MEMORANDUM FOR: Commander, Mississippi Valley Division

SUBJECT: Independent External Peer Review of Aberrant Barge Impact Loads on Hurricane Storm Risk Reduction System Floodwalls.

1. Reference the Final Independent External Peer Review (IEPR) Report, July 14, 2010 and NAD subject memo dated 02 August 2010, transferring the disposition of the IEPR to the New Orleans District (MVN) through the Mississippi Valley Technical Office, CEMVD-RB.

2. The Independent External Peer Review of Aberrant Barge Impact Loads on Hurricane Storm Risk Reduction System Floodwalls, July 14, 2010, was conducted from January 2010 through June 2010. The independent team consisted of ten (2) Panel Members from two (2) major engineering disciplines; geotechnical and structural. The IEPR effort included an Orientation Briefing, IEPR Conference, and Teleconference.

3. A total of 143 comments were submitted by the IEPR Team. The USACE PDT evaluated each comment and provided a response that included specific revisions that will be made to the Barge Impact Report, as appropriate. This allowed the reviewers to see how the final report will be revised to incorporate their comments.

4. The following comments from the IEPR Report by the reviewers are furnished to highlight what they consider the most important items to be addressed. Comments from the report are reproduced here in *italics* followed by the USACE response.

   (1) Aberrant barges can occur during hurricane and other weather-system events that can impact various types of GNOHSDRRS structures in the New Orleans area. The study only addressed (i) dolphins, (ii) Pro floodwalls and structures, and (iii) HPO floodwalls and structures; thus the findings may not be applicable to other structures in the GNOHSDRRS.

   a. Agree, barges can impact various types of structures in the New Orleans area; however, floodwalls were the most susceptible to damage from loose barges during hurricane events, as was documented from field inspections of barges after hurricanes Katrina and Gustav. This guidance only addresses hurricane event induced forces; it does not include any load case requirements for "Marine Vessel" navigation impacts which shall also be considered where applicable. Impact barriers can be used to shelter hurricane protection structures; the loading would then be reduced to Debris Loading. The HSDRRS Design Guidelines have been revised to incorporate the findings and recommendations of the study and the IEPR where appropriate.

(2) The previously designed and/or constructed GNOHSDRRS floodwalls and fronting structures should be evaluated in light of the results of this study, and if necessary, modifications should be made.

a. Any previously designed and/or constructed structures, incorporated into the GNOHSDRRS, have been re-evaluated using the latest Barge / Boat Impact guidance and retrofitted where necessary to resist the increased loading.

(3) Although the numerical modeling and analytical results concerning pile loads and impact forces caused by barge impacts were found to be relatively insensitive to the soil properties, accurate characterization of the soil stratigraphy and measurement of the engineering properties of the soils should be used for design and analysis efforts.

a. Accurate characterization of foundation conditions (stratigraphy), soil measured engineering properties, and empirical values are utilized in all of our design analyses.

(4) New U.S. Coast Guard regulations concerning barge placement during hurricane and storm events should be implemented carefully so as not to move the risk from the lower, lesser-populated areas of New Orleans to the upper, more highly populated areas of the City.

a. The USACE New Orleans District has met with the US Coast Guard to address barge placement during a hurricane or tropical event. Discussions with the USCG have included evacuation alternatives and mooring facility design. Barge impact loading as determined by the subject study have been provided to the US Coast Guard for their use. The Coast Guard will determine evacuation requirements or alternative mooring requirements. The Comment will be provided to the Coast Guard for their consideration.

b. There are two (2) alternatives, currently under investigation, which address barge placement during a hurricane or tropical event.

i. The first alternative would require all barge sized vessels to evacuate in advance of a storm. The event size and advance time is currently being established. We recommend a minimum 24 hour evacuation in advance of any tropical storm having at least 70 mph sustained winds. This criteria is similar to the US Coast Guard regulation but would be applied to all waterways frequented by barge size traffic.

ii. The second alternative would provide minimum design requirements that a mooring facility must comply with. The design requirements would give the USACE increased assurance that remaining vessels secured to these facilities would remain secured during a tropical event.

Conclusion: The four highlighted items considered most important by the IEPR review team were evaluated satisfactorily. The IEPR of Aberrant Barge Impact Loads on Hurricane Storm Risk Reduction System Floodwalls was conducted as required, and in accordance with, all applicable laws and USACE regulations. The reviewers of this study were instrumental in providing input for additional safety features for the Greater New Orleans Hurricane Storm Damage and Risk Reduction System. These features can be incorporated into future flood risk reduction systems as well as some of the current systems. At all stages of the review the peer reviewers demonstrated their command of the topics and their desire to contribute meaningfully to improvements to Corps design criteria in South Louisiana that will result in greater stability and longevity of structures. They are all to be commended and thanked for their service.

This memo closes out the action on the Independent External Peer Review Process.

WALTER O. BAUMY, JR., P.E.
Chief, Engineering Division

CF:
Chief, TFH, Michael F. Park
CEMVN Commander, COL Edward R. Fleming
HPO Commander, COL Robert Sinkler
CEMVN-ED-H, Nancy Powell
CEMVN-ED-F, Richard Pinner
CEMVN-ED-L, Jean Vossen
CEMVN-ED-S, Jake Terranova
CEMVN-ED-E, Michael Dupuy
CEMVN-ED-T, Mark Gonski
CEMVN-TFH, Tawanda Wilson-Prater

75% REVIEW – REVIEWER COMMENTS

Comment Report: All Comments
Project: Design Guidelines IPR
Review: Barge Impact 75%
Displaying 74 comments for the criteria specified in this report.

Id	Discipline	Section/Figure	Page Number	Line Number
3016274	Structural	Section 7.3	81	n/a

In the experimental study the wave-maker set-up was such that it could generate waves travelling only in parallel direction to the flood wall. However, in reality depending upon the wind direction, waves in an open water body can travel from any direction with respect to the flood wall. Specifically, waves travelling in perpendicular directions to the flood wall were not simulated. Please provide explanation.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
It was not possible in the USNA coastal basin to produce waves that traveled perpendicular to the flood wall since the waves could not be damped and reflections would have caused problems with results. The lab conditions also model the worst expected for impact since there is no reflection back to slow barge down. However, this condition of perpendicular waves was modeled in depth the CFD analysis. These results will be included in the final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
This comment will be addressed after the final 100% report is submitted.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016282	Structural	Section 7.6	87	n/a

In the experimental study, the barge longitudinal axis was oriented at an initial angle of 0 degrees, 30 degrees, or 60 degrees. The possibility of barge orientation at 90 degrees or perpendicular to the flood wall, and wave and wind also travelling in the direction perpendicular to the flood wall was not considered in the study. In other words, the possibility of barge/stern collision was not studied. Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

Revised 25-Jan-10.

1-0 Evaluation **Concurred**
The probability of a barge being blown or pushed by waves in a bow or stern-on condition was considered very low probabiliity and was not studied. This condition would present the lowest projected wind (sail area) and current area. In both the experimental and CFD studies, the barge tended to broach and

never impacted the wall at 90 degrees.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**
Whenever a barge or any other vessel is loose in a hurricane situation, it is hard to predict how the combined effects (forces) due to waves, wind and currents may affect its movement. Moreover, all these forces change their directions with time. For example, post-Katrina damage survey found that at "Bayou Bienvenue" Control Structure, a hopper barge striked the T-wall monoliths at almost 90 degree angle. Also, the CFD Analysis considered the case of the barge bow/stern (perpendicular) impact on the floodwalls.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

2-0 Evaluation **Concurred**
The condition of a 90 degree impact angle was not possible and a constraint in the physical model. A comment will be added to the final report in Chapter 7.

Submitted By: Robert Patev (9783188394) Submitted On: 04-Mar-10

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 24-Mar-10
Current Comment Status: **Comment Closed**

3016339	Structural	Section 7.6	87	n/a

In open water body such as Gulf of Mexico the waves are mostly wind driven, and both wind and waves may be in same direction. However, in the experimental study the wind and waves were never acting in the same direction. They were either at 45 degrees or 90 degrees to each other. Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
It was not possible in the USNA coastal basin to produce waves and wind in the same direction. See previous response to comment #3016274. However, this condition was modeled in the CFD analysis. This will be documented in the final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
This comment will be addressed after the final 100% report is submitted.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016343	Structural	Section 7.6	87	n/a

What was the basis of selecting wave heights of 1" to 2.5" and a wave period of 1.6 seconds? Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

The wave period was scaled using the Froude time scale (1/5) equal to the square-root of the geometric scale factor (1/25). The given wave period of 8 s provided by the USACE was scaled by dividing it by 5, which resulted in a period of 1.6 s. The maximum experimental wave height of 2.5-in scaled to 5.2 ft and was the highest wave possible without flooding the model. The other wave heights were selected to provide a range for the experiments

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

Current Comment Status: **Comment Closed**

3016348	Structural	Section 7.6	87	n/a

How the close proximity of the tank-floor, due to the shallow water depth of 7" or 14" might have affected the wave characteristics in the tank? Please explain

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

The water depths of 7-in and 14-in scaled to 14.6-ft and 29.2-ft, respectively. The waves with a 1.6-s model-scale period were considered to be "intermediate" relative to these water depths. At the model scale, the "deep water" wave length would be about 13.1 ft. The wave length was 6.6 ft for the 7-in water depth and 8.9 ft for the 14-in water depth. Therefore, both conditions had no effect on the waves in the tank.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**

Based on the above evaluation response: (i) for 7" water depth and L=6.6 ft., d/L = 0.088 which implies that it is a "Transitional Wave" (ii) for 14" water depth and L=8.9 ft., d/L = 0.13 which implies that it is a "Transitional Wave"

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

Current Comment Status: **Comment Closed**

3016356	Structural	Section 7.6	87	n/a

Since in the experimental study the generated waves travelled only in direction parallel to the flood wall, therefore the effects such as wave-reflection at the flood wall, standing-waves, etc. were not simulated. Please explain how this may affect the results.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

It was not possible in the USNA coastal basin to produce waves that traveled perpendicular to the flood wall. However, this condition was modeled in the CFD analysis. This will be documented in the final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**

This comment will be addressed after the final 100% report is submitted.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

Current Comment Status: **Comment Closed**

3016362	Structural	Section 7.5	86	n/a

The shape of the barge model was like a rectangular box. The shape of the bow and stern of a prototype were not captured in the experimental study. Please comment, how this might have affected the results in terms of the barge velocity, added mass coefficient, drag coefficient, etc.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Non-concurred**

The experimental barge model was NOT like a rectangular box. The bilge radius was 0.5-in, scaled from the full-scale bilge radius of 1-ft. The stern of the model was a geometric scale of the full scale stern. Two experimental bows were used. The first had a straight rake angle while the second was an exact geometric scaled version of the prototype bow. Since the scaled draft of the model was just less than 1 inch, the shape of the bow had little effect on the response of the barge model.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

Current Comment Status: **Comment Closed**

3016373	Structural	Fig. 7.4	n/a	n/a

For a typical 180-200 foot-long supply vessel in the U.S. Gulf of Mexico, the API RP2A Recommendations suggest using, added mass coefficient of 1.4 for broadside collision, and 1.1 for bow/stern collision. However, Figure 7.4 suggests the experimental value of the mean added mass coefficient as 0.5 which seems low. Also please discuss, this value is based on impact from which direction? Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Non-concurred**

The barge that was modeled was in the empty condition with a draft of 2-ft. This lower draft tends to produce lower added mass coeffficents then for a fully-loaded supply vessel or barge. See Appendix H of Ocean Engineering Mechanics with Applications, by M. E. McCormick, Cambridge University Press, 2010, for more information on added mass coefficients..

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**

Due to close proximity to the U.S. Gulf of Mexico, many supply vessels in New Orleans and vicinity are servicing the offshore industry.These supply vessels are often fully loaded. Sometimes due to weather in the Gulf (offshore) or other issues, the barges/supply vessels are in "waiting mode" after the cargo is fully loaded on the vessels. So, there may be a situation where the vessel may not be "empty" Please explain the "empty barge" assumption used for this study.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

2-0 Evaluation **Concurred**

The PDT was tasked with only analyzing a single empty barge based on MVN field inspections of barges after Katrina and Gustav. This correlates correctly with the post-Katrina aerials examined and reported in Chapter 4.

