Final BackChecks in Response to Revised USACE Draft Evaluator Responses to the Final Panel Comments

Independent External Peer Review of the Brazos Island Harbor, Texas Channel Improvement Project Draft Integrated Feasibility Report and Environmental Assessment

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LIST OF ACRONYMS

BCR	Benefit-cost Ratio
BSC	Brownsville Ship Channel
EA	Environmental Assessment
ER	Engineer Regulation
FR	Feasibility Report
NED	National Economic Development
PDT	Project Delivery Team
PL	Public Law
TSP	Tentatively Selected Plan
USACE	United States Army Corps of Engineers

Final Panel Comment 1

The NED benefits may be overestimated because they include benefits from pass-through commodities whose benefits would accrue to Mexico rather than the United States.

Basis for Comment

Benefits from deep-draft navigation projects are derived mainly from transportation cost savings or from higher net income to commodity users or producers during the economic period of analysis (USACE, 2010; p. 20). In evaluating benefits related to enlarging the Brazos Island Harbor channel, NED benefits should reflect those benefits that accrue only to U.S. commodity users or producers; they should not include benefits that accrue to Mexico's commodity users or producers. Increases in Mexican trade from port deepening should be reflected as Regional Economic Development benefits, not the NED benefits.

The Draft Integrated FR/EA notes that the present and future Brazos Island Harbor deep-draft commodity traffic consists mostly of imports that pass through Brazos Island Harbor bound for Mexico. Because NED benefits should accrue to the United States, transportation savings associated with traffic to or from Mexico should not be included. The report does not quantify the Mexican traffic or the transportation savings associated with the benefits reported. The BCR for the project (excluding Section 6009 benefits) is close to unity. If benefits associated with Mexican trade are excluded, and project benefits are reduced as a result, the TSP may not be justified. If the Mexican-related benefits are significant, their elimination could result in a shallower or even no depth increase upstream from Keppel AmFELS, which could result in a single-owner situation for the channel to Keppel AmFELS.

Significance – Medium/High

Without Mexican trade-related benefits, the TSP may not be justified.

Recommendation for Resolution

1. Provide the benefits by channel depth associated with U.S. origin/destination and those associated with Mexican origin/destination.

PDT Draft Evaluator Response (FPC#1):

Non-Concur

Explanation: The USACE Deep Draft Navigation Manual and other USACE regulations require the calculation of deep-draft navigation benefits to be based on reduced transportation costs, as explained in ER 1105-2-100, Appendix E, paragraph E-10, which is being provided under separate cover. As the benefits include transportation cost savings for travel to the Brazos Island Harbor channel, those are appropriate to be included in the NED calculation. Thus, the benefits are appropriately calculated with those commodities that are in-transit cargoes to Mexico.

In addition, the USACE guidance does specify the incidence of navigation benefits, as stated on page 42

of the National Economic Development Procedures Manual, which is provided under separate cover. Further, HQ has previously allowed that "in-transit" cargos at BIH are a valid NED benefit and that Corps guidance does not address incidence of benefits, as provided in the Project Guidance Memorandum provided under separate cover.

Finally, the single-owner situation does not apply at the Port of Brownsville because the Port is a public non-federal owner of the property that leases land to Keppel-AmFELS, as shown in the Port documents provided under separate cover. According to ER 1165-2-123 (also being provided under separate cover), when the property owner is a public non-federal entity, the entity will not be considered as a single owner or single entity for navigation projects.

Recommendation #1: Not adopt

Explanation: The benefits for the in-transit cargo have been appropriately calculated and displayed in accordance with USACE guidance, including ER 1165-2-123.

Panel Draft BackCheck Response (FPC#1):

Non-Concur. The Panel is relieved by the 22 February revelation that the Keppel Amfels facility is owned by the port authority because, as noted in paragraph 5.b of ER 1165-2-123, this avoids a single-owner situation. The Panel's concern was that traffic to docks above Keppel Amfels would have to be justified to the same depth as at Keppel Amfels to avoid a single-owner situation.

The Panel notes that despite the documents provided on 21 February, 2014, none explicitly resolve the question of Mexican traffic constituting NED benefits. Because the single-owner issue has been resolved, this concern has far lesser significance. However it still affects the potential for incrementally justifying the channel depths above Keppel Amfels.

The Panel fully understands the USACE's methodology for computing navigation benefits. And that was never an issue. Our concern was whether transportation savings accruing to Mexican traffic can be counted as NED benefits.

Commerce into and out of Mexico through the port contributes to regional economic development benefits by creating local jobs to handle the landside volume of traffic.

As for national economic development benefits, USACE guidance clearly indicates that they are those that accrue to the nation. This is specified on pages 1-2 and 1-3 of ER 1105-2-100 wherein paragraph 2.(b) states "Contributions to national economic development (NED) are increases in the net value of the **national** output of goods and services, expressed in monetary units. Contributions to NED are the **direct** net benefits that accrue in the planning area [Brownsville] and the **rest of the Nation**. Contributions to NED include increases in the net value of those goods and services that are marketed." Paragraph 7(a) reinforces this and states, "The national economic development (NED) account displays changes in the economic value of the **national output** of goods and services."

Reduced transportation cost savings of goods going to or coming from Mexico do not accrue to the United States. They accrue to Mexico. The United States is paying for the channel improvements that provide reduced transportation costs and Mexico is receiving those benefits. Perhaps an exception may apply to maquiladora-associated traffic to Matamoros as mentioned in section 5.3.4 of the Economic Appendix. This traffic represents an unspecified amount of Mexican traffic referenced in sections 5.3.1&2 that discuss petroleum product going to inland markets in Mexico for consumption.

