Company, and U.S. Environmental Protection Agency, Region 6.

Integral Consulting Inc. and Anchor QEA, LLC (2013). Remedial Investigation Report, San Jacinto River Waste Pits Superfund Site. Prepared for: McGinnes Industrial Maintenance Corporation, International Paper Company, and U.S. Environmental Protection Agency.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 15, 2022

Ms. Ashley Howard
US Environmental Protection Agency, Region 6
1201 Elm Street, Suite 500
Dallas, TX 75270

Sent via email

Subject: Supporting Deliverables to the 90% Remedial Design for the Northern Impoundment, San Jacinto River Waste Pits Federal Superfund Site, Highlands, Harris County, Texas

Dear Ms. Howard:

The Texas Commission on Environmental Quality (TCEQ) has reviewed the Supporting Deliverables to the 90% Remedial Design for the Northern Impoundment of the San Jacinto River Waste Pits Federal Superfund site received on May 31, 2022 and has the following comments.

Field Sampling Plan Comments:

General Comment: The 90% Remedial Design proposes the reuse of cap rock material at the site during or after the Remedial Action. The TCEQ suggests that additional representative sampling of stockpiled cap rock be conducted prior to reuse to demonstrate that it does not have contaminated sediment or soil adhered to it and has not become contaminated by the process of removing the cap rock from the top of the geotextile or geomembrane. Any stockpiled cap rock that is found to be contaminated with waste material above the cleanup level should be sent for disposal rather than reused at the site.

Section 2.1.1: It is proposed that 6 to 8 discrete samples will be collected from each Decision Unit (DU), but it is unclear if all the DUs will have the same number of samples from 6 to 8 or if each DU may have a number of samples ranging from 6 to 8. Figure 2.2 indicates that all the DUs may have the same number of samples. The TCEQ recommends that additional discrete samples (more than the proposed 6 to 8) be collected and incorporated into the composite sample from each DU to be more representative of the potentially heterogeneous concentrations at the post-excavation surface.

Figure 2.4: Given the importance of this figure to implementing the FSP, it should be included as a full-page figure, perhaps 11x17" like other maps and design drawings, so it can be viewed at adequate resolution to read the boring location labels. Additionally, please provide a caption or annotation describing the meanings of each column of the inset table "Additional Feet of Excavation" (e.g., what is the meaning of the "Number" column and why are the depth intervals presented as negative numbers?).

Section 3: Historic Berm Material Sampling: The Pre-Design Investigation sampling events had a limited number of borings collected from the approximate centerline of each historical berm and did not finely delineate the boundaries of contaminated material from clean berm material. The TCEQ suggests that berm material identified for reuse rather than disposal be sampled at a greater frequency. Also, the TCEQ requests that the 100% RD include details of how this material will be excavated and stockpiled while waiting for sample results in a manner that keeps it separate from and uncontaminated by waste materials being excavated nearby. Please note that Texas Risk Reduction Rule requirements for reuse of soil containing Chemicals of Concern (COCs) above background concentrations are addressed in 30 TAC §350.36.

Section 4.3 Sample Analyses: In addition to the chemical analyses in Table 4.1, please list other analyses of off-site fill soil samples that will be conducted, (e.g. particle size, organic matter, pH) or reference Section 31 23 23 of the Technical Specifications where other soil analyses are described.

Table 5.1: The standard analytical TAT given in Table 4.4.4 of the Addendum to the Final 100% Remedial Design- Southern Impoundment submitted to EPA on June 2, 2022, is 3-5 business days for TSS, Metals, and Dioxins/Furans. Please update the standard analytical TAT in Table 5.1 to be consistent or provide an explanation why 3-5 days is available for the Southern Impoundment, but 10-15 days TAT is proposed for the Northern Impoundment water treatment compliance samples. TCEQ suggests that the fastest practicable TAT be chosen to minimize lag in receiving compliance results while discharge is ongoing.

Site-Wide Monitoring Plan

Figure 3.2: Please provide frequency plots for Ambient A, B, and D in addition to Ambient C as this is relevant to interpretation of the ambient data statistics.

Section 3.4.1.2 Data Review: The ambient turbidity data herein was collected from December to March, within the planned excavation season, while the BMP installation may occur outside the planned excavation season (i.e., during hurricane season). The natural water conditions and river traffic conditions that impact turbidity may fluctuate seasonally. Please discuss if there is any uncertainty or bias from using the ambient turbidity data collected in the winter/spring to establish the criteria for work that may be conducted in a different season.