Submitted By: Robert Patev (9783188394) Submitted On: 04-Mar-10

2-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 24-Mar-10

Current Comment Status: **Comment Closed**

3016393	Structural	n/a'	n/a	n/a

The supply vessels, barge traffic, etc. in New Orelans and vicinity often transport substantial amount of cargo. The experimental study was based on the "empty" barge condition only. Thus the result may not be based on realistic values for the barge mass. Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Non-concurred**

The analysis conducted does NOT examine normal operating conditions of barges in the New Orleans area and their impact into floodwalls. This work effort for HSDRRS has been direct to barges impacting floodwalls due to a hurricane environment only. Most barges that impact floodwalls or levees during Katrina and Gustav were empty barges. Most loaded barges in the area are moved out of the region into safe haven to protect them from sinking and losing cargo.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**

Due to close proximity to the U.S. Gulf of Mexico, many supply vessels in New Orleans and vicinity are servicing the offshore industry.These supply vessels are often fully loaded. Sometimes due to weather in the Gulf (offshore) or other issues, the barges/supply vessels are in "waiting mode" after the cargo is fully loaded on the vessels. So, there may be a situation where the vessel may not be "empty" Please explain the "empty barge" assumption used for this study.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

2-0 Evaluation **Concurred**

See response for Comment 3016373.

Submitted By: Robert Patev (9783188394) Submitted On: 04-Mar-10

2-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 24-Mar-10

Current Comment Status: **Comment Closed**

3016419	Structural	n/a'	n/a	n/a

The API RP2A Recommendations suggest, the vessel mass for a typical 180-200-foot long supply vessel in the U.S. Gulf of Mexico be at least 1,100 short-tons. Please discuss how this value compare with the values used in the study both experimental and analytical models.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Non-concurred**

The USACE does not follow API guidelines for barge impact loads. The values of mass selected for both empty and loaded barges are documented using both the USACE Lock Performance Monitoring System of types of barges that are in the local area.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**
Due to close proximity to the U.S. Gulf of Mexico, many supply vessels in New Orleans and vicinity are servicing the offshore industry.These supply vessels are often fully loaded. Because of quite active offshore industry in New Orleans and Southern Louisiana parishes, it is important and realistic to compare the assumptions and results of the study with the API RP2A Guidelines which is one of the codes used by the offshore industry.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

1-2 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 24-Mar-10

2-0 Evaluation **Concurred**
See response to Comment 3016373.

Submitted By: Robert Patev (9783188394) Submitted On: 04-Mar-10

Backcheck not conducted

Current Comment Status: **Comment Closed**

3016428 Structural n/a' 82 n/a

On very first and the last line on page 82, the figure numbers (Fig. 2.1 and Fig 2.2) seem wrong. Please use correct figure numbers.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Figure will be corrected in final version.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

Current Comment Status: **Comment Closed**

3016433 Structural n/a' 95 n/a

On page 95, in the last line of the first paragraph the figure numbers (Fig. 2.3a and Fig. 2.12) seem wrong. Also, Captions for Figure 7.4 refers to "Fig. 2.3a" which may be in error as well. Also on the very last line on the same page "Fig. 2.11" seems wrong. Please use the correct figure numbers.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Figure numbers will be corrected in final version.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016450 Structural n/a' 98 n/a

On very last line on Page 98, "Fig. 2.12" seems incorrect. Also on page 99, in very first line "Fig. 2.12" seems incorrect. Please use the correct figure numbers.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Figures will be corrected in final version.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016477 Structural Section 7.8 99 n/a

What is the rationale behind assuming the drag coefficient, Cd = 1.0? The statement, "this is due to the fact that the air flow above and about the barge is three-dimensional" is ambiguous. Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Non-concurred**
This is a typical average value of drag coefficients for rectangular bluff bodies in three-dimensional flow. See Fluid Dynamic Drag by Hoerner for more information.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Please clarify the statement, "This choice is due to the fact that the air flow over and about the barge is three-dimensional."

Submitted By: Jay Jani (504-412-8482) Submitted On: 04-Mar-10
Current Comment Status: **Comment Closed**

3016489	Structural	Section 7.9	n/a	n/a

How was the effect of curents modelled in the experimental set-up? Currents may become quite an important parameter, especially in case of floodwall overtopping in which the floodwall may act as a weir. Please discuss briefly.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **For Information Only**
Current and wind forces were both included in the constant force pull on the barge model. In the CFD study, both wind and currents were considered on the free barge.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016521	Structural	Section 7.3	n/a	n/a

The change in the base elevation near the levee was not modelled in the experimental study. Please discuss, the significance of this, and how this may affect the results in camparision to actual conditions near the levees.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
The changes in base elevation were captured in the CFD model. The limited space available in the USNA Coastal Basin did not allow for modeling of the base elevation profiles for the experimental portion. In those experiments where the water was most shallow (7 inches), the scaled draft of the barge was less than an inch. Since the water depth was over 7 times greater than the barge depth, the base elevation would have had negligible effect. This discussion will be added to the results section.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
This comment will be addressed after the final 100% report is submitted.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016544	Geotechnical	Overall Document	n/a	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

The reviewer recommends adding a member to this IEPR team that has a background in hydraulic modeling and numerical simulation to help evaluate that portion of the study, which provides many of the inputs for later analyses.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
This H&H team member has been identified and included as part of the ATR/IEPR team. He will be providing his comments as part of the 100% review.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**
This will be a good addition. Is this individual going to be an IEPR member? Has this individual participated in the review of the original Design Guidelines document or reviews of other HSDRRS projects?

Submitted By: David Lourie (5044580431) Submitted On: 25-Feb-10

2-0 Evaluation **Check and Resolve**
We have added John Winkelman who is a USACE Coastal and Hydraulics Regional Technical Specialist. John has assisted MVN with the design of HSDRRS H&H and knows the DG very well. John will review the final report as part of the ATR effort and will involve the IEPR if he finds problems with the H&H components of the report.

Submitted By: Robert Patev (9783188394) Submitted On: 11-Mar-10

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 23-Mar-10
Current Comment Status: **Comment Closed**

3016545	Geotechnical	Overall Document	n/a	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

There are various writing-related issues in the document that should be corrected. These include subject-verb agreements, tenses, word usage, and awkward sentence structure. The subject-verb issues occur in various places in the document. In Chapter 1 particularly, there are places where the tense issue occurs. In many passages, it is stated that something will be done (future tense); however, because this is a report that describes what has been done, the past tense should be used. In some cases the word "insure" and its variants are used, when the more correct word is ensure or one of its variants.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
The report will be fully edited in the final version to correct tense and other editorial/grammatical errors.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 25-Feb-10
Current Comment Status: **Comment Closed**

3016546	Geotechnical	Abstract	Page 8	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

In the second paragraph, the reviewer suggests noting/clarifying that the barge impact loads had been questioned by independent internal and external technical reviewers.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
A statement to reflect this will be included as part of the introductory chapter in final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 25-Feb-10
Current Comment Status: **Comment Closed**

3016549	Geotechnical	Chapter 1, 1.1 Background	Page 9	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

In the first paragraph, it's stated that Battelle's review of the Design Guidelines occurred in 2007. They actually were begun in 2008 and have continued into 2010.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
These dates will be corrected in final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 25-Feb-10

Current Comment Status: **Comment Closed**

3016552	Geotechnical	Chapter 1, 1.2 Project Delivery Team Members	Page 10	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

The reviewer recommends referencing and describing the Independent External Peer Review (IEPR) effort.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Non-concurred**
Previoius IEPR effort is briefly discussed in the report but should not be described in detail in this report since the PDT was not involved in this effort and is outside their SOW.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**
Non-concur. The reviewer's comment was to reference and describe the IEPR effort. This doesn't require an extensive dissertation.

Submitted By: David Lourie (5044580431) Submitted On: 25-Feb-10

2-0 Evaluation **Check and Resolve**
Section will be added to Chapter 1 defining the IEPR process and that this review meets the requirements of USACE review guidance.

Submitted By: Robert Patev (9783188394) Submitted On: 11-Mar-10

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 23-Mar-10

Current Comment Status: **Comment Closed**

3016555	Geotechnical	Chapter 1, 1.4 Critical Assumptions and Constraints	Page 11	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

The text identifies some constraints. The reviewer recommends identifying the consequences on this study, if any, imposed by these constraints.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Additional constraints from other chapters in report will be included as critical assumption in this section. This will be completed in final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**
The reviewer has not seen the language that the evaluator's response indicates will be added to address the reviewer's comments. However, the reviewer will close this comment under the assumption that the stated language will be added as indicated.

Submitted By: David Lourie (5044580431) Submitted On: 25-Feb-10

1-2 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10
Current Comment Status: **Comment Closed**

3016558	Geotechnical	Chapter 1, 1.7 Project Quality Assurance Plan (QAP)	Page 15	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

The second paragraph states that all reviewers will sign a certification statement. Please clarify if the IEPR team will be asked to sign the certification statement. If the IEPR team will be asked to sign it, please provide a copy of the proposed language for review. The words "certification" and "certify" have legal implications that could be problematic unless their meaning is well defined. Perhaps calling a declaration would be better.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **For Information Only**
The ATR and IEPR teams will be required to provide a certification statement after the final report is review and comments closed. This is part of the USACE QC review procedures. This document will be provided by NAB later after the final resolution is complete.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**
The reviewer's original comment noted: "If the IEPR team will be asked to sign it, please provide a copy of the proposed language for review. The words "certification" and "certify" have legal implications that could be problematic unless their meaning is well defined." The evaluator's response provide some additional information, but a copy of the proposed language has not been provided for review. To reduce the potential for delays about this matter, the reviewer again requests a copy of the proposed certification language for review.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10

2-0 Evaluation **Concurred**
This text has been modifed in final report to reflect only the ATR team. Please close comment.

Submitted By: Robert Patev (9783188394) Submitted On: 14-May-10

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 20-May-10
Current Comment Status: **Comment Closed**

3016559 | Structural | Section 7.3 | n/a | n/a

During hurricane conditions, sometimes barges break loose and are adrift without any active pull on them. The experimental data suggest, that the results are based on the condition where there was always a constant pulling force on the barge model. Can we manipulate existing data to learn more about the barges that are adrift? Please discuss.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Non-concurred**
The constant pulling force in the experimental study was simulating the forces imparted on the barge by the current and wind. It was not suggested that actual barges are actively pulled toward the flood walls.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016560	Geotechnical	Chapter 2, 2.2 Existing HSDRRS Guidelines	Page 17	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

The first paragraph contains some repetitive text.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Text will be deleted in final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10
Current Comment Status: **Comment Closed**

3016563	Geotechnical	Chapter 2, 2.2 Existing HSDRRS Guidelines, 2.2.1 Modifications to HSDRRS Guidelines	Page 19	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

The passage in the second paragraph about dolphins doesn't read right.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Text will be reworded in final version.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10
Current Comment Status: **Comment Closed**

3016565	Geotechnical	Chapter 2, 2.3 HSDRRS Allowable Overstress and Load Combinations	Page 19	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

The first sentence in the first paragraph doesn't read right.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
This will be corrected in final version.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10
Current Comment Status: **Comment Closed**

3016566	Geotechnical	Chapter 3	n/a	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

In this chapter, reference is made to hurricanes almost exclusively. However, the area is subject to other types of tropical storms and weather systems. Are the provisions of this chapter applicable to these other weather systems, too, or just hurricanes?

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
The provision of this chapter reflect the conditions from gale force winds to Category V hurricanes. Therefore, this is for tropical storms and hurricanes. This chapter is only included to show the procedures being established by the Coast Guard and how they effect the risks to floodwalls in the New Orleans area.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**
Section 3.1, which provides the background for the chapter and thus sets the stage for what follows only references hurricanes. Although gale force winds are referenced, the references occur in the context of an approaching hurricane. The term "tropical storm" occurs only once in the text and once in an appendix to Chapter 3, with the reference in the text being an excerpt of what's in the appendix. Therefore, because the area is subject to weather systems other than hurricanes that can produce winds that can be damaging, the reviewer believes it should be clarified that other conditions could merit following the provisions of this chapter.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10

2-0 Evaluation **Check and Resolve**
Text will be added to Chapter 3 to reflect that all winds considered for this analysis are not all applicable to hurricane events but smaller tropical storms.