From the USACE's website, page 35 of National Economic Development Procedures Manual - Overview Manual for Conducting National Economic Development Analysis (IWR Report 91-R-11) addresses the issue directly in stating:

"It has long been recognized that foreign interests may benefit substantially from improvements to our Nation's coastal ports. These benefits are never quantified in or considered in the decision process--not because they are not real economic benefits, but because from the national perspective, we are unconcerned about benefits in other countries."

Final Panel Comment 2

The accuracy and acceptability of the benefits of deepening beyond Keppel AmFELS could not be evaluated because information on the Brazos Island Harbor's upstream terminals and the depths needed at those terminals is not provided.

Basis for Comment

Section 6009 allows proprietary shielded data to be included in calculating project benefits. This allowance provides ample economic justification for deepening the channel to 52 feet from the mouth of the channel up to the Keppel AmFELS terminal. However, there is insufficient data to evaluate the benefits associated with the Port's terminals that are upstream of Keppel AmFELS, including what depths are needed to achieve optimum NED benefits.

Without individual terminal arrival and departure statistics for depth-restricted vessels over the past few years and for the future fleet, it is difficult to determine if there is economic justification for deepening to 52 feet for ships that use the portions of the project above Keppel AmFELS. Additional information, such as the terminal depths at either the port of origin and/or previous port of call for vessels importing materials to Brazos Island Harbor or the terminal depth at ports of destination for exports, is needed to show that Brazos Island Harbor currently limits the depth at which these vessels can operate.

The extent of 52-foot-deep channel deepening needed beyond Keppel AmFELS is unclear because of the following statement in Appendix L, Plan Formulation (p. 38):

> "The largest vessel expected in the future is a tanker with dimensions of 793 feet by 138 feet by 46 feet, but this would only come in a maximum of three times a year, and represents less than 3 percent of the deep-draft vessel fleet forecasted."

A ship this size, even if fully loaded, presumably would have spent some of its fuel and thus would arrive at less than design draft. However, even if it were to arrive at its design draft, it would have a 6-foot underkeel clearance, which appears to be greater than the normal rule of thumb (10% of the draft) used as a minimum draft at other ports.

It is also unclear why a 10-foot deepening is needed when only one of the existing terminals has a berth equal to the authorized channel depth. Table 4-1 of Appendix A (Economic Appendix) shows that only Dock 15 has a 42-foot-deep berthing area. This could indicate that the full potential of the harbor is not being achieved under the without-project condition, which could skew the assessment of benefits claimed with a channel deepening. Additional information provided by the USACE after its mid-review teleconference with the Panel (which was facilitated by Battelle) was not dock-specific and leaves questions regarding where the few ships drawing the most water (39 feet) dock.

Finally, a 52-foot-deep Brazos Island Harbor channel would be the deepest throughout the Gulf of Mexico, and yet it would remain one of the smallest ports in terms of commodity throughput. If larger ports do not need a 52-foot channel, a channel of this depth for Brazos Island Harbor may be difficult to explain.

Significance – Medium/High

If the channel depth above Keppel AmFELS does not optimize at 52 feet, a 52-foot channel to Keppel AmFELS becomes a single-owner situation that shifts the cost sharing for the increased depth to Keppel AmFELS and results in a lesser-depth federal channel.

Recommendations for Resolution

1. Provide “port-pair” data for existing traffic.
2. Provide present design and load drafts by terminal for the most recent 2-year period.
3. Provide transportation savings by terminal for future with-project conditions.
4. Provide the underkeel drafts used in the analysis for the design ship.
5. Provide a letter of commitment from the port stating what berths it intends to deepen and to what depths.
6. Provide assumed load factors for the future with-project fleet.

PDT Draft Evaluator Response (FPC#2):

Concur

Explanation: Additional information will be added to the report to confirm the depth along the entire channel.

Recommendation #1: Adopt

Explanation: The report will include port-pair data for the most recent three years of traffic.

Recommendation #2: Adopt

Explanation: The report will include design and load drafts by terminal for the most recent three years of traffic.

Recommendation #3: Adopt

Explanation: The report will include an incremental analysis for each vessel class for future with-project conditions.

Recommendation #4: Adopt

Explanation: The underkeel clearance is assumed to be three feet, which will be included in the report.

Recommendation #5: Adopt

Explanation: The report will provide additional information regarding the associated costs, to include the depths at each berth the port intends to deepen.

Recommendation #6: Adopt

Explanation: The report will include the assumed load factors used in the with-project fleet.

Panel Draft BackCheck Response (FPC#2):

Concur

Final Panel Comment 3

The validity of the HarborSym model application cannot be determined because it is not clear what dock-specific future fleet ship drafts, vessel distribution, and loaded and unloaded drafts were used.

Basis for Comment

HarborSym is the model used to determine the transportation cost savings and thus is the key to determining the TSP. A clear understanding of the model input is critical because of the TSP's relatively low BCR.

Although supplemental information regarding the HarborSym model was provided, certain fundamental questions that could affect the validity of the results remain unanswered. For example, the Draft Integrated FR/EA does not clearly describe whether vessel drafts were determined by the model or provided as input to the model. Tables 6-5 and 6-10 of the Draft Integrated FR/EA show a range of drafts for various size categories, but neither the Draft Integrated FR/EA nor the supplemental information explains the specific drafts assigned to various vessel classes under loaded and unloaded conditions.

It appears that only one vessel speed (5.5 knots) (Appendix A, Economics, p. 64) was used on the interior channel (beginning with reach 5). It seems reasonable that larger ships, which occupy a greater cross-sectional area of the channel, might travel more slowly due to resistance and/or to minimize waves and suction that would affect moored vessels. Further, the varying width of the interior channel is not discussed in terms of impact on vessel speeds. It is not clear whether one speed was assigned to all reaches, whether prototype data were assigned, or whether there was a speed distribution. If the latter was used, there is no discussion in the Draft Integrated FR/EA of how the distribution was derived.