Section 3.4.2 Remedial Action Monitoring Locations: The first paragraph states that the data from ambient velocity monitors shows that the flow around the vicinity of the TCRA cap is along the northern edge in a south-easterly direction and along the eastern edge in a southerly direction. Please provide the relevant ambient velocity data collected in a figure or table to support the conclusion. Additionally, Background Location B appears to be very close to the eastern edge of the BMP installation area, within the area of support boat traffic at the site during BMP installation. Please provide the minimum distance expected from Location B to the eastern BMP installation area and provide rationale/justification for the close proximity of this background location to the cap.

Figure 3.3: Add a scale bar and a North arrow to this figure.

Section 3.6 Odors: The first bullet discusses “deployment of odor suppressing foams.” If the use of these foams is necessary, the TCEQ suggests verifying that the foam is free of PFAS/PFOAs.

Please let me know if you have any questions. You can reach me at (512) 239-2505 or Katie.Delbecq@tceq.texas.gov.

Sincerely,

Katie Delbecq

Katie Delbecq, P.G., Project Manager
Superfund Section
Remediation Division
Texas Commission on Environmental Quality

KD/dl

Harris County
Pollution Control
Harris County Pollution Control Services
Dr. Latrice Babin, Executive Director

Established in 1953

June 27, 2022

Ashley Howard
Remedial Project Manager
Superfund and Emergency Management Division
U.S. Environmental Protection Agency, Region 6
1201 Elm Street, Suite 500
Dallas, Texas 75270-2102

Dear Ashley,

Please find the comments below on the San Jacinto River Waste Pits PreFinal 90% Remedial Design submitted by Harris County Technical Advisory Committee. Thank you for this opportunity to provide comments. Do not hesitate to let me know if you have any questions or comments related to the comments below.

Comments on Field Sampling Plan

Section	Comment
2.3	If, in post-excavation confirmation sampling, a composite DU sample exceeds the cleanup level, and one or more discrete samples are identified as the cause of the exceedance, the plan recommends over-excavation of an area only to half the distance to other discrete sample locations. Since there will be no information on COC concentrations between the discrete samples, we recommend over-excavation of the entire distance (not half the distance) between adjacent discrete samples that met the cleanup levels as the only way to verify that the DU-average concentration meets the cleanup level.
2.3	We recommend sidewall sampling as part of post-excavation confirmation sampling to ensure that thin sections of waste will not be left in place at the boundaries between the seasonal cells.

3.	Because it has not been established that the historic berm material is completely free of contamination exceeding the cleanup level, and it will be used on-site for cover and other purposes, we believe that one sample per 1,000 CY may not be sufficient, and recommend one composite sample for every 500 CY, as in the southern impoundment monitoring plan.
5.2	The submittal does not appear to state the discharge criteria that the effluent sampling will be compared to. We note that 30 TAC §319.23 specifies maximum discharge concentrations for metals to tidal waters. Nor does it state what response measures or notifications will be performed if exceedances of discharge criteria are observed, beyond collection of a second sample.

Comments on Site-Wide Monitoring Plan

Section	Comment
3.4.2	The monitoring stations selected do not appear to account for the fact that the flows reverse in this tidal system. Station C is not a suitable location, as it is unlikely that suspended solids released by construction-related disturbance can travel across the entire channel under any conditions except slack tide. It may be an appropriate reference site under flood tide conditions. We recommend moving C across the channel near to the west bank. Station A would not be an appropriate background site under flood tide conditions.
3.4.5	Since the turbidity sondes can be programmed to operate continuously and have telemetry, they should measure, report, and record turbidity every 5 to 15 minutes rather than 2x/day. In addition to absolute turbidity thresholds, the data should be scanned for sudden turbidity increases that may be associated with site actions. The goal here is not to shut down or delay the installation of sheet pile walls, but to optimize practices and controls to minimize sediment resuspension. Particularly during the first week or two of BMP installation, the evaluation should be performed by an independent on-site owner representative who can work with the RC to optimize practices through the adaptive management approach mentioned.

3.4.6	Exceedance of turbidity thresholds should trigger collection of ambient water samples for TSS and COCs, as well as notifications of EPA and TCEQ, and required checks on the proper installation and functioning of the turbidity curtains.

Regards,

Dr. Latrice Babin

Executive Director