Submitted By: Robert Patev (9783188394) Submitted On: 11-Mar-10

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 23-Mar-10
Current Comment Status: **Comment Closed**

3016568	Geotechnical	Chapter 5, Figures 5.4, 5.5, 5.16, 5.17	Pages 61, 62, 70, and 71	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

These figures are too small to read well. Also, the various strata can't be identified. Also, some of the soil parameters (unit weight and cohesion) used in the models can't be discerned from the soils profiles on Figures 5.4 and 5.16.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Chapter 5 is being rewriten now and the figures will be expanded for easier reading. This will be included in final version.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10
Current Comment Status: **Comment Closed**

3016570	Geotechnical	Chapter 5, Figure 5.4	Page 61	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

It appears that a shear strength of 800 psf is used for the embankment fill. Previous discussions during the DG document review process and Table 3.3 of the DG document indicated that a shear strength of about 400 psf should be used for embankment fill. Please discuss the basis for using a value that is much greater.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

This value is from actual test information collected for the floodwall and are used to model a specific foundation condition for the pushover analysis. The values found in the DG use a conservative value for design given most walls do not have sufficient boring data to design with.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**

The reviewer appreciates that the value is from actual test information and generally advocates using actual data instead of assumed values. However, in discussions with USACE personnel during other IEPR assignments, the reviewer has been told that the values shown in the DG document are based on historical data and while they have been selected to be conservative, they are not believed to be unduly conservative. Therefore, it seems that it would be appropriate to use a lower value for analyses.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10

2-0 Evaluation **Check and Resolve**

The suggested values in Table 3.3 of the HSDRRS Design Guidelines for shear strength (cohesion) for levee fill are intended for new levee construction when the values need to be estimated for the borrow soil (i.e. no actual test data is available). If the reviewer believes the design guidelines are unclear, that can be clarified. For this study, since actual project features are being modeled, actual subsurface soil properties are more appropriate than the typical values listed in Table 3.3 of the HSDRRS guidelines.

Submitted By: Robert Patev (9783188394) Submitted On: 11-Mar-10

2-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 23-Mar-10

Current Comment Status: **Comment Closed**

3016571	Geotechnical	Chapter 5, Figure 5.5	Page 62	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

While the design strength lines and strength line trends generally look reasonable, there are intervals where the design line lies above the c/p line even though there are many data points that lie below the design line. Please comment. Also, please comment on the design unit weight line below about El -90 that lies above a considerable number of the data points.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

Noted. The data used in the pushover and in FEA was taken directly from the design calculations used by the New Orleans District in the design of these floodwalls. The PDT relied on the Districts' knowledge of the soils strengths and lines and incorporated those values used by MVN in their analysis.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**

Thank you for the response. However, the response that has been provided doesn't present the basis for the rationale used to address those data points that lie below the strength and unit weight lines.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10

2-0 Evaluation **Check and Resolve**

There is scatter in the data below elevation -80 that required reasonable engineering judgment to be used in establishing the final strength line. While data points do exist below the selected strength line, an equal number exist above the line. In addition, the slope of the line is approximately 10 psf/ft which is very reasonable and matches the c/p line very well. Therefore, the final strength line is more than reasonable. And while it is true that the unit weight line could be drawn slightly to the left (about 5 pcf), this minor adjustment will obviously have little impact on the study results since it will only affect drained strength parameters below -90. This has minimum affect on capacity of the system.

Submitted By: Robert Patev (9783188394) Submitted On: 11-Mar-10

2-1 Backcheck Recommendation **Open Comment**
The evaluator's comment about undrained shear strength addresses values below El -80; however, the reviewer's original comment about strength data applied to the shallower strata. While there may be approximately equal numbers of tests above and below the proposed strength line, the individual shear strength values and their distance from the strength line are more important than the number of test results above or below the line. Furthermore, weak layers or zones are potentially problematic, so average values may not be appropriate in all cases. The reviewer believes that it would be prudent to confirm that a FS of at least 1.0 exists when a lower-bound strength profile is used in analysis. The unit weight comments in the reviewer's original remark do tend to focus on the deeper strata. And while the reviewer doesn't disagree with the evaluator's comment on the influence of using greater unit weights in the deeper strata in these analyses, a lower unit weight line would fit the data better and thus be considered more appropriate.

Submitted By: David Lourie (5044580431) Submitted On: 23-Mar-10

2-2 Backcheck Recommendation **Open Comment**
The reviewer is waiting for a response from the evaluator, so the comment is being left open.

Submitted By: David Lourie (5044580431) Submitted On: 20-May-10

3-0 Evaluation **Concurred**
While we concur and agree with the reviewer's comment, this affects only the results from the pushover analysis which is included only for an example of a process that may be used in the extreme limit state of the DG. This information does not affect the actual barge impact forces which is the primary product of this report.

Submitted By: Robert Patev (9783188394) Submitted On: 07-Jun-10

3-1 Backcheck Recommendation **Close Comment**
Because the pushover analysis is used only "as an example of a process" and not for computation of the actual barge impact forces, the reviewer will close the comment.

Submitted By: David Lourie (5044580431) Submitted On: 15-Jun-10
Current Comment Status: **Comment Closed**

3016574	Geotechnical	Chapter 5, Figure 5.10	Page 66	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

This table presents various soil parameters. The reviewer recommends adding a column in the "Cohesion" section that shows the shear strength at the top of the stratum, which together with strength at the bottom of the stratum that is included in the table, is more informative than providing the average value for the stratum. Please explain the source for the shear strength from El

0 to -15 given that no values are shown on the boring log (Figure 5.11) for this interval. Please check the bottom strength values between El -81 and -116; the values in Figure 5.10 are higher than suggested by the data shown on Figure 5.11. Finally, please discuss the use of a singular value for the angle of internal friction for the S-Case for the clay strata even though the soil plasticities vary. Also, a value of 23 degrees seems high for highly plastic clay; is there backup for this value?

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

Noted. This data was taken directly from the design calculations used by the New Orleans District in the design of these floodwalls. The PDT relied on the Districts' knowledge of the soils strengths and friction angles and incorporated those values used by MVN in their analysis. We had requested addtional boring data for this site but only one boring was available and it did not fully reflect the design values since it was landward of the floodwall location. Therefore, the only data used for the analysis was the data contained within the table.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**

The reviewer appreciates the response and understands limitations when using data provided by others. Nonetheless, the evaluator's response doesn't address fully the reviewer's comments. For example, obtaining an average implies that there are multiple values used to compute the average value, so these values (data) should be somewhere; the absence of values between El 0 and -15 doesn't seem to be explained; there is no response to the comment that the values in Figure 5.10 are higher than suggested by the data shown on Figure 5.11; and the use of one phi angle for soils with varying plasticities isn't addressed, yet the geotechnical literature suggests that phi angles tend to vary with plasticity.

Submitted By: David Lourie (5044580431) Submitted On: 02-Mar-10

2-0 Evaluation **Check and Resolve**

Since the field crew was unable to retrieve enough sample between 0 and -11, no test data was available until the sample tested at -13.0; and based on the moisture content is likely the same deposit. A cohesion value of 115 psf is certainly in line with highly organic deposits in the area, and is also consistent with the lab test at El. -13.0. The shear strength values could be given at the top and bottom of each strata in Figure 5.5; but the manner in which it is presented has been commonly used by the geotechnical engineering community and certainly not incorrect. Lastly, the USACE has historic data indicating that in the range of PIs for these soil deposits, a phi of between 22 and 25 is not uncommon. Therefore, a phi of 23 degrees is reasonable. Any potential changes based on this comment will have little to no impact on the results of the study.

Submitted By: Robert Patev (9783188394) Submitted On: 11-Mar-10

2-1 Backcheck Recommendation **Open Comment**

The reviewer understands the intent of the statement about the soils between El 0 and -11 and using indicator parameters such as water content. However, in addition to water content, one would need Atterberg limits to evaluate the similarity of the soils. In other words, water content is necessary, but may not sufficient. Nonetheless, the reviewer recommends adding a note to the table or adding language to the text that explains the rationale used to assign parameters when data were not available. While presenting average shear strength values is not incorrect, as noted in the reviewer's original comment, the inclusion of strength values at the top and bottom of a stratum would be more informative. If they are available, the reviewer recommends presenting them, especially since the bottom values are already given in the table. When average values only are used, they often are presented in conjunction with other statistical descriptors such as number of value used to compute the average, maximum and minimum values, and the standard deviation. The database or plot showing the relationship between PI and phi angle that the evaluator is referencing hasn't been presented to the reviewer, so the reviewer is unable to evaluate the response provided by the evaluator. However, the values in the table are consistent with values shown in the literature for peak friction values for clays with similar plasticities, though they are considerably higher than residual friction angles in similar clays. Therefore, the reviewer recommends indicating in the report if these are intended to be peak or residual friction angles.

Submitted By: David Lourie (5044580431) Submitted On: 23-Mar-10

2-2 Backcheck Recommendation **Open Comment**

The reviewer is waiting for a response from the evaluator, so the comment is being left open.

Submitted By: David Lourie (5044580431) Submitted On: 20-May-10

3-0 Evaluation **Concurred**

While we agree and concur with the reviewer's comments, this only applies to the pushover analysis and does not directly affect the results from the barge impact analysis which is the focused result from this report.

Submitted By: Robert Patev (9783188394) Submitted On: 07-Jun-10

3-1 Backcheck Recommendation **Close Comment**

Because the pushover analysis is used only "as an example of a process" and not for computation of the actual barge impact forces, the reviewer will close the comment.

Submitted By: David Lourie (5044580431) Submitted On: 15-Jun-10

Current Comment Status: **Comment Closed**

3016577	Geotechnical	Chapter 7, Develop Barge Motions from Numerical and Physical Scale Models (Wind and Storm Surge), 7.2 Background	Page 72	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

For clarity and completeness, the reviewer recommends explaining why only the empty barge condition was considered. Also, it might be beneficial to note that a loaded barge condition was considered in a later sensitivity analysis.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

Noted. Single empty barges were only analyzed since that is typical of aberrant barges that impacted floodwalls and levees during Katrina and Gustav. The loaded barge condition was added as sensitivity to address any further questions and address a range of design values for the final guidelines.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**

Thanks for the additional information. Please confirm that this information will be added to the next version of the report.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10

2-0 Evaluation **Check and Resolve**

The analysis of single empty barges were scoped by MVN based field inspections on the review of post-Katrina and Gustav. This is also confirmed by the inventory of barges using aerials from post-Katrina. This inventory will be part of Chapter 4 in final version.

Submitted By: Robert Patev (9783188394) Submitted On: 11-Mar-10

2-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 23-Mar-10

Current Comment Status: **Comment Closed**

3016578	Geotechnical	Chapter 7, Develop Barge Motions from Numerical and Physical Scale Models (Wind and Storm Surge), 7.10.4	Page 107	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

For clarity and completeness, the reviewer recommends providing the basis for the model input values.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

Noted. Model input values were taken from design wave parameters used in flood wall design as shown in Chapter 5. A paragraph will be added to Chapter 7 referencing these model inputs.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10

Current Comment Status: **Comment Closed**

3016581	Structural	n/a'	n/a	n/a

Fig. 7.8 thru Fig. 7.17 show the results plotted in terms of the "Impact Velocity" and the "Pull Force." Identifying the impact velocity with corresponding degree of freedoms described below may be useful. Also, It may be more insightful to include the plots showing, the barge motions in terms of surge, sway, heave, roll, pitch and yaw (the six degrees of freedom).

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

Noted. In the experimental study, the motions were recorded in laboratory coordinates, not barge (local) coordinates. Surge, sway, and heave directions are defined relative to the barge (local) coordinates. Since the barge model was yawing, rolling, and pitching, it was not possible to show barge motions in terms of surge, sway, and heave.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016585 Structural 7.10.3 105 n/a

In the first line of Section 7.10.3, the "Fig 4.2" seems incorrect. Please correct this.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

Revised 25-Jan-10.