Because the Draft Integrated FR/EA has proposed a finite channel extension of the proposed deepening, HarborSym should account for traffic to docks along the deepened route. Dock-specific data are not provided, and the calling ships' design drafts, load distributions, or tug assistance are not discussed. Without this information, the economic justification of the specified channel extension cannot be confirmed.

Under the alternatives presented, there would be a transportation cost increase under the future with-project condition to handle larger ships in an undeepened turning basin. Ships would require a design draft of at least 48 feet to fully utilize a 52-foot-deep channel. To turn around in the turning basin, they would have to unload to 33 feet. The Draft Integrated FR/EA does not discuss (1) whether these ships would unload that much, (2) how they would be assisted in the turning process, or (3) because of such a large "sail" exposure, what wind conditions at what frequency would curtail their movement.

Normally, the largest transportation savings are obtained by more fully loading a given ship or by realizing economies of scale associated with the open-ocean leg of a voyage. However, the Draft Integrated FR/EA appears to discuss only the harbor portion of the benefit analysis. The relationship of the at-sea benefits versus the harbor benefits is not discussed.

Finally, the Draft Integrated FR/EA (p. 68) states that the HarborSym model accounts for uncertainties, but the report does not adequately discuss how uncertainties are factored into the model.

Significance – Medium/High

Without this information, the economic justification of the specified channel extension cannot be confirmed.

Recommendations for Resolution

1. Describe the input data for HarborSym in more detail.
2. Present in the Draft Integrated FR/EA total transportation savings by dock, including vessel wait time and associated waiting costs.
3. Elaborate on how the model accounts for risk and uncertainty.
4. Discuss the nature of the ship speed distribution used in the model, and describe how it accounted for varying channel width under each alternative.
5. Describe the restrictions the model placed on individual docks in terms of berthing depths and vessel assistance, and explain how those restrictions changed under the future with-project conditions.
6. Provide an approximate percentage of benefits that the model generated for the harbor portion of the origin-destination transportation cost savings.
7. Explain how HarborSym accounts for the bank and bottom suction for various size ships and for alternative channel depths and widths.
8. Explain how the model accounts for vessel assistance as a function of ship size and load, by alternative.
9. Discuss how the model treated ship movements in the turning basin with regard to light loaded drafts, tug assistance, and wind restrictions.

PDT Draft Evaluator Response (FPC#3):

Concur

Explanation: Description will be added to section 6.1 Methodology on the inputs to the Harborsym model. Separate tables with at-sea versus in channel benefits will be added. Harborsym inputs are contained in part in the vessel call lists described in section 6.3.7 of Appendix D. A table presenting an example aggregate vessel call list will be added. Vessel call lists contain historical fleet distributions from data sources such as WCSC and pilot logs. Future vessel call lists reflect adjustments to the fleet mix and commodity mix based off forecasts presented in table 5-16 5-17 and 5-18. The Monte Carlo simulations for each scenario pull from projected fleet mixes to decide which fleet mix and commodity mix combination under different scenarios to run through the physical descriptions in section 6.3.5 and in Model documentation. Route group distances are pulled from 6-4 and are not assumed to change in the different project scenarios. Vessel mix utilized for different depth and width scenarios calculate the transit times for selected scenario. Exact vessel call list tables cannot be published due to their similarities to historical proprietary data.

Recommendation #1: Adopt

Explanation: A visual depiction of the vessel call list will be included to describe the concept.

Recommendation #2: Adopt

Explanation: Separate tables with at-sea versus in channel benefits will be added.

Recommendation #3: Adopt

Explanation: A historical sailing draft distribution will be better represented in table 5-12.

As a Monte Carlo simulation model, HarborSym simulates several iterations of possible inputs combinations; such as vessel size, cargo type etc. The likelihood of the simulation outcomes relative to the simulation inputs contained in the vessel call list are related to historical record where as other inputs such as route distances is assumed to be normally distributed. The risk lies in combinations of low-end inputs from one or more characteristics and the effect of the event on the overall outcome. The risk of compounding outputs on the outcome is aggregated across all possible outcomes.

Recommendation #4: Adopt

Explanation: A table will be included depicting benefits at sea and in channel for the TSP. The analysis assumed no significant benefit impacts to vessels due to their time in channel. If crowding or congestion was an issue, this assumption would not to hold. Vessel speeds are based on information from the Pilots and end-users. No distribution around vessel speeds is provided under the assumption that widths will not impact wait time or congestion due to no congestion issues currently or expected in the future. In channel vessel costs are small compared to at-sea vessel costs. The channel width benefits will be impacted by the vessel fleet mix and a new vessel fleet at sea savings. As congestion is not a concern, vessel speeds are not expected to exacerbate any large vessel wait times.

Recommendation #5: Adopt

Explanation: The report provides the dock depths for the current/without-project condition. An additional table will be included that provides the dock depths for the with-project condition that was used in HarborSym.

Recommendation #6: Adopt

Explanation: The report will include an incremental analysis for each vessel class for future with-project conditions.

Recommendation #7: Adopt

Explanation: The model inherently takes into account the vessel sizes and channel width and depths and does not need to be explained further.

Recommendation #8: Adopt

Explanation: BIH is a relatively straight channel with no reported issues. Vessel assistance is not a common occurrence at BIH and thus is not included in the model analysis. However in a scenario where vessel assistance was needed, the model can account for it by adding a rule to the in channel dimension

and VOC.

Recommendation #9: Adopt

Explanation: The typical practice of the very large vessels is to unload before utilizing the turning basin then turn on its way out of the channel. A light-loaded very large vessel in the turning basin is not assumed to need tug assistance in the turning basin. Other analysis where tug assistance, light loading and wind restrictions is a common occurrence has been known to count the tug assist savings toward widening. However, for BIH the discussion was omitted to not lead the reader to assume that tug assist was a common practice.

