

ATTACHMENT 8
COMPARISON AND REVIEW FOR
BENEFICIAL USE

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Comparison and Review for Beneficial Use of GRR New Work Dredged Material for Determination of Least Cost Method

Objective

The purpose of the document is to compare the potential Beneficial Use (BU) site alternative to the recommended plan of upland confined placement to determine as to ascertain what proposal would be least cost. For purposes of this memo, total costs have not been estimated, rather a comparison of the work required for each has been conducted.

Study and Placement Options

Several channel improvement features have been identified as part of the Freeport Harbor Channel Improvement Project – General Revaluation Report (FHCIP GRR) as shown in Figure 1. The current GRR plan places approximately 1.7 MCY of new work material into PA 1.

Potentially viable options in the project vicinity for BU could include either beach nourishment or marsh nourishment. Due to low sand content of the dredged material, only marsh nourishment projects appear viable. For this exercise a potential BU site was identified and shown in Figure 1. The site is located northeast of the project feature at the intersection of Texas State Highway 332 and Casco Road. The site was selected based on its proximity to the dredge site, no data (geotechnical, biological or survey) information has been collected and very limited real estate coordination has been conducted for the site.

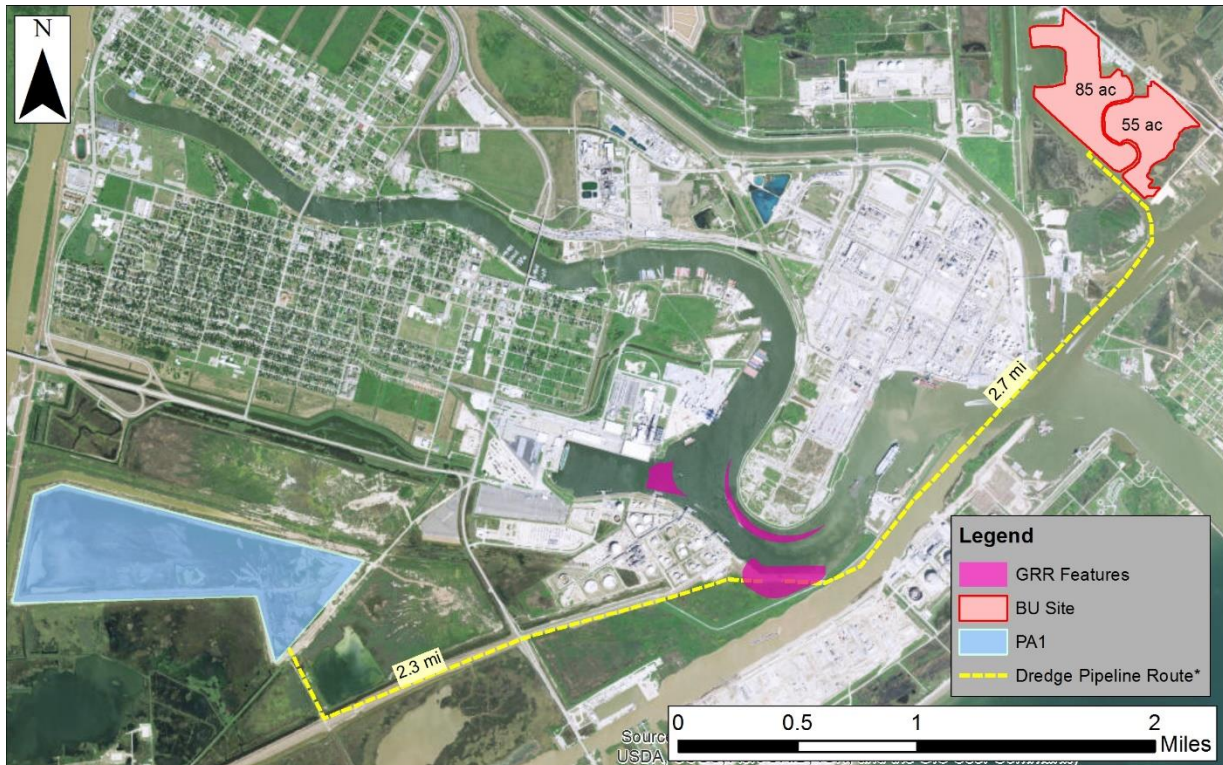


Figure 1 – Project features, placement area, and potential BU site

*Note: Dredge pipeline routes are assumed and may differ with actual pipeline routes.