1-0 Evaluation **Concurred**
Figure will be corrected in final version.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016590 Structural Section 7.10.5 107 n/a

In the first line of Section 7.10.5, the "Fig 4.3" seems incorrect. Please correct this.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Figure will be corrected in final version.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016596 Structural Section 7.10.3 105 n/a

In the section 7.10.3, "CFD Control Volume and Boundary Conditions" the discussion of coordinate system for the CFD model is confusing. Please add a sketch showing the coordinate system including the floodwall, still water level, barge, etc.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Agreed. Figure of coordinate system will be added to the final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016616	Structural	Section 7.10	n/a	n/a

In Section 1.6.8 (Project Scope of Work) it is mentioned that, "the CFD model will be calibrated to the physical results..." However, in the experimental study the wave direction was in the parallel direction to the floodwall (Fig. 7.9); whereas in CFD model both wind and waves are applied in the direction perpendicular to the floodwall (Fig. 7.19). In experimental study the wind direction was either at 45 degrees or 90 degrees with respect to the floodwall. Please explain this discrepancy, and how the CFD model was calibrated.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Noted. The CFD model was not calibrated to the physical results. The CFD model results were only compared to the physical results in terms of motions and velocities. The CFD model solves the Navier-Stokes equations and does not have the ability to be "calibrated". This will be corrected in Section 1.6.8 in the final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
This comment will be addressed after the final 100% report is submitted.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016626	Structural	Section 7.10.3	n/a	n/a

In the CFD model, wind waves,currents and water level conditions were applied. In experimental study the effects of currents and the water level conditions were not simulated. Only the effects of wave and wind were simulated. How does this affect the comparision between the CFD results from the second control volume; and the experimental results. Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Noted. Current and wind forces were both included in the constant force pull on the barge model. In the CFD study, both wind and currents were considered on the free barge.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016636 Structural Section 7.10.3 107 n/a

On page 107, in first paragraph the text, "The air space directly above the floodwall, in the same plane as the vertical flood-side face was modelled as a pressure-outlet" This whole paragraph seems somewhat ambiguous. Please include a sketch with some explanation to make it more clear.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Agreed. A figure will be added to the final report showing this fact.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016645 Structural Section 7.10.4 107 n/a

Please explain, the basis for using the wave heigh of 8 ft, and wave period of 8 sec in CFD model for the Lake Ponchartrain and vicinity.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
These were the wave values used for design of the flood walls as shown in Chapter 5. Cross-reference will be made in final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**
In the experimental study the equivalent wave height of 5.2 ft was used. Please explain the difference in the expereimental and CFD analysis values for the wave height.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

2-0 Evaluation **Concurred**
The wave heights used for the experimental study was limited by the constraints of the test facility and model barge. See section 7.6.

Submitted By: Robert Patev (9783188394) Submitted On: 04-Mar-10

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 24-Mar-10
Current Comment Status: **Comment Closed**

3016652	Structural	Section 7.10.5	107	n/a

CFD Results: Please explain the statement, "The empty barges, being rather lightweight, were sometimes flipped up out of the water and thrown towards the wall" This result (observation) does not seem realistic. Please explain this finding.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
In the hurrincae conditions, there is tremendous force exerted on the barge by the wind. Since the barges had a shallow draft, there was relatively lower hydrodynamic resisting force available. In the CFD modeling, especially in the Category 3 and 5 winds, the barge in broadside condition heeled over to greater than 30 degrees, at which time the wind was able to catch beneath the barge and continue heeling it over, in some cases capsizing it with the barge completely leaving the water.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**
The evaluation response above describes the observation from the results of CFD analysis. However, this behavior of the barg seems unrealistic Please explain above based on the CFD model, assumptions, limitations of CFD analysis, etc. which may have contributed to this barge behavior.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

2-0 Evaluation **Concurred**
The sentence will be modified to reflect that barges are not flipped out of the water but will heel based on strong winds. Additional CFD runs were completed recently to reduce any numerical errrors in the model.

Submitted By: Robert Patev (9783188394) Submitted On: 04-Mar-10

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 24-Mar-10
Current Comment Status: **Comment Closed**

3016661	Structural	Section 7.10.5	107	n/a

CFD Results: The finding stated as, "Even on the Category 1 cases, the wind blowing directly at the wall increased the water level at the wall, with water leaving the control volume above the floodwall. This overtopping occured even when the SWL was half the vertical wall height" This result (observation) also seems unrealistic. What about wave reflection, standing wave at the wall? Can the CFD model handle reflected waves and standing wave? Please explain these findings.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

Noted. The CFD model incorporates reflected and standing waves. However, the set-up of the water level of the wind blowing against the flood wall caused overtopping before the waves reached the wall to reflect and become a standing wave.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

Current Comment Status: **Comment Closed**

3016668	Structural	Section 7.10.5	107	n/a

How were the effects of the barge "added mass" and the "drag", modelled in the CFD analysis? Please provide the detailed explanation. Also, please describe the analytical model, the analysis procedure, assumptions, etc. in detail to make it more clear.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

Noted. The CFD model solves the Navier-Stokes equations of fluid dynamics. It does not model added mass or drag, but these values are results obtained from solution of the equations of motion.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

Current Comment Status: **Comment Closed**

3016671	Structural	Section 7.10	107	n/a

CFD Model Please include the the Barge Traslation towards the wall vd. Time plots.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
These plots will be included in final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

Current Comment Status: **Comment Closed**

3016675	Geotechnical	Chapter 7, Develop Barge Motions from Numerical and Physical Scale Models (Wind and Storm Surge), 7.3 Experimental Setup, Observations and Analysis	Page 82	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

The text states that a one-twenty-fifth scale model is shown in Figure 2.1. Is this the correct scale?

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Noted. The barge model was a 1/25th geometric scale of the jumbo hopper barge.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10

Current Comment Status: **Comment Closed**

3016676	Structural	Section 7.10	107	n/a

CFD Model In the Teleconference on December 17, 2009 there was a plot displayed. The plot was the Barge Transalation towards the Wall vs. Time. It suggested the barge moved towards the floodwall at a rate of about 38 meters in 15 seconds. This velocity seemed too excessive. This plot is not included in the 75% document. Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

Noted. This velocity (38 m / 15 s = 2.53 m/s) was not excessive at all. It is equivalent to 4.9 knots. Plots showing the translation of the barge toward wall as a function of time will be included in the final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**

This comment will be addressed after the final 100% report is submitted.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

Current Comment Status: **Comment Closed**

3016677	Geotechnical	Chapter 8, Development of Dynamic FEM Barge Impact Model to Determine Impact Forces, 8.3.2.2 Soil Resistance	Page 134	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

Values for e50 (strain at 50% failure) may be available from the geotechnical consultant(s) who conducted the laboratory strength testing, especially if the borings were drilled as part of the HSDRRS project. Please explain the physical meaning of the term "vertical failure shear stress, tu" and how it is determined. Also, what are the correlations used to obtain shear modulus, G, and tu?

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

Noted. Values of e50 were not readily available among the dataset provided to UF by the USACE. Additionally, a soil-parameter sensitivity study revealed that, for a practical range of values, the variation of certain soil-strength parameters (e.g., e50 and G) did not result in a substantial change in hurricane protection structure response from the perspective of the impact loads imparted. (See Sec. 8.4.6.6 for numerical results that were obtained as a consequence of varying such parameters.) Hence, representative design values were employed for these parameters. Vertical failure shear stress is a unit-length stress quantity of the ultimate skin resistance available to a buried foundation element for a given pile type, pile width dimension, soil layer type, and the corresponding SPT blow counts through the soil layer. The correlations used to obtain Tu from SPT values were made in accordance with: FB-Deep, FB-Deep User's Manual. Bridge Software Institute, University of Florida, Gainesville, FL, 2009.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**

For clarity and completeness, please confirm that the essence of this response that addresses the design values and sensitivity analyses will be included in the next version of the document. Concerning the vertical failure shear stress, its meaning or definition should be included in the document for clarity and completeness. The units of psf (stress per unit area) and the description suggest that it is a skin-friction or a soil-pile adhesion value. In clays, it is often considered a function of the undrained shear strength (cohesion) and the pile material with some limiting value; in granular soils, it is usually a function of the friction angle between the soil and pile, the effective vertical stress, and a lateral earth-pressure coefficient, again subject to a limiting value. So, is Tu equivalent to the soil-pile adhesion value described by the reviewer? In the New Orleans-area clays, SPT values have very little value and aren't used in geotechnical practice. In fact, the use of SPTs to characterize very soft to very stiff clays and obtain strength values from the SPT values or the recovered samples conflicts with "best practices" in use today and the practices followed by geotechnical engineers for over 50 years. So, it's not clear to the reviewer why an SPT-based approach is being used for obtaining clay properties. SPT-based approaches are more suitable for granular soil environments.

Submitted By: David Lourie (5044580431) Submitted On: 02-Mar-10

2-0 Evaluation **Check and Resolve**

See attachment from UF on Tu clarification. This includes many resources that they use at the college.

Submitted By: Robert Patev (9783188394) Submitted On: 11-Mar-10
(Attachment: Tu_Information.pdf)

2-1 Backcheck Recommendation **Open Comment**

Thank you for furnishing the attachment (Tu_Information.pdf). It contains useful information that clarifies the meaning of Tu. The attachment confirms that Tu is a soil-pile adhesion value as expressed in the reviewer's previous comment. Given the guidance contained in the Conclusions section of Transportation Research Record 1808, Paper No. 02-3304, which was included in the attachment, the reviewer is surprised that Tomlinson's method is used for computing Tu. In the TRR paper, two of the pertinent recommendations are: 1. The LRFD phi factor for alpha-Tomlinson is too high when compared to other reliable methods such as PDA or conventional load test. Furthermore, the alpha-Tomlinson method has many limitations (i.e., total stress approach, independent of the groundwater table, etc.). 2. For concrete piles in cohesive soils, the semiempirical alpha-API method is recommended. It is simple and more reliable than the other methods. Even though the name of the method is alpha, it accounts for changes in the effective stress. In the alpha-API method for cohesive soils, the unit skin friction, f, is given as f = alpha*Su with the constraint that alpha 440 psf. Perhaps calculation worksheets would help clarify this issue. The attachment didn't really address the validity of correlating Su and SPT values in very soft and soft clays. Referring to the TRR paper cited above, few of the piles in the database are in highly plastic cohesive soils and the concrete piles that are in clays have OCRs of 8, which implies heavily overconsolidated deposits, not the normally consolidated clays in the New Orleans area. Finally, in the reviewer's previous comment, there were requests to confirm that certain definitions and explanations would be incorporated into a revised document, but this was not addressed in the response.

Submitted By: David Lourie (5044580431) Submitted On: 24-Mar-10

3-0 Evaluation **Concurred**

If desired, the definition of tu given in the first paragraph of Sec. 8.3.2.2 and again in the first paragraph of Sec. 8.3.4.2 can be changed from "vertical failure shear stress" to "soil-pile adhesion". For the tu (soil-pile adhesion) values that were determined using the alpha-Tomlinson method, values of tu exceeded the corresponding Su (undrained shear strength) values in accordance with the Tomlinson curve employed (i.e., only when the Su values were less than 440 psf). As part of the 75% report revisions, this was denoted in Sec. 8.3.3.2. Otherwise, tu values were determined using site-representative, composite profiles of SPT blow counts and not from boring-specific Su values. As a consequence, variation was observed between the site-representative tu values and boring-specific Su values for tu values determined in the latter manner. Additional discussion was added to clarify the reason for the variation of tu (relative to Su) values in Sec. 8.3.4.2 as part of the 75% report revisions. For the impact scenarios considered in this study, the results of a soil-sensitivity study (discussed in Sec. 8.4.6.7) indicate that even significant changes to the soil stiffness produce relatively small changes in the impact forces imparted.

Submitted By: Robert Patev (9783188394) Submitted On: 14-May-10

3-1 Backcheck Recommendation **Open Comment**

1) The reviewer concurs with the proposal to change "vertical failure shear stress" to "soil-pile adhesion" in the document. 2) The evaluator's explanation about Tu values being greater than the soil's measured Su value when Su is < 440 psf was noted by the reviewer in his previous comment. 3) The reviewer still doesn't understand fully the use or explanation of composite profiles and SPT values to generate Tu values when boring-specific Su values are available the use of SPTs in very soft and soft normally consolidated clays in the New Orleans area. 4) As noted in the reviewer's previous comment, the attachment that was provided (Tu_Information.pdf) didn't really address the validity of correlating Su and SPT values in very soft and soft clays. Referring to the TRR paper cited in an earlier comment by the reviewer, few of the piles in the database are in highly plastic cohesive soils and the concrete piles that are in clays have OCRs of 8, which implies heavily overconsolidated deposits, not the normally consolidated clays in the New Orleans area. 5) The reviewer recognizes that the results of the soil-sensitivity study indicate that even significant changes to the soil stiffness values produce relatively small changes in the impact forces that are imparted. Nonetheless, the reviewer believes that consistent and realistic soil parameters should be used in the analyses.