Panel Draft BackCheck Response (FPC#3):

Concur

Final Panel Comment 4

The rationale for recommending a 52-foot-deep channel for the TSP wider than 250 feet above station 64+000 has not been documented, and the difference in project costs for deepening the channel areas beyond 250 feet have not been provided.

Basis for Comment

The constricting width of the existing project is the downstream reach of the interior channel (from station 0+000 to station 64+000), which has an authorized width of 250 feet. This width was used for all alternatives considered in the Draft Integrated FR/EA for the downstream section. Beyond station 64+000, however, all alternatives used the existing project widths that vary from 300 to 400 feet. Given that all vessels visiting Brazos Island Harbor must traverse the constricting width in the downstream section, it is unclear why widths of 300 to 400 feet are necessary above station 64+000. There is no discussion in the Draft Integrated FR/EA of the federal interest, rationale, or justification for continuing the existing project width for any increased depth alternative beyond station 64+000. Although the 300- and 400-foot wide reaches are authorized to a depth of 42 feet, their economic justification at greater depths cannot be assumed.

Significance – Medium

Without providing a rationale for the design (and for the associated costs) of the deepened channel in excess of the 250-foot constricting width, questions remain as to whether there is sufficient justification to incur the additional costs.

Recommendation for Resolution

1. Revise the report to justify channel widths in excess of 250 feet as being a federal responsibility.
2. Document project costs associated with providing a 52-foot-deep channel for widths in excess of 250 feet in the areas above station 64+000.

PDT Draft Evaluator Response (FPC#4):

Concur

Explanation: The Brazos Island Harbor 1960 Planning Report justified the need for 300-foot widths along the Main Channel in specific locations. This report states:

“The greater widths are needed for safer and easier vessel handling in the turning basin and turning basin extension, and to provide an adequate width of fairway to the turning basin in the reach of channel just before and adjacent to the oil terminals.”, “Vessels have difficulty passing the entrance to the Brownsville turning basin extension when vessels are moored at the oil docks. Because of the comparatively small cross sectional area of the channel, large vessels must pass at a slow rate of speed to prevent damage to the moored vessel and wharves for surge action. The very slow speed is not sufficient for steerageway and control of the vessel is difficult, particularly during rough weather.”, and “The 400 ft wide transition

from the jetty channel to the main channel is needed because of strong southeast winds which cause the water in the exposed pass and in the portion of the waterway crossing the Laguna Madre to become very rough and, at times, difficult for navigation."

1990 Design Memorandum reevaluated the 1979 authorized project and did a ship simulation of the entire channel which resulted in the current width recommendations:

"Based on ship simulation studies conducted by WES, the channel width in the entrance channel and the inshore channel reach from the Laguna Madre to Goose Island has been decreased from authorized project dimensions. The entrance channel will remain at 300-foot as opposed to the authorized 400-foot. The inshore reach that was authorized to be widened from 200 feet to 300 feet will be widened to 250 feet. The Report of the Chief of Engineers dated December 20, 1979, recommended that the turning basin be constructed at a 1,000-foot diameter. Based on WES ship simulation studies and recommendations, the project plan provides for a 1,200-foot diameter turning basin."

Based on this 1990 Design Memorandum and its ship simulation, channel construction results in narrower widths along most of the channel than those that had been authorized. This channel design resulted in a more efficient channel than that which was originally authorized. The current 300-foot wide reaches were needed based on the ship simulation for safety and vessel handling along the port facilities.

It is expected that the improved channel will need the same historical clearances as before to eliminate most of the waiting time encountered by vessels unable to pass in the narrow channel and also to reduce the navigational hazards in this reach.

Recommendation #1: Adopt

Explanation: The existing channel widths will not be modified; however, the justification of these historical widths from the past channel studies and design memorandum will be included in the report.

Recommendation #2: Not adopt

Explanation: Justification of these historical widths from the past channel studies and design memorandum will be included in the report.

Panel Draft BackCheck Response (FPC#4):

Non-concur. The references justifying the additional width above station 63+000 are between 24 and 54 years old and addressed a 42-foot channel depth in the 1960s and not a 52-foot depth in today's navigation environment. Given that the design ship beam of 106 feet (see PDT response to FPC#4) is the same used for the 42-foot channel authorization and current channel design criteria call for a maximum of 265 foot in lieu of ship simulation, the Panel is at a loss as to the need for the increased widths of 300 and 400 feet.

If the PDT includes information in the report based on these historical documents, it is suggested that the validity of the recommendations of these documents to the navigation environment that would exist with the proposed deepening be confirmed, especially in the reach between 63+000 and, say, 73+000 where there appears (based on Drawing Number C-03 of Appendix B, Cost Report and Plans) to be no docks. While factors such as safer, easier vessel handling and potential damaging effects on moored vessels are valid concerns supporting a wider channel, some design calculations quantifying vessel

speeds and associated surge effects on moored vessels would be helpful in supporting such claims.

Final Panel Comment 5

The factors and methods used for the risk and uncertainty analysis have not been documented sufficiently to support the design and economic justification of the project.

Basis for Comment

Section 6.8 of the Draft Integrated FR/EA contains a qualitative discussion of risk and uncertainty inherent in certain aspects of the study, including an assessment of the likely impact on the TSP. Other areas of risk and uncertainty appear to have been considered, but they are not documented in the Draft Integrated FR/EA. For example, the Draft Integrated FR/EA states (Section 6.8.3, p. 68) that "the cost and schedule risk analysis report regarding the risk findings and recommended contingencies for TSP are included in Appendix B"; however, the risk analysis is not documented in Appendix B. As a further example, the Draft Integrated FR/EA (Section 6.8.2, p. 68) states that the HarborSym model has risk and uncertainty built into the program as a result of the Monte Carlo simulation process, but does not provide any further explanation or analysis beyond the statement. Additionally, the Draft Integrated FR/EA discusses risk and uncertainty in some of the engineering analyses conducted for the study, including relative sea level rise, shoaling, hydrodynamics, and storm surge; however, risk and uncertainty exist with regard to other aspects of the design of the TSP, such as geotechnical conditions and the design of the recommended channel width.