Work Required for Placement of All Material at PA1

The work required with placement of all new work material at PA1 was estimated by listing all of the necessary activities to create sufficient capacity for placement of the estimate 1.7 MCYs of new work material. The necessary activities include but are not limited to mobilization/demobilization, surveys of the dikes, dike raising earthwork, and pipeline dredging work. The necessary work estimate for placing all new work dredged material in PA1 is itemized in Table 1.

Table 1 – Work Estimate for Disposal of All Material in PA1



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6/12/2017

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**US ARMY CORPS OF ENGINEERS
 FREEPORT HARBOR CHANNEL IMPROVEMENT PROJECT
 GRR BENEFICIAL USE OF NEW WORK COMPARISON - PLACEMENT AT PA1**

CONSTRUCTION ITEMIZATION AND QUANTIFICATION

ITEM	QUANTITY	UNIT
1. Dredge Mobilization / Demobilization	1	LS
2. Construction Surveying - PA1 Levees	1	LS
3. Construction Surveying - GRR Features	1	LS
4. Dredging and Dredged Material Placement to PA1	1,700,000	CY
5. PA Levee Raising	170,000	CY

DEFINITIONS

1. Includes transporting personnel, equipment, supplies and incidentals to and from the site, establish offices, buildings, and other facilities necessary, obtain bonds, required insurance, perform cleanup, and any other efforts necessary.
2. Includes initial and final surveys of the PA levees. It is assumed that surveys are not required for documenting elevations and extents of dredged material discharged within the placement area.
3. Includes initial, interim, and final surveys of GRR features.
4. Includes dredging GRR new work material and placing all material within PA1.
5. Includes raising of levees around PA1. Quantity is estimated assuming 20,310 linear feet of levee with two (2) feet of freeboard and two (2) feet ponding. Levee section is assumed to have a crest width of 10 feet and side slopes of 3H:1V.

The above referenced required work is necessary to accommodate the engineering details for PA 1 as shown in Table 2 below.



Table 2 – Engineering Calculations for PA1

PA1 Levees

Levee Perimeter, <i>ft</i>	20,310
In-Place Dredge Volume, <i>cy</i>	1,700,000
Bulking Factor	1.425
PA1 Area, <i>ac</i>	320
Placement Fill Height, <i>ft</i>	4.69
Levee Cross Sectional Area, <i>sq ft</i>	226
Levee Work Volume, <i>cy</i>	169,697

Work Required for Beneficial Use

The existing elevation within the BU site is unknown. For the purposes of this work comparison, an average fill height of 3 feet was assumed. Based on this fill height the potential BU site can contain roughly 0.7 MCY of dredged material. The remaining 1.0 MCY of new work material needs to be placed at PA1. It was assumed that a containment dike with 3 feet of freeboard would be needed during dredged material placement at the BU site. A natural meandering channel, currently passes through the BU site. In order to retain the existing channel, the BU site was split in to two (2) parcels. The BU site does not have sufficient area to hold all 1.7 MCYs of new work material; therefore, the BU site and PA would be required to be used. No other nearby BU sites have been identified.

The work required with placement of 0.7 MCY of new work material at the BU site and the remaining 1.0 MCY at PA1 was estimated by taking into account mobilization/demobilization, surveys, dike raising costs of PA1, containment dike establishment costs of the marsh, decant structures and pipeline dredging requirements. The necessary work for placement of new work at the BU site and remaining material at PA1 is itemized in Table 3.



Table 3 – Work Required for Including Beneficial Use of Dredged Material



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6/12/2017

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**US ARMY CORPS OF ENGINEERS
 FREEPORT HARBOR CHANNEL IMPROVEMENT PROJECT
 GRR BENEFICIAL USE OF NEW WORK COMPARISON - PLACEMENT AT PA1 AND BENEFICIAL USE**

CONSTRUCTION ITEMIZATION AND QUANTIFICATION

ITEM	QUANTITY	UNIT
1. Dredge Mobilization / Demobilization	1	LS
2. Additional Pipeline Mobilization / Demobilization	1	LS
3. Construction Surveying - PA1 Levees	1	LS
4. Construction Surveying - Marsh Parcels	1	LS
5. Construction Surveying - GRR Features	1	LS
6. BU Site Decant Structures	5	LS
7. Dredging and Dredged Material Placement to BU Site	700,000	CY
8. Dredging and Dredged Material Placement to PA1	1,000,000	CY
9. Marsh Containment Dikes	165,000	CY
10. PA Levee Raising	90,000	CY