Submitted By: David Lourie (5044580431) Submitted On: 20-May-10

4-0 Evaluation **Concurred**

While we agree with concerns of the reviewer, these values will have very little affect, as discussed in the sensitivity results, on the overall force calculations since the impact force is of short duration and mobilization of the shear stress in the soils would be minimal.

Submitted By: Robert Patev (9783188394) Submitted On: 08-Jun-10

4-1 Backcheck Recommendation **Close Comment**

Concur and closed with the following comment, which the reviewer has made previously. "The reviewer recognizes that the results of the soil-sensitivity study indicate that even significant changes to the soil stiffness values produce relatively small changes in the impact forces that are imparted. Nonetheless, the reviewer believes that consistent and realistic soil parameters should be used in the analyses."

Submitted By: David Lourie (5044580431) Submitted On: 15-Jun-10

Current Comment Status: **Comment Closed**

3016679	Geotechnical	Chapter 8, Development of Dynamic FEM Barge Impact Model to Determine Impact Forces, Figures 8.45, 8.53, and 8.63	Pages 135, 141, and 148	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

These figures present soil profiles used in certain analyses. Are these actual profiles from a specific boring or are they "synthetic" profiles composited from a series of borings? Please clarify in the report and if they are from multiple borings, please note the borings and provide the supporting information if it's not already in the document.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

Noted. The soil layer profiles used for each hurricane protection structure model were provided directly by the USACE. The soil layer profiles employed are consistent with those given for respective hurricane protection structures in Chapter 5 of the report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**

In reviewing the evaluator's response and the report, it appears that the soil profiles are actual soil profiles based on a compilation of borings at each location. Is that correct? If so, the reviewer recommends adding clarifying language to the report that explains this. If not, please provide additional information. Thank you.

Submitted By: David Lourie (5044580431) Submitted On: 02-Mar-10

2-0 Evaluation **Check and Resolve**

A sentence will be added to this section of Chapter 8 indicating that the profiles are a compilation of boring in the area of the wall.

Submitted By: Robert Patev (9783188394) Submitted On: 11-Mar-10

2-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 24-Mar-10

Current Comment Status: **Comment Closed**

3016680	Geotechnical	Chapter 8, Development of Dynamic FEM Barge Impact Model to Determine Impact Forces, Tables 8.2, 8.3, and 8.4	Pages 135, 141, and 148	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

The source(s) of the values in these tables should be cited. Most of these tables contain SPT values. Based on the reviewer's New Orleans-area experience, many of the SPT values assigned to the cohesive strata look suspect. First, SPTs are not normally conducted in clays in the New Orleans area. Second, in the Recent (Holocene) clays, the reviewer believes that values between 0 (weight of hammer, WOH) and 4 would be more common than values of 4 or more.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

Noted. Estimates of N60 blow counts were directly provided by the New Orleans staff since these values were incorporated into their flood wall designs.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**

Thank you for identifying the source of the values and please confirm this information will be incorporated into the revised report. In the reviewer's initial comment, it was noted that many of the SPT values assigned to the cohesive strata look suspect. First, SPTs are not normally conducted in clays in the New Orleans area. Second, in the Recent (Holocene) clays, the reviewer believes that values between 0 (weight of hammer, WOH) and 4 would be more common than values of 4 or more. So even though the data came from New Orleans staff, the reviewer's comment and concerns haven't been addressed.

Submitted By: David Lourie (5044580431) Submitted On: 02-Mar-10

2-0 Evaluation **Concurred**

The reference to the New District GDM has been added to the top of Tables 8.2, 8.3 and 8.4 in final report.

Submitted By: Robert Patev (9783188394) Submitted On: 14-May-10

2-1 Backcheck Recommendation **Open Comment**

1) The reviewer doesn't know what the "New District GDM" is; please clarify. Thanks. 2) In the reviewer's initial comment, it was noted that many of the SPT values assigned to the cohesive strata look suspect. First, SPTs are not normally conducted in clays in the New Orleans area. Second, in the Recent (Holocene) clays, the reviewer believes that values between 0 (weight of hammer, WOH) and 4 would be more common than values of 4 or more. So even though the data came from New Orleans staff, the reviewer's comment and concerns haven't been addressed.

Submitted By: David Lourie (5044580431) Submitted On: 20-May-10

3-0 Evaluation **Concurred**

GDM is the General Design Memorandum. The GDM has all the recommend values for soil properties and all boring logs and testing as completed for the project. While the Barge Impact PDT does not disagree with the reviewers comments, these values were given to this team by MVN geotech from their own GDM. We as the barge impact PDT assume those values are correct and utilized them in the modeling effort. However, we also note that these values have little to no effect on the final barge impact results since the load duration was very short and the mobilization of the piles would not occur under this loading.

Submitted By: Robert Patev (9783188394) Submitted On: 08-Jun-10

3-1 Backcheck Recommendation **Close Comment**

Closed with the following comment. The reviewer understands the evaluator's response and appreciates the practical need to take certain inputs as "givens" when working on a multi-disciplinary project team and when working on limited aspects or features of a larger design or analysis effort. Furthermore, the reviewer accepts that these input values have little to no influence on the final barge impact results for the reasons the evaluator stated. Nonetheless, the reviewer believes that consistent and realistic soil parameters should be used in the analyses, and if there is a need to use values provided by others, they should be reviewed for their reasonableness by an experienced geotechnical engineer who has knowledge of the geology and experience in the project area. Finally, if it is determined that there are limitations on the values being used, but it is concluded their use has little to no practical influence on the results, the reviewer believes it is important to note clearly that the limitations are recognized, their influence has been evaluated, and then state their influence on the results that have been obtained.

Submitted By: David Lourie (5044580431) Submitted On: 15-Jun-10

Current Comment Status: **Comment Closed**

3016681	Geotechnical	Chapter 8, Development of Dynamic FEM Barge Impact Model to Determine Impact Forces, Tables 8.2, 8.3, and 8.4	Pages 135, 141, and 148	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

In Table 8.2, the Su values for Layers 4 through 6 look high for normally consolidated clay. Finally, in these tables the values of tu are less than all of the values for Su in Table 8.2, but in Tables 8.3 and 8.4, some of the tu values exceed the Su values. Please explain.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

Noted. The Su values in Table 8.2 were provided directly by the New Orleans District as they were used in their floodwall design for each hurricane protection structure modeled. For the PRO wall soil modeling (Table 8.3), SPT values were not available for determination of Tu. Consequently, Tu values were estimated from Su values using: Tomlinson, M. J. Pile Design and Construction, Taylor & Franics, Abingdon, UK, 1994. Per this reference, values of Su less than app. 440 psf, correspond to slightly larger Tu values. For the PRO dolphin soil modeling (Table 8.4), Su values provided by the district engineers were specific to one boring. In contrast, Tu values were determined using correlations with averaged values of estimated SPT blow counts from several borings. The correlations used to obtain Tu were taken from: FB-Deep, FB-Deep User's Manual. Bridge Software Institute, University of Florida, Gainesville, FL, 2009. Hence, for the PRO dolphin soil model, the Tu values (which were not specific to one boring) varied relative to the available Su values (which were specific to one boring). Where Tables 8.3 and 8.4 are cited in the report, additional referencing and discussion have been added to clarify the reasons for the discrepancies between Su and Tu values.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**

The reviewer requests that the evaluator provide the figure or table from the cited Tomlinson reference because in the reviewer's experience in clay soils, adhesion values are less or equal to the undrained shear strength of the clay. Additionally, because correlations are being used, the reviewer suggests presenting these correlations and worksheets for review. Finally, for clarity and completeness, the correlations and worksheets should be included with the revised document.

Submitted By: David Lourie (5044580431) Submitted On: 02-Mar-10

2-0 Evaluation **Check and Resolve**
See response and attachment to 3016677

Submitted By: Robert Patev (9783188394) Submitted On: 11-Mar-10

2-1 Backcheck Recommendation **Open Comment**
Thank you for furnishing the attachment (Tu_Information.pdf). It contains useful information that clarifies the meaning of Tu. The attachment confirms that Tu is a soil-pile adhesion value as expressed in one of the reviewer's previous comments. Also see the reviewer's response to 3016677. The graph associated with the alpha-Tomlinson method shows alpha > 1.0 for Su < 440 psf, but it's not clear why Tu values are greater than Su values when Su > 440 psf. When Su is > 440 psf, the alpha value is less than 1, so alpha*Su would be less than Su. Perhaps calculation worksheets would help clarify this issue, and as recommended above, the reviewer believes they should be included with the report.

Submitted By: David Lourie (5044580431) Submitted On: 24-Mar-10

3-0 Evaluation **Concurred**
Please see the most current response to Comment ID 3016677 and also please note that clarifying discussion was added as part of the 75% report revisions in the first paragraph of Sec. 8.3.4.2.

Submitted By: Robert Patev (9783188394) Submitted On: 14-May-10

3-1 Backcheck Recommendation **Open Comment**
Please see the reviewer's follow-up response to Comment ID 3016677.

Submitted By: David Lourie (5044580431) Submitted On: 20-May-10

4-0 Evaluation **Concurred**
While we do not disagree with the comments of the reviewer, these values had little overall effect on the final barge impact values due to the short load duration and the lack of mobilization of the shear along the piles.

Submitted By: Robert Patev (9783188394) Submitted On: 08-Jun-10

4-1 Backcheck Recommendation **Close Comment**

Closed with the following comment. The reviewer understands the evaluator's response and appreciates the practical need to take certain inputs as "givens" when working on a multi-disciplinary project team and when working on limited aspects or features of a larger design or analysis effort. Furthermore, the reviewer accepts that these input values have little to no influence on the final barge impact results for the reasons the evaluator stated. Nonetheless, the reviewer believes that consistent and realistic soil parameters should be used in the analyses, and if there is a need to use values provided by others, they should be reviewed for their reasonableness by an experienced geotechnical engineer who has knowledge of the geology and experience in the project area. Finally, if it is determined that there are limitations on the values being used, but it is concluded their use has little to no practical influence on the results, the reviewer believes it is important to note clearly that the limitations are recognized, their influence has been evaluated, and then state their influence on the results that have been obtained.

Submitted By: David Lourie (5044580431) Submitted On: 15-Jun-10

Current Comment Status: **Comment Closed**

3016682	Geotechnical	Chapter 8, Development of Dynamic FEM Barge Impact Model to Determine Impact Forces, Tables 8.2, 8.3, and 8.4	Pages 135, 141, and 148	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

In these tables, Poisson's ratio (v) is taken as 0.4; for soft saturated clays, v is often taken as 0.4 to 0.5, with a value of 0.45 being common.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**

Noted. A soil-parameter sensitivity study revealed that, for a practical range of values, the variation of certain soil-strength parameters (e.g., v) did not result in a substantial change in hurricane protection structure response (i.e., the impact loads imparted were not markedly altered) . See Sec. 8.4.6.6 for numerical results that were obtained as a consequence of varying such parameters. Given this lack of sensitivity, representative design values were employed for this parameter.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 02-Mar-10
Current Comment Status: **Comment Closed**

3016683	Geotechnical	Chapter 8, Development of Dynamic FEM Barge Impact Model to Determine Impact Forces, Tables 8.5, 8.6, 8.7, 8.8, 8.10, 8.11, 8.12, 8.13, 8.14, 8.15, A-1, B-1, and C-1	Pages 151, 168, 174, 177, 178, 184, 186, 189, 191, 200, and 209	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

For clarity and completeness in these tables, the reviewer recommends adding the weight (362 tons) to the table in addition to noting the barge is empty. When a loaded barge is used, the weight also should be shown.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Barge weights (362 tons for empty, and 1645 tons for loaded) have been added to all tables. These have been incorporated into final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10
Current Comment Status: **Comment Closed**

3016685	Geotechnical	Chapter 8, Development of Dynamic FEM Barge Impact Model to Determine Impact Forces, Table 8.9	Page 173	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

For clarity and completeness, the reviewer recommends adding a column that shows the empty barge velocity in the transverse directed was 5 knots. Given that the empty barge velocity was 5 knots and the loaded barge velocity was only 4 knots, then it appears that the percentage differences in the maximum force shown in the last column of the table and discussed on Page 172 are a little misleading and understated. Please comment.