Some elements of the Economic Analysis (Appendix A) have risk and uncertainty associated with them, including the commodity and fleet forecasts. Appendix A briefly discusses two sensitivity analyses conducted to examine areas of risk and uncertainty; however, the analyses are not discussed in sufficient detail to understand their methodology. A migration to larger ships or more fully loaded ships under the future with-project condition is the basis of the project benefits. The uncertainty and risk associated with this basis are critical because of the project's low BCR.

Significance – Medium

The limited description of the risks and uncertainties associated with key variables of the project affects the understanding of certain engineering and economic aspects of the study.

Recommendations for Resolution

1. Add the cost and schedule risk analysis to Appendix B.
2. Discuss in detail how HarborSym accounts for risk and uncertainty.
3. Elaborate on the sensitivity analyses performed regarding commodity and fleet forecasts.
4. Add quantitative details regarding the risks and uncertainties associated with the engineering data and models.

PDT Draft Evaluator Response (FPC#5):

Concur

Explanation: The document will be revised to better documented risk and uncertainty analysis sufficiently to support the design and economic justification of the project. The cost and schedule risk analysis will be included in the appendices, as well as additional information on risk and uncertainty of engineering data and models. The HarborSym model is the USACE corporate model which has Monte Carlo simulation incorporated into its calculations to account for risk and uncertainty. Additional sensitivity analyses can be completed and included in the final report.

Recommendation #1: Adopt

Explanation: The CSRA, which used Monte Carlo simulation, did not include cost risks for HarborSym. It is assumed that HarborSym has a built-in risk/uncertainty; CSRA does not included this type of risk (historically). We do capture potential programmatic risks, e.g. congressional funding pathways. The CSRA will be included in Appendix B in the final report.

Recommendation #2: Adopt

Explanation: See response to IEPR comment #3

Recommendation #3: Adopt

Explanation: Additional information will be included in the report that explains the sensitivity analyses used for the commodity and fleet forecasts.

Recommendation #4: Adopt

Explanation: Quantitative details regarding risk and uncertainty in engineering data and models will be added to the report for Shoaling, Sea Level Rise, and Storm Surge. At this point there are no other quantitative details regarding risks and uncertainties associated with the other engineering data and models to be added.

Panel Draft BackCheck Response (FPC#5):

Concur

Final Panel Comment 6

The TSP channel width does not conform to channel width design criteria.

Basis for Comment

The width of the Brazos Island Harbor interior channel appears to be under-designed. USACE guidance (USACE, 2006; p. 8.4) indicates that channel widths 2.5 times as wide as the design ship's beam should be adequately conservative. This guidance is based in part on ship simulation modeling. Table 8-1 in USACE (2006) recommends a channel width of 250 feet for a ship with a beam of 106 feet operating in the Brazos Island Harbor channel (channel width:ship beam ratio = 2.4).

The Draft Integrated FR/EA does not provide the beams of ships calling. Page 30 of the Economic Appendix (Appendix A) states that pilots currently restrict beams to 130 feet, although special permission has previously been granted to three very light loaded tankers with beams of 140 feet. These represent channel width:ship beam ratios of 1.9 and 1.8 respectively, significantly less than the recommended ratio of 2.5.

Despite current pilot practice, it is not clear if a federal project whose width is significantly less than recommended design standards established by modeling could be recommended.

Significance – Medium

If a federal project with a channel width significantly less than USACE design standards is not allowed under USACE regulations, the identification of the TSP and the cost of the project could be impacted.

Recommendations for Resolution

1. Provide a summary (or a recent history) of ships expected to traverse the Brazos Island Harbor along with their geometric dimensions.
2. Explain why width:beam ratios significantly less than those recommended by USACE (2006) are acceptable; include modeling or ship simulation results as appropriate.
3. Provide the basis for approving a proposed channel width for authorization that does not meet USACE design criteria.

PDT Draft Evaluator Response (FPC#6):

Concur

Explanation: The three lightly loaded tankers given special permission to transit the Brownsville Channel are not a part of the normal everyday traffic transiting the channel. The normal traffic consists of vessels not exceeding 106 foot width. This falls within the guidelines of design criteria for the channel width. Report shows vessel classification with a maximum beam of 140 foot. However, Harborsym only utilized vessels with the maximum beam of 106 for the TSP. Larger beam vessels are available to Harborsym at other width scenarios yet their inclusion did not justify widening. Too much detail on specific vessel used

can be divulging proprietary data. Aggregated historical vessel information can be found in the Economic Appendix Section 5.5 Bulk Carriers and 5.6 Tankers. It is important to remember that the vessel classification characteristics is not an all-encompassing range of characteristics (i.e. a very large vessel can have a DWT of 60,000+, draft of 47 and only a beam of 106). An asterisk will be added to table 5-10 of the economics appendix to clarify that classifications can fall outside of the ranges listed.

Recommendation #1: Adopt

Explanation: See response to IEPR comment #3

Recommendation #2: Not adopt

Explanation: USACE guidelines recommend starting the ratio of channel design widths to design vessel beam with an initial ratio of 2.5. The ratio 2.5 is a very conservative ratio. Guidance states that this initial estimate should be followed with ship simulations to determine the actual required ratio. Ship simulations have determined the required ratio for BIH to be less than 2.5, and that 2.4 was adequate for the proposed project. A ratio lower than 2.5 is typical of uniform straight canals with small currents. The largest vessel expected in the future is a tanker with dimensions of 793 feet by 140 feet by 46 feet. Vessels utilizing BIH exceeding 106 feet in width are a rare event (less than three percent of the fleet). Those vessels alone could not justify the additional channel width cost.