DEFINITIONS

1. Includes transporting personnel, equipment, supplies and incidentals to and from the site, establish offices, buildings, and other facilities necessary, obtain bonds, required insurance, perform cleanup, and any other efforts necessary.
2. Includes additional efforts to mobilize pipelines between PA1 and BU site. Also includes activities for end of pipeline management during placement at the BU.
3. Includes initial and final surveys of the PA levees. It is assumed that surveys are not required for documenting elevations and extents of dredged material discharged within the placement area.
4. Includes initial, interim, and final surveys of containment dikes and interior of the marsh parcels.
5. Includes initial, interim, and final surveys of GRR features.
6. Includes installation of structures necessary to dewater the BU site during construction.
7. Includes dredging and placement of material to the potential BU site. Quantity has been estimated assuming an average fill thickness of three (3) feet on the BU parcels shown in Exhibit 1.
8. Includes dredging remaining new work material and placing the material in PA1.
9. Includes establishment of containment dikes around the marsh parcels shown in Exhibit 1. Quantity is estimated assuming 21,100 linear feet of containment dike with three (3) feet of freeboard above three (3) feet of interior fill thickness (total dike height of 6 feet). Dike section is assumed to be trapezoidal, with crest width of five (5) feet and side slopes of 5H:1V.
10. Includes raising of levees around PA1. Quantity is estimated assuming 20,310 linear feet of levee with two (2) feet of freeboard and two (2) feet ponding. Levee section is assumed to have a crest width of 10 feet and side slopes of 3H:1V.



The above referenced required work is necessary to accommodate the engineering details for the BU Site and PA 1 as shown in Table 4 below.

Table 4 – Engineering Calculations for BU Site & PA 1

Marsh Containment Dikes

Dike Perimeter, <i>ft</i>	21,100
Freeboard, <i>ft</i>	3
Average fill height, <i>ft</i>	3
Side Slope	5
Top width, <i>ft</i>	5
Dike Cross Sectional Area, <i>sq ft</i>	210
Dike Work Volume, <i>cy</i>	164,111

Marsh Interior Fill

Nourishment Area, <i>ac</i>	140
Average fill thickness, <i>ft</i>	3
Fill volume, <i>cy</i>	0.7

PA1 Levees

Levee Perimeter, <i>ft</i>	20,310
In-Place Dredge Volume, <i>cy</i>	1,000,000
Bulking Factor	1.425
PA1 Area, <i>ac</i>	320
Placement Fill Height, <i>ft</i>	2.76
Levee Cross Sectional Area, <i>sq ft</i>	117
Levee Work Volume, <i>cy</i>	87,787

Comparison

Table 5 compares the required work which effectively translates into cost requirements for the purpose of this comparison.



Table 5 – Required Work/Cost Comparison

Metric	Upland Placement (PA 1)	Least Cost	Beneficial Use Placement (BU) & PA 1
Sufficient Capacity	Yes	n/a	No, identified BU site can only hold 0.7 MCYs additional non-BU site required. PDT was not able to identify another BU site in proximity.
Construction Surveys	One	PA 1	Two
PA/BU Constructing Mobilization and Demobilization	Once	PA 1	Twice (For BU and again for PA 1)
Dredge Mobilization and Demobilization	Once	Same	Once
Pipeline Mobilization and Demobilization	Once	PA 1	Twice (For BU and again to PA 1)
Pumping Distance	2.3 miles	PA 1	.7 MCY for 2.7 miles to BU site and 1 MCY PA 1 for 2.3 miles to PA 1 = (2.5 miles weighted average)
New Decant Structures	No, existing	PA 1	Yes, five (5) for BU Site
Sensitive Resources	None remaining, covered by previous EA/EIS	PA 1	No evaluation of resources conducted on BU Site, not necessary on PA 1,
Geotechnical Surveys	Conducted and Completed	PA 1	None existing on BU Site, will require investigation
Real Estate Easement	Existing Easement owned by NFS	PA 1	No easement on BU Site, underlying land owned by multiple non-NFS entities
PA 1 Levee Raising (CYs)	170,000	BU	165,000
Marsh Levee Raising (CYs)	0	PA 1	90,000
Bankline Stabilization	No	PA 1	Yes
Least Cost Placement Alternative	YES	***	NO

Conclusion

After a careful consideration and comparison of the required work and specifics to construct the placement area and to discharge the material, it has been determined that the placement of the entire 1.7 MCY of new work into PA 1 would be the least cost placement alternative. While the BU site is a potential placement area it cannot handle the required volume, nor is there any other potential BU area in the proximity for use. Additionally, the cost for acquiring the land for the BU, if able to do so, would likely greatly exceed the cost of the PA 1 recommended plan.