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Noted. An additional column has been added to Table 8.9 to emphasize the difference in impact velocity between the empty and loaded impact cases.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**
The response addresses the first part of the reviewer's comment. However, the second part of the reviewer's comment that is about the percentage differences in the maximum force shown in the last column of the table and discussed on Page 172. Because of the differences in barge velocities, the values are a little misleading and understated. Please comment.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10

2-0 Evaluation **Check and Resolve**
Column has been removed in table 8.9 to remove inconsistancy between results.

Submitted By: Robert Patev (9783188394) Submitted On: 11-Mar-10

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 24-Mar-10

Current Comment Status: **Comment Closed**

3016686	Geotechnical	Chapter 8, Development of Dynamic FEM Barge Impact Model to Determine Impact Forces, 8.4.6.6 Soil Strength and Stiffness	Page 187	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 75% Submittal)

The text notes that soil strength and stiffness were doubled, which resulted in relatively small changes in peak forces and reduced impact durations. Because of the increased soil strength and stiffness, one might expect deflections to decrease. Was this evaluated or noted?

Submitted By: David Lourie (5044580431). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Noted. Displacements associated with the strengthened soil models were indeed smaller. Commentary to this effect has been added to the relevant report section.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 26-Feb-10
Current Comment Status: **Comment Closed**

3016687	Structural	Section 7.10	107	n/a

In the experimental results (and CFD analysisl as discussed in the Teleconference call on Dec 17, 2009) it was observed that, the barge initially translated steadily towards the floodwall and then as it came close to the floodwall it accelerated towards the wall. Please explain this observation.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Noted. As the barge came close to the wall, the restriction in flow area between it and the wall caused an acceleration in flow. The Bernoulli effect (conservation of energy) caused a reduction in pressure or suction between the wall and the barge, resulting in the barge accelerating as it neared the wall.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Open Comment**
Did the results of CDF analysis show the reduction in pressure was sufficient to accelerate the barge towards a wall? Did results show negative pressure (suction) when the barge was near the wall? Please explain your response quantitatively with data and/or plots.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

1-2 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 21-May-10

2-0 Evaluation **Concurred**
Acceleration of barge due to Bernoulli effect was a qualitative observation from the experimental tests. This behavior occurred only after the barge first contacted the wall at a corner and was rotating towards it. The CFD analysis stopped at first wall contact, so it did not capture this behavior. This does not affect a significant difference in barge velocities in the final model.

Submitted By: Robert Patev (9783188394) Submitted On: 14-May-10

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 21-May-10
Current Comment Status: **Comment Closed**

3016688	Structural	Section 8	107	n/a

Dynamic FEM Impact Model The barge model did not include the under deck framing such as transverse and longitudinal bulkheads and frame frames. Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Noted. It is not clear what the reviewer is referring to in this comment. Further clarification is needed. However, it can be stated that the barge model incorporates all internal structural details that were present in the physical hopper barge that was modeled; this includes all internal frames, stiffeners, etc. Furthermore, given the focus on bow and stern impact conditions, only the internal structural configuration in these areas is likely to have a significant influence on the impact loads that are predicted.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016689	Structural	Section 8	107	n/a

The FEA Barge Impac Model: The barge model did not include any ballast compartments or ballast. This may have resulted in lower than actual mass of the vessels encountered in real situation. Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

Revised 25-Jan-10.

1-0 Evaluation **Concurred**

Noted. As is noted in the report, the bare steel barge model weighs 285 tons. However, observations by the USACE and others indicated that typical empty barge drafts are approximately 2 ft which corresponds to a weight greater than 285 tons. An additional residual payload was therefore added to the bare steel barge model to bring the total weight up to 362 tons, which produces a draft of 2ft. The 362 ton barge weight used in the simulations is therefore reflective of observed conditions, and can be thought of as either a barge with residual payload and/or ballast.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

Current Comment Status: **Comment Closed**

3016694	Structural	n/a'	n/a	n/a

Please include an explanation on how the effect of pitch and roll is accounted in terms of the buoyancy of the barge. How does the buoyancy force in the buoyancy springs change with respect to the pitch and roll of the barge? Please provide a brief explanation.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

Revised 25-Jan-10.

1-0 Evaluation **Concurred**

Noted. As noted in the report, each buoyancy spring produces a buoyant uplift force on a tributary area of barge bow based on the immersed depth at the location of the spring. With more than 26,400 such springs, the tributary area associated with each spring is quite small (approx. 9 square inches). If roll or pitch of the barge occurs during impact, the buoyant forces exerted by each spring on the barge will change based on vertical motions of each point on the barge bottom surface.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10

Current Comment Status: **Comment Closed**

3016697	Structural	n/a'	n/a	Section 8.3

The floodwal model (Fig. 8.43 & Fig. 8.44) does not include the cut-off sheet pile. Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Noted. The primary purpose of the sheet piling is not to provide lateral resistance to wall movement, therefore the sheet piling was not included in the structural model. The sheet pile is placed to provide seepage cuttoff.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016700	Structural	n/a'	n/a	Section 8.3

The uplift load diagram (Fig. 8.47) used in the FEA analysis is incorrect. Please refer to Section 5.8 of the USACE's latest "HSDRRS Design Guidelines" for the correct up-lift load diagrams.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Noted. The uplift pressure distributions used in the simulations were taken directly, without modification, from calculation summary sheets provided by the USACE. It is also noted that while these loads were included in the models for completeness, variations in the pressure distributions will have negligible effects on predicted impact loads.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016701	Structural	n/a'	n/a	Section 8.4

FEA Barge Impact Model Section 8.4 - Simulation Results: The transeverse velocity of the barge, Vx = 5 Knots seems too high. API RP2A Recommendations, suggest for a typical supply vessel of 180 to 200-foot length in U.S. Gulf of Mexico should be used as 1.64 ft/sec which is about 1/5th of the value Vx=5 Knots used in the analysis. Please explain the basis for using Vx = 5 Knots in the FEA analysis.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Noted. This velocity is specified for winds of a Category 1 to 2 hurricane based on the CFD results. API recommendations are not reasonable to use for velocities from winds and surge due to hurricanes. They also are considered for normal operating conditions.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 04-Mar-10
Current Comment Status: **Comment Closed**

3016703	Structural	Fig. 5.6	n/a	n/a

Please show the the WL in Figure 5.6.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
The WL will be shown on the figure in the final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016704	Structural	Fig. 5.8	64 & 65	n/a

Figure 5.8 on page 64 & 65 is missing. Please include this.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Figure will be included in final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3016705	Structural	Section 5.3.2	69	n/a

The text in the paragraph above Figure 5.14 on page 69 is somewhat ambiguos. Please include a sketch for the swing gate and explantion to clarify.

Submitted By: Jay Jani (504-412-8482). Submitted On: 25-Jan-10

1-0 Evaluation **Concurred**
Section will be revised and a sketch of the swing gate will be included in final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3017286 Structural Sec 5.1 59 n/a

The Scope of Work described In Section 5.1, suggest that, "PRO selected 3 walls and HPO selected one wal" for this study. However, the Pushover analysis and all other areas of this study seems to have only considered two 92) floodwalls for PRO instead of three(3) in the SOW. Please comment

Submitted By: Jay Jani (504-412-8482). Submitted On: 26-Jan-10

1-0 Evaluation **Concurred**
Noted. Pushover Analysis was preformed on (2) PRO walls & (1) PRO Dolphin. Since numerical modeling is being performed on (1) PRO Wall & (1) PRO dolphin structure, the remaining PRO wall is not included and will be removed from the final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3017304 Structural Figure 5.20 73 n/a

On Figure 5.20 FEA model pleased show the Waterline.

Submitted By: Jay Jani (504-412-8482). Submitted On: 26-Jan-10

1-0 Evaluation **Concurred**
Noted. WL will be shown in Figure 5.20 in final report.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3017331 Structural Section 5.4.1 74 n/a

What was the basis of using the load factor of 1.0 in the Push-over analysis? USACE "HSDRRS Design Guidelines" Section 5.5.3 recommends using the load factors as shown below: for D.L. & L.L - use Load factor of 1.7 Please provide explanation.

Submitted By: Jay Jani (504-412-8482). Submitted On: 26-Jan-10

1-0 Evaluation **Concurred**
Noted. A requirement of pushover analysis is the removal any partial satety factors in term of load or demand factors. This is why a load factor of 1.0 is used. This permits the analysis to be completed at truly a limit state condition of failure.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3017362 Structural Section 5.4.1 74 n/a

USACE "HSDRRS Design Guideline" Section 5.5.3 also recommends using: (i) a Hydraulic factor of 1.3 (for moment & shear) and; (ii) a Hydraulic factor of 1.65 (for direct tension). Please explain how this was incorporated in the push-over analysis, Barge Impact FEA study, etc.

Submitted By: Jay Jani (504-412-8482). Submitted On: 26-Jan-10

1-0 Evaluation **Concurred**
Noted. Similiar to previous question, pushover analysis is limit state and can have not partial safety factors included.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3017370 Structural Section 5.4.1 74 n/a

In push-over analysis only "empty-barge" condition was analyzed. The barges with full pay-load were not considered. Please explain

Submitted By: Jay Jani (504-412-8482). Submitted On: 26-Jan-10

1-0 Evaluation **Concurred**
Noted. Pushover analysis does not include any barges in the analysis per se but it is an incremental loading that is used to determine what the ulitimate load is when the factor of safety of the limit state goes below 1.0. This ultimate load can then be compared to the load from the dynamic FEA in terms of factor of safety.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3017411 Structural Section 5.4.1 75 n/a

On page 75 of Section 5.4.1. the defination of the failure modes used in the "Push-Over Analysis" is amibuous. Please clearly define and explain the rationale behind the failure modes titled "Damage" and "Collapse". The text on page 75 is not clear.

Submitted By: Jay Jani (504-412-8482). Submitted On: 26-Jan-10

1-0 Evaluation **Concurred**
Noted. These definitions will be made clearer in final report. The pushover results will be shown only for collapse loads and the damage states will be left to a separate table to show they were analyzed.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3017428 Structural Section 5.4.1 75 n/a

Please include the description about the "Analytical Model, including the elements such as Piles, Soil, reinforcement steel, boundary conditions used, material properties, etc.

Submitted By: Jay Jani (504-412-8482). Submitted On: 26-Jan-10

Revised 26-Jan-10.

1-0 Evaluation **Concurred**
This was inadvertently left out of the 75% review and has been added.

Submitted By: Kent Hokens (651-290-5584) Submitted On: 05-Feb-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 03-Mar-10
Current Comment Status: **Comment Closed**

3017455	Structural	n/a'	n/a	n/a

This Barge Impact Study was initiated based on the IPER comments in the original "HSDRRS Design Guidelines" In the response to our comments in the original "HSDRRS Design Guidelines" it was promised that all the comments will be addressed by this "Barge Impact Study". Please make sure all the comments in the original "HSDRRS Design Guidelines" are addressed.

Submitted By: Jay Jani (504-412-8482). Submitted On: 26-Jan-10

1-0 Evaluation **Non-concurred**
Since this PDT was not responsible for the original HSDRRS DG that was reviewed, it is out of the purview of the PDT to include those comments in this report and/or address them. The original comment resolution to the IEPR comments will be addressed through different process by the New Orleans District after this report is completed and certified.

Submitted By: Robert Patev (9783188394) Submitted On: 23-Feb-10

1-1 Backcheck Recommendation **Close Comment**
The 100% draft report will be reviewed to see if the original concerns are addressed by this study. It is also expected that in the 100% draft report, the current Barge Impact Study will come up with a recommendation for the realistic Barge Impact Loads for the design of HSDRRS projects in New Orleans and vicinity, and help update the current Design Guidelines.

Submitted By: Jay Jani (504-412-8482) Submitted On: 10-Mar-10

2-0 Evaluation **Concurred**
New DG will be written into Chapter 10 of the final report. These are intended to replace the DG presented in Chapter 2 that was an issue with the HSDRRS DG IEPR.

Submitted By: Robert Patev (9783188394) Submitted On: 04-Mar-10
Backcheck not conducted
Current Comment Status: **Comment Closed**

100% REVIEW – REVIEWER COMMENTS

Comment Report: All Comments
Project: Design Guidelines IPR
Review: Barge Impact 100% Report
Displaying 69 comments for the criteria specified in this report.