Recommendation #3: Not adopt

Explanation: The proposed channel widths were not modified and they meet the USACE design criteria. : USACE guidelines recommend starting the ratio of channel design widths to design vessel beam with an initial ratio of 2.5. The ratio 2.5 is a very conservative ratio. Guidance states that this initial estimate should be followed with ship simulations to determine the actual required ratio. Ship simulations have determined the required ratio for BIH to be less than 2.5, and that 2.4 was adequate for the proposed project. A ratio lower than 2.5 is typical of uniform straight canals with small currents.

Panel Draft BackCheck Response (FPC#6):

Concur. However, based on the responses to this Final Panel Comment, the Panel is concerned that inconsistent vessel sizes were used to calculate the depth and width needed for the channel and the vessels used to calculate benefits obtained by this project. The bulk carrier and tanker beam and draft data referenced in the Economic Appendix (Tables 6-9 and 6-10) supports vessels that require >50 foot deep channels, but those vessels have beams too great to use the waterway routinely, which the PDT acknowledges in their responses above. The design vessel noted in the PDT's response says that 106-foot wide vessel was used, which in some simulations equates to a Panama Canal maximum ship (Panama Canal maximum ship dimensions are 965-ft length, 106-ft beam, and 39.5-ft draft). The Panel requests that the report clearly indicate the length, beam, and draft of the future vessel fleet used to calculate the depth and width needs of the channel and benefits such that it is clear what was used.

In addition, the use of a 106 foot vessel as the design ship width appears to conflict with the PDT's response to Recommendation #3 of FPC 6. Reaches 5 and above exceed the conservative design criteria expressed by the PDT as being 2.5. A 106-foot beam vessel would only need a channel width of 265 feet at the conservative ratio of 2.5 and not 300 to 400 feet. During the Comment Response Teleconference facilitated by Battelle and attended by the Panel and USACE PCX and PDT personnel,

the USACE PDT indicated that a ship simulation was not conducted above Reach 5, which is where the Panel is concerned with the lack of justification for a channel width exceeding 250 feet at depths of 52 feet. The Panel believes that if the 106-foot vessel is the vessel of design, additional justification for the 300 to 400 foot channel widths is necessary.

Final Panel Comment 7

The array of alternatives considered is incomplete because it does not take into consideration uniform channel widths throughout the length of the interior channel.

Basis for Comment

The existing project as described in the Draft Integrated FR/EA has an interior channel with "telescoping" widths that progressively increase beyond station 64+000 from the constricting 250-foot width to 300 and then 400 feet. The alternatives described in the Draft Integrated FR/EA as "deepening only" include these existing widths of the wider channel reaches beyond station 64+000. The Draft Integrated FR/EA does not discuss the rationale for including the additional width for these upstream reaches for any of the deepening alternatives. Accordingly, since the Draft Integrated FR/EA does not consider alternatives that have a single, fixed-width, interior channel throughout the length of the proposed project, it does not include a full range of widening alternatives.

Significance – Medium

The failure to evaluate alternatives with uniform channel width could lead to a TSP that is more costly and has greater environmental impacts than is warranted.

Recommendations for Resolution

1. Provide the rationale for maintaining telescoped, wider upstream reaches for all depth alternatives.
2. Revise the Draft Integrated FR/EA to evaluate alternatives with uniform channel widths of 250 feet and greater.

PDT Draft Evaluator Response (FPC#7):

Concur

Explanation: See response to IEPR comment #4

Recommendation #1: Adopt

Explanation: Report will be revised to include justification of widths. See response to IEPR comment #4.

Recommendation #2: Not adopt

Explanation: Widths greater than 250 feet have been justified for safety and vessel handling. See response to IEPR comment #4.

Panel Draft BackCheck Response (FPC#7):

Concur.

Final Panel Comment 8

Benefits claimed by application of Section 6009 of PL 109-13 do not include a statement of their certification, raising a concern over the validity of the analysis.

Basis for Comment

Without a certification of the validity of Section 6009 benefits, the Panel cannot comment on their appropriateness. These benefits are needed to support channel deepening to the Keppel AmFELS terminal. The amount of net benefits and the resulting BCR influence prioritizing of project appropriations. USACE guidance for application of Section 6009 to project benefits requires a statement from the Chief Executive Officer (or equivalent) certifying the validity of the information.

Significance – Medium

Without certification, the benefits claimed under Section 6009 of PL 109-13 may be overstated.

Recommendations for Resolution

1. Provide a statement from the Chief Executive Officer (or equivalent) certifying the validity of the information.

PDT Draft Evaluator Response (FPC#8):

Concur

Explanation: Certification was received regarding the Section 6009 benefits and this will be stated in the report.

Recommendation #1: Adopt

Explanation: Certification was received regarding the Section 6009 benefits and this will be stated in the report.

Panel Draft BackCheck Response (FPC#8):

Concur

Final Panel Comment 9

The impacts of disposing of dredged material from non-federal berthing areas may not have been adequately accounted for in the project construction costs and schedules.

Basis for Comment

The Draft Integrated FR/EA discusses placement of new work material associated with the TSP beginning on p. 50 and shows the costs associated with berth deepening in Table 6.4, p. 59. However, the Draft Integrated FR/EA does not specify a disposal site for the material to be dredged from non-federal berthing areas. If non-federal material will be disposed of in one of the placement areas being used for disposal of new work material from the TSP, there will be costs associated with using the placement area for non-federal disposal; otherwise, the non-federal project costs may be underestimated. Further, the project schedule on p. 60 does not show when during project implementation the dredging of the berthing areas will occur.

Significance – Medium/Low

Project costs and schedules could be adversely affected if (1) a placement area is used for disposal of non-federal dredged material, and (2) the sequencing of non-federal use of the placement area is not properly accounted for in the implementation schedule.

Recommendations for Resolution

1. Clearly describe where the non-federal dredged material will be disposed of. If it will be disposed of in a project placement area, revise the cost apportionment to account for the use of the placement area capacity by non-federal interests.
2. Clearly describe when dredging of the non-federal berthing areas will be accomplished.