Id	Discipline	Section/Figure	Page Number	Line Number
3171616	Structural	Section 9	n/a	n/a

The original Scope of Work (SOW) as indicated in 75% Barge Impact document (page 6 & 218) included Chapter 9 - "EXAMINE CURRENT OVERSTRESS ALLOWABLES AND FACTORS OF SAFETY." This entire section about "Examining Overstress & Factor of Safety" is missing in the 100% Document. Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**

This chapter was eliminated by the PDT and was incorporated into Chapter 9 since the overstress factors and factors of safety are essentially part of the design guidelines and not a separate chapter.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**

As discussed and agreed during the teleconference call on Aprill 22, 2010, please discuss briefly and explain the determination of the recommended values for the barge impact design load cases, the Overstress factors (Section 9.4, 100% draft), recommended modifications to the HSDRRS Design Guidelines (Section 9.4.2., 100% draft) based on the Probabilistic Model, etc.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10

Current Comment Status: **Comment Closed**

3171664	Structural	n/a'	n/a	n/a

The original Scope of Work (SOW) as indicated in 75% Barge Impact document (page 6 & 220) included Chapter 11 - "DESIGN RECOMMENDATIONS FOR BARGE IMPACT ON HSDRRS FLOODWALLS"." In the 100% document, the DESIGN RECOMMENDATIONS and other sections (e.g. Sec 11.7, 11.8 & 11.9 outlined in 75% DOC) are missing. Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**

This chapter was eliminated by the PDT and was incorporated as Chapter 9 of the 100% report.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3171685 Structural Section 7 n/a n/a

The original Scope of Work (SOW) as indicated in 75% Barge Impact document (page 117) included, Section 7.13 Appendix B - "ROW EXPERIMENTAL DATA (to be included in final report)." This Appendix-B in Section 7 is missing in the 100% Document. Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**
This document was too large to incorporate into the 100% report. It will be incorporated into the final report. A copy of the Appendix B is attached to this comment for review

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10
(Attachment: MEI_Barge_Motions-App_B.doc)

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3171755 Structural Section 5.4 86 n/a

In the first paragraph of Section 5.4 it states, "USACE New Orleans District (MVN) and St. Paul District (MVP) performed the Nonlinear Static Pushover analysis for flood walls..." However, in 3rd paragraph on the same page (page 86) it states, "This, a nonlinear static analysis method (our analyses were linear) is used..." This is a contradictory statement. Furthermore, in Appendix - A - "Pushover Analysis of LPV 145, SB-11 T-wall; on Page A-3, the very first sentence states, "The STAAD analysis is a linearly elastic analysis" This is quite confusing and inconsistent. Please correct and clarify, whether the 'Nonlinear Static" or "Linear Static" analyses were used for "Pushover Analysis"

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Concurred**
All of the analyses performed for the study were static and linear. Paragraph 2 of section 5.4 will be edited to clarify this.

Submitted By: Kent Hokens (651-290-5584) Submitted On: 16-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3171781 Structural Section 5.4.1 88 n/a

On page 88, in the sentence, "Shear failures were assumed to occur at d/2 away from an assumed impact area....." Please define "d" on a sketch, and also explain the rationale behind this assumption.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Concurred**
d in reinforced concrete design is the distance from the extreme compression fiber to the centroid of the tension reinforcement. This definitioin will be added.

Submitted By: Kent Hokens (651-290-5584) Submitted On: 16-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3171797 Structural Section 5.4.1 88 n/a

The last sentence, "For impact at the center of the monolith, the yield line for moment would be along the base of the wall" Please show the yield line for this case on a Figure/sketch similar to Figure 5.18

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Concurred**
This should be able to be described without an additional sketch. The sentence will be changed to " For impact at the center of the monolith, the yield line for moment is a horizontal line at the base of the wall."

Submitted By: Kent Hokens (651-290-5584) Submitted On: 16-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3171804 Structural Section 5.4.1 89 n/a

For H-Pile Data Please correct the text - Pile Tip -75 ft. to Pile Tip EL (-) 75 ft.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Concurred**
Changed

Submitted By: Kent Hokens (651-290-5584) Submitted On: 16-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3171862 Structural Section 9.4.2 269 n/a

Please include a discussion about the basis and rationale behind selecting the Design Load Cases & Barge Impact Values for - "Usual", "Unusual" and "Extreme" load cases.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**
The selection of impact values for the three load cases is based on the USACE guidance in EM 2200 referenced in the section. This guidance allows the selection of usual, unusual and extreme load cases based on a return period depending upon the structure and load type. The PDT made the decision as to which return periods they would select such that it match existing design return periods for hydraulic events such as the 100 and 500 year events for wind and waves. This is common accpeted practice within the USACE and in engineering practice in general.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3171887 Structural Section 9.4.2 269 n/a

The USACE Design Guidlines, Section 5.6.2. - "Loading Considerations" recommends: - In addition to using ASCE 7 to determine maximum wind force, it also states using a minimum wind pressure of 50 PSF Please include the minimum pressure requirement in Design Load Cases in Section 9.4.2 as well.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**
This statement has been added to the final report as "A minimum value of 50 psf should be used as defined in Section 5.6.2 of the HSDRRS DG".

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3171903 Structural n/a' n/a n/a

In a slow-moving hurricane situation, a barge in near vicinity of a flood wall may stike the flood wall for more than once due to cyclic wave loading environment. Is this scenario of multiple barge impacts is considered in the study? This phenomenon may also lead to a situation of cumulative damage to a flood wall due to multiple impacts. Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**
While this may be a possibility, only first impacts were analyzed as part of this study since they generally impart the largest impact force to the structure.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Possibility of Multiple Barge Impacts: The first impact may be the largest, however, the structural strength may be progressively reduced with each impact. In other words, the effect of cumulative damage due to multiple impacts on a floodwall may lead to a progressively weakening structure and its eventual failure.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3171941 Structural 8 n/a n/a

In the dynamicfinite element analysis, what was the values of Dynamic Magnification Factor for the barge impact load? Please include a brief discussion on the natural period of the structures (flood walls, dolphins) and the duration of barge impact loading.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**

Dynamic magnification factors (DMFs) were not explicitly used in the barge impact analyses, nor quantified from the analysis results. However, fully dynamic (and nonlinear) contact-impact finite element simulation techniques were used to assess impact loads. When analyzed in such a manner, dynamic amplification effects were automatically included. Hence, dynamic magnifications are included in the computed impact force results. In regard to the natural periods of the wall structures, the approximate natural periods are discussed on page 208. For all oblique (1 degree or larger) impact conditions analyzed, load durations were greater than the natural period of the impacted structure.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10

Current Comment Status: **Comment Closed**

3171965 Structural 7.4 n/a n/a

In the CFD model, was the "Hydrodynamic Added Mass" in Longitudinal, Transverse and Rotational degrees of freedom was considered. Please clarify. Also, it may be helpful to include a small discussion on the CFD Model with all the corresponding hydrodynamic parameters, , coordinate system (a sketch), etc. used in the CFD analysis

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**

This question was addressed in 75% Response 3016668 as "The CFD model solves the Navier-Stokes equations of fluid dynamics. It does not separately model added mass or drag, but these values fall out from solution of the equations of motion. The sketch and coordinate system for the CFD model are shown in Figures 7.30 and 7.31."

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Open Comment**

As discussed and agreed during the teleconference call on Aprill 22, 2010, please provide more clarification on the "Added Mass Coefficients" Longitudial,Transverse and Rotational degrees of freedom.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10

2-0 Evaluation **Concurred**

Text has been revised. Figure has been modified. Table of material properties and boundary conditions has been added to final report.

Submitted By: Robert Patev (9783188394) Submitted On: 14-May-10

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 21-May-10
Current Comment Status: **Comment Closed**

3171991 Structural 7.4.5 142 n/a

Last paragraph on page 142 - The sentence, "The CFD also provided some surprising results, especially for Category 5 cases. empty barge weighing 362 tons in their empty condition, were sometimes flipped up out of the water and thrown toward the wall. In this case the barge became airborn, barge velocities exceeded 60 ft/s (41 mph)....." As pointed out in 75% document, this finding seems unrealistic, and may be due to some error in numerical solution during CFD analysis runs. Please review the validity of these computer runs, and provide explanation for this finding.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**
The results and boundary conditions have been checked for this analysis. The sustained winds for this condition are at 155 mph. This behavior was consistent and repeatable on the CFD model. As shown in Figure 7.35 of the report, the barge heels up and the wind catches beneath the hull. The wind force is then acting on the entire 195-ft by 35-ft keel, which could be over 400,000 lb of force. With a low draft to provide hydrodynamic resistance, the barge becoming airborne is not considered unrealistic. This type of behavior of "flipping barges" has been observed during heavy sea and wind conditions.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Open Comment**
As discussed and agreed during the teleconference call on Aprill 22, 2010, please incorporate the changes in the text (last pargraph on page 142) and in Fig. 7.35 corresponding to the CFD numerical simulation runs cut-off at t=1.75 seconds.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10

2-0 Evaluation **Concurred**
This modification to figure and text has been completed in final report

Submitted By: Robert Patev (9783188394) Submitted On: 14-May-10

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 21-May-10
Current Comment Status: **Comment Closed**

3171995 Structural 7.4.5 142 n/a

Please explain the difference in the Impact Velocity values deterimned by the experimental study and the CFD analyses

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**

The main difference is that the experimental study and lab faciliites only permitted impact velocities for wind speeds of about 75 -80 mph. For winds speedabove this level, the CFD data was used to supplement the barge velocities for three conditions: Category I, III and V hurricane events. The impact velocity values of the Category 1 data and upper ranges of experimental study were very close in impact velocities.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**

Please include this (abve) explanation in the final report in Chapter 7

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10

Current Comment Status: **Comment Closed**

3172016 Structural Figure 7.43 142 n/a

In Dynamic FEA, the Maximum Barge Impact Veocity of 5 Knots was used. From the CFD Analysis as shown in Figure 7.43, the maximum barge impact velocity in X-direction is about 22 ft/sec which is about 13 Knots. Also, Figures 7.36 to 7.41 show the Barge Impact Velocity values greater than 5 Knots. Please expain the basis of choosing the barge impact velocity of 5 Knots in the Dynamic Finite Element Analysis..

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**

The nominal 5-knot impact speed utilized by UF to conduct the bulk of the barge impact simulations was provided to UF by the USACE and was based on data that were simultaneously being generated by the Naval Academy. Regarding the possible effects of using increased impact speeds, the data presented in Figure 8.89 indicate a possible plateau in the impact forces that are generated at higher speeds, momentums, and kinetic energies (this phenomenon is generally associated with plastic deformation of the barge). The data presented in Figure 8.89 indicate that increasing the impact speeds from 5 knots to 13 knots would not generate a proportional increase in impact loads, rather a force¬-plateau would be reached at these impact energy levels. FYI, the maximum velocity used in the probabalistic model in Chapter 9 was 10 knots which was considered a weighted average from the three hurricane conditions at the impact locations show in Figure 7.43.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3172049 Structural 9.4.2 269 n/a

The Dynamic FEA Results listed in Table 8.8 suggest that, the values of the maximum barge Impact load for PRO dolhins, range from 307 Kips to 435 Kips. Design Load Cases for Dolphins Please explain the basis for recommending the design impact load valuess of 100 Kips, 160 Kips and 300 Kips; for "USUAL", "UNUSUAL" and "EXTREME" cases respectively.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

Revised 31-Mar-10.