PDT Draft Evaluator Response (FPC#9):

Concur

Explanation: The Port of Brownsville is responsible for dredging their docks. The Berthing and Dock Modifications costs of $47,100,000 in Table 6.4 include dredging costs to deepen the dock areas, as well as the costs to improve the facilities (including site preparation, sheet piling and concrete work). It is expected that material from the deepening of dock facilities would be placed in PA 5A and/or PA 8. This dredging of port facilities is expected to be completed during the deepening of the channel at the same time as the adjacent channel improvement and is relatively small compared to the dredging of the Main Channel. The Port will pay the additional incremental cost to place this material removed from their facilities into the PAs, which includes the cost of dike raises. The cost tables include the $47,100,000 in non-Federal Cost.

With regards to maintenance dredging over the 50-year period of analysis, the Port is also responsible for the cost of maintaining their facilities, It is expected that these facilities will be dredged at the same time as the adjacent reach of channel, if needed. The Port would pay the incremental costs of the facilities

dredging. The landlocked reaches of the channel where the Port facilities are located do not have high rates of shoaling. Additionally, the banks of these facilities are basically hardened (sheet piling, etc.) and there is very little erosion and most likely even less shoaling is expected within the dock area. Overall, the quantity of material to be removed at the Port facilities is very small compared to the dredging of the main channel and can easily be included within the PAs without any additional dike raises being needed to accommodate the dock material.

Overall, the costs for disposing of non-federal berthing area dredge material is insignificant compared to the project disposal costs and the 50-year maintenance dredging will be minimal. Historical practice dictates that costs for disposing of non-federal berthing area dredge (new work and operations and maintenance) materials are paid for by the Port of Brownsville as options during Invitation For Bids (for main channel). The total volume of non-Federal berthing area dredged material is insignificant (negligible) when compared to total volume of channel (new work and operations and maintenance) material per geotechnical engineering investigations of incremental dike raises.

Recommendation #1: Adopt

Explanation: The non-federal dredge material will be dredged and placed according to placement area capacity and pumping distance. It is expected that PA5A and PA8 will be used. More detailed description what is included in the associated costs and the general timing and placement of material will be added to the Main Report.

Recommendation #2: Adopt

Explanation: Dredging of the berthing and dock areas will be done with the regular maintenance dredging schedule of the channel. This statement will be added to the Main Report.

Panel Draft BackCheck Response (FPC#9):

Concur

Final Panel Comment 10

The construction schedule for the TSP may not have accounted for the required lag time between completing placement area dike raising and use of the placement area for disposal of new work material.

Basis for Comment

The Engineering Appendix (p. 24) states the following:

> "It is recommended that construction of the raised perimeter dikes be completed a minimum of three months prior to start of channel improvement dredging."

It is not apparent from reviewing the construction schedules in the Draft Integrated FR/EA (p. 60) or the Engineering Appendix (p. 69) whether this lag time has been accounted for in the construction schedule and, if not, whether interest costs during construction will increase.

Significance – Medium/Low

Project costs and schedules could be adversely affected if the lag time following dike raising is not properly accounted for.

Recommendation for Resolution

1. Review the project schedules in the Draft Integrated FR/EA and in the Engineering Appendix to ensure that appropriate lag time following dike raising is reflected in the project schedule.

PDT Draft Evaluator Response (FPC#10):

Concur

Explanation: It is conservative to add a three (3) month settlement period to the schedule for each containment dike as the quality/suitability of side-cast material is unknown.

2. For each recommendation, please indicate whether the PDT will 'adopt' or 'not adopt' the recommendation and provide an explanation. If 'adopt', please provide information on how this recommendation will be adopted. If 'not adopt', please explain why.

Recommendation #1: Adopt

Explanation: The following sentence was added to the Engineering Appendix, Pg. 24; "The construction schedule indirectly includes a settlement period for dikes."

Panel Draft BackCheck Response (FPC#10):

Concur.

Final Panel Comment 11

The cost appendix does not include sufficient information regarding unit prices for various dredging and construction activities to determine if the final cost estimate is accurate.

Basis for Comment

Appendix B summarizes estimated project construction costs. These costs are presented as a series of seven contracts representing phases of the required dredging and dike-raising activities. The cost estimate for each contract is developed using a table that includes construction costs (planning, engineering, and design) and construction management costs. Construction costs combine mobilization, demobilization, and operating costs. However, the cost details do not include unit prices or quantities used as the basis for the cost estimates. Unit prices are needed to evaluate the accuracy of the cost estimates provided.

The Draft Integrated FR/EA (p. 39) shows project costs and dredging quantities. These result in dredging costs of about $24 per cubic yard (cy) for the deepening increment from 42 to 45 feet; $14.7/cy for deepening from 42 to 48 feet; $14.2 for deepening from 42 to 50 feet; and $13.8 for deepening from 42 to 52 feet. While a slight decrease in unit cost would be expected with greater volume to account for mobilization and demobilization, in the case when the placement locations are the same for all alternatives, the huge unit cost decrease from dredging to 48 feet versus to 45 feet is not explained.

Significance – Low

Unit costs are essential to facilitate comparison of estimated project costs to historical data from other projects and locations.

Recommendations for Resolution

1. Revise Appendix B to include more detail on the basis of the cost estimates.
2. Specify unit costs used to develop cost estimates for dredging and construction activities. If unit costs were not used, compute the resulting unit costs resulting from the cost estimates for each contract.

PDT Draft Evaluator Response (FPC#11):

Non-Concur

Explanation: The USACE Cost MDX has full responsibility to validate all cost data associated with this project. Accordingly, the Charge Question regarding cost (#25) was inadvertently included in our list of charges, and therefore, should not be addressed by the panel and no Non Disclosure Agreement is required. The unit cost will not be provided.

Recommendation #1: Not adopt

Explanation: The cost appendix has been developed in accordance with normal practices. No more than three folder levels are shown per Cost MCX Walla Walla. Cost are independently reviewed and certified.

Recommendation #2: Not adopt

Explanation: The cost appendix has been developed in accordance with normal practices. No more than three folder levels are shown per Cost MCX Walla Walla. Cost independently reviewed and certified.

Panel Draft BackCheck Response (FPC#11):

Concur. Per the attached email, the Panel understands that Charge Question #25 should not have been part of the Panel's charge. Therefore, the Panel concurs with the USACE response. As directed in the email they will rely on the USACE MCX to check the cost data as requested in Charge Question #25.

From: Grandison, Johnny L SAM
To: McLeod, Lynn; Johnson-Young, Karen; Willey, Sheridan S SWG; Williams, Byron D SWG; Neubauer, James G NWW
Cc: Grandison, Johnny L SAM
Subject: RE: BIH IEPR - cost question (UNCLASSIFIED)
Date: Friday, February 21, 2014 12:39:28 PM

Lynn: Our cost MCX has full responsibility to validate all cost data associated with this project. Accordingly, the Charge Question regarding cost (#25) was inadvertently included in our list of charges, and therefore, should not be addressed by the panel and no NDA is reqired.

Thanks,

Johnny Grandison, Sr.
DDNPCX Review Manager
(251) 694-3804

Final Panel Comment 12

Details describing how the TSP meets the four criteria in the Principles and Guidelines have not been provided.

Basis for Comment

The Draft Integrated FR/EA (p. 40) and Appendix L, Plan Formulation, state: “Each plan was formulated in consideration of the four criteria in the Principles and Guidelines: completeness, effectiveness, efficiency, and acceptability.” However, neither the FR/EA nor the appendix explains how the TSP satisfies the criteria.

Significance – Low

The completeness of the Draft Integrated FR/EA would be improved if additional information were included to document how the four criteria in the Principles and Guidelines (Water Resources Council, 1983) were met under the TSP.

Recommendation for Resolution

1. Revise Table 5-3 of the Draft Integrated FR/EA to state how the TSP meets each of the four criteria in the Principles and Guidelines.

PDT Draft Evaluator Response (FPC#12):

Concur

Explanation: Each plan has been formulated in consideration of the four criteria in the Principles and Guidelines. These criteria were met under the TSP which the TSP being complete, effective, efficient, and acceptable. Section 5 of the report will be revised to indicate how each of the alternatives in the final array met this criteria.

Recommendation #1: Adopt

Explanation: Either Table 5-3 will be revised to add the criteria and discussion for each alternative or will be added to Section 5 with this information.

Panel Draft BackCheck Response (FPC#12):

Concur

Final Panel Comment 13

The cumulative impacts section does not discuss potential project-induced changes in air quality associated with repair and construction operations at Keppel AmFELS.

Basis for Comment

Sections 7.11.1, Environmental Justice, and 7.12, Cumulative Impacts, of the Draft Integrated FR/EA indicate that air quality in the project area is in attainment and that project construction will not have adverse impacts on air quality. However, the Draft Integrated FR/EA does not discuss the possibility that an increase in construction and repair activities will contribute to air pollution.

The Draft Integrated FR/EA assumes that deepening the Brazos Island Harbor channel will lead to increased repair and new construction activities at the Keppel AmFELS facility, since existing channel depth is cited as an impediment to navigation by both drilling vessels and drilling platforms. Repair and fabrication utilize a wide range of diesel-fueled air pollution-generating devices, including cranes, trucks, lift trucks, and air compressors, as well as welders, grinders, cutters, sandblasters, etc.

The assumed increase in air pollutants may be offset by vessel fleet changes to fewer, larger, and more fuel-efficient ships, but the FR/EA does not recognize the potential for either improved or diminished air quality. Emission inventory data are extant for a broad range of construction equipment from agency reports and equipment manufacturers.

Significance – Low

A discussion of an increase in construction and repair activities as contributors to air pollution would improve the understanding of the project.

Recommendation for Resolution

1. Compare the possible reduction in air pollution (from a more efficient vessel fleet) with the assumed increase in air pollution (from repair and construction activities in the various port facilities, including Keppel AmFELS).

PDT Draft Evaluator Response (FPC#13):

Concur.

Explanation: The Cumulative Air impacts section will be revised to add the following. “Increased air contaminant emissions are not expected with TSP channel improvements. The more efficient use of the deep draft tanker fleet is projected to result in a small decrease in vessel trips, which would result in a small decrease in air contaminant emissions. No increase in the number of oil rigs being repaired or fabricated is projected by the economic analysis, and therefore no increase in air contaminant emissions associated with these activities is anticipated. Should a small unanticipated increase occur, it would likely

be offset by the forecasted reduction in tanker emissions."

Recommendation #1: Adopt

Explanation: Galveston District concurs that the draft report did not address the potential for increased air contaminant emissions associated with rig repair and construction activities. The report will be revised to acknowledge that an unexpected increase might occur, and should that happen, the increase would be expected to be small and likely offset by fewer deep-draft vessel trips. Table 5-19 of the Economic Appendix displays HarborSym vessel trips for rigs that must remove thrusters to enter the channel. The future with-project does expect larger rigs, but took into account yard capacity in projecting vessel trips. It is a conservative projection.

Panel Draft BackCheck Response (FPC#13):

Concur

REFERENCES

USACE (2006). Hydraulic Design of Deep-Draft Navigation Projects. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Manual (EM) No. 1110-2-1613, May 31.

USACE (2010). National Economic Development Manual for Deep Draft Navigation. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. IWR Report 10-R-4. April 2010.

Water Resources Council (1983). Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. U.S. Water Resources Council, Washington, D.C., James G. Watt, Chairman. March 10.