1-0 Evaluation **Check and Resolve**
The recommended impact load values are determined using a probabalistic barge impact analysis that constructs a cumulative density function (CDF) for impact loads and not the actual loadings from the model since those are only a single point in the distribution. The CDF is based on wind speed, barge velocity, impact angle and impact location. This CDF then is multiplied by the probability of aberrancy to get the final impact value. This process is described in Chapter 9.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
As discussed and agreed during the teleconference call on Aprill 22, 2010, please discuss briefly and explain the determination of the recommended values for the barge impact design load cases, based on the Probabilistic Model, etc.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3172062 Structural Section 9.4.2 269 n/a

The Dynamic FEA Results listed in Table 8.7 suggest that, the values of the maximum barge Impact load for PRO Floodwalls range from 307 Kips to 722 Kips. Design Load Cases for PRO Floodwalls Please explain the basis for recommending the design impact load valuess of 0 Kips, 180 Kips and 350 Kips; for "USUAL", "UNUSUAL" and "EXTREME" cases respectively.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**

The recommended impact load values are determined using a probabalistic barge impact analysis that constructs a cumulative density function (CDF) for impact loads and not the actual loadings from the model since those are only a single point in the distribution. The CDF is based on wind speed, barge velocity, impact angle and impact location. This CDF then is multiplied by the probability of aberrancy to get the final impact value. This process is described in Chapter 9.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10

Current Comment Status: **Comment Closed**

3172074	Structural	Section 9.4.2	269	n/a

The Dynamic FEA Results listed in Table 8.6 suggest that, the values of the maximum barge Impact load for HPO Floodwalls range from 318 Kips to 1440 Kips. Design Load Cases for HPO Floodwalls Please explain the basis for recommending the design impact load valuess of 0 Kips, 200 Kips and 400 Kips; for "USUAL", "UNUSUAL" and "EXTREME" cases respectively.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

Revised 31-Mar-10.

1-0 Evaluation **Check and Resolve**

The recommended impact load values are determined using a probabalistic barge impact analysis that constructs a cumulative density function (CDF) for impact loads and not the actual loadings from the model since those are only a single point in the distribution. The CDF is based on wind speed, barge velocity, impact angle and impact location. This CDF then is multiplied by the probability of aberrancy to get the final impact value. This process is described in Chapter 9.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**

As discussed and agreed during the teleconference call on Aprill 22, 2010, please discuss briefly and explain the determination of the recommended values for the barge impact design load cases, the Overstress factors (Section 9.4, 100% draft) based on the Probabilistic Model, etc.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10

Current Comment Status: **Comment Closed**

3172094	Structural	8.5	232	n/a

In the 3rd paragraph of section 8.5, it is stated that, "Maximum force for perfectly side-on or nearly side-on impact conditions (0 deg and 1 deg), were generally larger than those produced during oblique impacts (15 deg or more). Insufficient information is currently available to quantify the probability of occurence of 0 deg to 1 deg....." In light of the above, can we really neglect the possibility of side-on barge impact condition in the Design Load Cases? Please comment.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**
The probability of a side impact (
Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3172121	Structural	Section 8.3.4	184	n/a

Under a Barge Impact condition, the Dlphin structures will absorb energy primarily from the following: 1. Localized plastic deformation (i.e. "denting") of the pile (tubular) wall 2. Elastic/plastic bending of the member 3. Elastic/plastic elongation of the member 4. Barge deformation and/or rotation Please include a dicussion on how each of the above were accounted for in the FInite Element Analysis.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**
All of the energy dissipation mechanisms noted above were included in the dolphin impact simulations. Energy dissipation through plastic hinging of the pipe piles supporting each dolphin was accounted for by assigning inelastic material models to both the steel pipe piles as well as the corresponding concrete plugs. Energy dissipation through inelastic deformation of the barge was accounted for through specification of an inelastic steel material model for all shell elements making up the barge model. Energy conversion due to redirection (rotation) of the barge was accounted for by using a dynamic contact-impact analysis procedure.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Please include this (above) explanation in the final report in Section 8.3.4.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3172150	Structural	Section 9.5	271	n/a

Section 9.5 Conclusions: (Page 271) The sentence, "The results from this study may require limited modifications to existing floodwalls under construction or in design in HPO or PRO but these results will not require a complete redesign of their floodwall protection structures" The flood protection structures in New Orleans and vicinity are designed based on USACE's HSDRRS Design Guidelines, which recommends using a design Barge Impact load of 100 Kips. The finding of current "Barge Impact Study" revealed that the "Barge Impact Load Values range from 307 Kips to to 1440 Kips. This values are much higher than the ones being used until now. In light of above, how can we justify the conclusion outlined in Section 9.5? Please explain.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**

The conclusions in Section 9.5 are based on the results presented from the probabalistic barge impact analysis and not from the FE model results for single impact cases presented in Chapter 8. Impact forece data from Chapter 8 is used to develop the probabalisitic model in Chapter 9 to determine the return period loads. These loads are distinctly different in magnitude and meaning and the information from Chapter 8 should not be use for design since the probability of occurence is not equal to one.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**

As discussed and agreed during the teleconference call on Aprill 22, 2010, please discuss briefly and explain the determination of the recommended values for the barge impact design load cases, the Overstress factors (Section 9.4, 100% draft), recommended modifications to the HSDRRS Design Guidelines (Section 9.4.2., 100% draft) based on the Probabilistic Model, etc.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10

Current Comment Status: **Comment Closed**

3172170 Structural Section 5.4.1 90 n/a

In Table 5.1 and Table 5.2 please clarify at what location the "deflections" are reported. A sketch may be helpful.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Concurred**

The deflections are at the top of the wall in the locations noted. This will be added to the description in the paragraph at the bottom of page 89.

Submitted By: Kent Hokens (651-290-5584) Submitted On: 16-Apr-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10

Current Comment Status: **Comment Closed**

3172189 Structural Section 5.4.1 90 n/a

In first paragraph below Table 5.1, the statement, "computed with a load increase of only 15%...." should be corrected as: "computed with a load increase of only 16%...."

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Concurred**
15% will be changed to 16%

Submitted By: Kent Hokens (651-290-5584) Submitted On: 16-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10

Current Comment Status: **Comment Closed**

3172207 Structural Section 5.4.2 93 n/a

In Pipe Pile Parameters, the Pile Tip - -135 ft should be corrected as; Pile Tip - EL(-) 135 ft

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**
This have been corrrected in final report.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10

Current Comment Status: **Comment Closed**

3172234 Structural n/a' n/a n/a

for the 75% document, In the evaluation response to my comment # 3016356, it was mentioned that, the wave travelling perpendicular to the floodwall and its effects such as wave reflection, standing wave conditions etc., will be modelled in CFD analysis and it will be documented in the final report. This information was not included in the 100% document. Please add a brief discussion about this in CFD Analysis section.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**
As discussed in Section 7.4.5 of the 100% report, the waves in the CFD analysis were traveling perpendicular to the flood walls. The wave reflection was captured in the CFD results.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Please include this (above) explanation in the final report in Section 7.4.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3172252 Structural n/a' n/a n/a

In 75% doc review, evaluation response to my comment # 3016596 it was promised that, in CFD Analysis section Figure of coordinate system, including a sketch showing the floodwall, barge, WL etc. will be included in the final report. This information was not included in the 100% doccument. Please include this information the report.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**
This information was included, as requested, in figures 7.31 of the 100% report.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3172255 Structural n/a' n/a n/a

In 75% doc review, evaluation response to my comment # 3016616 it was promised that, this comment will be addressed in 100% report. This comment was not addressed in the 100% doccument. Please include your response to my comment mentioned above in the final report

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**
The original response to comment #3016616 is repeated here: The CFD model was not calibrated to the physical results since they are under different wind conditions. The CFD model results were only compared to the physical results at the lower wind speed events. The CFD model solves the Navier-Stokes equations and does not have the ability to be "calibrated" to the physical models. In addition, the two models were used to complement each other in terms of wind speed and the determination of barge velocities. This slight

overlap of wind speeds produced similiar barge velocities.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3172256 Structural n/a' n/a n/a

In 75% doc review, evaluation response to my comment # 3016636 it was promised that, this comment will be addressed in the final report. This information was not included in the 100% doccument. Please include this information the report.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**
This information was included, as requested, in figures 7.31 of the 100% report.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3172258 Structural n/a' n/a n/a

In 75% doc review, evaluation response to my comment # 3016671 it was promised that, from CFD Analysis, the barge translation vs. time plots will be included in the final report. This information was not included in the 100% doccument. Please include this information the report.

Submitted By: Jay Jani (504-412-8482). Submitted On: 31-Mar-10

1-0 Evaluation **Check and Resolve**
This was included in figures 7.36 to 7.41 of the 100% report.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jay Jani (504-412-8482) Submitted On: 06-May-10
Current Comment Status: **Comment Closed**

3172558 Geotechnical Overall Document n/a n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

For clarity and completeness, the reviewer recommends adding a complete list of acronyms and abbreviations used in the document, along with definitions. Also, the reviewer recommends that the authors define an abbreviation/acronym at its first use in the text unless the first reference is in a heading. In that case, either use the abbreviation/acronym or the full term in the heading, but define the abbreviation/acronym in the following paragraph.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**

This will be added as a final appendix to the report and will be checked by the editors that will check the report for grammar, tense and consistency after the report is finalized after comments are all resolved.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10

Current Comment Status: **Comment Closed**

3172560 Geotechnical Overall Document n/a n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

There are various writing-related issues in the document that should be corrected. These include subject-verb agreements, tenses, word usage, and awkward sentence structure. The subject-verb issues occur in various places in the document. In Chapter 1 particularly, there are places where the tense issue occurs. In many passages, it is stated that something will be done (future tense); however, because this is a report that describes what has been done, the past tense should be used. In some cases the word "insure" and its variants are used, when the correct word is "ensure" or one of its variants.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**

This report will be checked by ERDC editors that will check the report for grammar, tense and consistency after the report is finalized after comments are all resolved.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Open Comment**

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10

1-2 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172561	Geotechnical	Abstract	Page 7	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

To improve the readability for a range of readers, the reviewer recommends either expanding the abstract or replacing it with an executive summary that provides a "roadmap" of the study and presents its key findings and recommendations.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
Abstract will be changed to an Executive Summary. This will be included in final version of report.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Concur. The reviewer has not seen the Executive Summary that the evaluator's response indicates will be developed to address the reviewer's comments. However, the reviewer's response of "Concur" is provided assuming that the stated Executive Summary will address the reviewer's comments.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172562	Geotechnical	Chapter 1, Introduction, 1.1 Background	Page 8	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

In the first paragraph, it's stated that Battelle's review of the Design Guidelines occurred in 2007. They actually were begun in 2008 and have continued into 2010.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
This sentence has been added to final report. "The guidelines were externally peer reviewed by Battelle in 2008 and have continued into 2010".

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172564	Geotechnical	Chapter 1, Introduction, 1.3 Authority	Page 10	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The reviewer recommends adding the word "safe" to the series that includes reasonable and cost-effective.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
The following sentence now reads in the final report as: "These guidelines are utilized to assist with developing safe, reasonable and cost effective designs for the risk reduction system surrounding the New Orleans area".

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172565	Geotechnical	Chapter 1, Introduction, 1.6.13 PDT review, ATR and IEPR of updated HSDRRS guidelines for barge impact loads	Page 14	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The target completion date is 17 February 2009; the reviewer thinks it should be a 2010 date.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
This date will changed in the final report depending upon when all the comments are resolved. This has now been changed to 'Target completion date: 30 April 2010" in the final report.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172566	Geotechnical	Chapter 1, Introduction, 1.7 Project Quality Assurance Plan (QAP)	Page 14	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The reviewer recommends changing the word "products" to "documents" in this paragraph.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
The term "products" has been modified to "documents" in this section of the final report.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172567	Geotechnical	Chapter 1, Introduction, 1.7 Project Quality Assurance Plan (QAP)	Page 14	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The second paragraph states that all reviewers will sign a certification statement. Please clarify if the IEPR team will be asked to sign the certification statement. If the IEPR team will be asked to sign it, please provide a copy of the proposed language for review. The words "certification" and "certify" have legal implications that could be problematic unless their meaning is well defined. Perhaps calling it a declaration would be better.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
This certification is only for the ATR and has been changed to reflect that in that sentence. The IEPR team provides a report as discussed in Section 1.7.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172568	Geotechnical	Chapter 2, Review existing HSDRRS Guidelines, 2.2 Existing HSDRRS Guidelines	Page 16	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The second sentence in this paragraph now reads, "The loads are minimal." For clarity, the reviewer recommends clarifying which loads are considered to be minimal.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
Sentence has been deleted from final version.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172570	Geotechnical	Chapter 4 IDENTIFY LOCATION OF HPO AND PRO	Page 68	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

In the first paragraph and in other locations in the text, reference is made to "St. Bernard's" when it should be "St. Bernard." The final paragraph contains the phrases "Jefferson West and Orleans East" and it should be changed to "West Jefferson and East Orleans."

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

Revised 01-Apr-10.

1-0 Evaluation **Check and Resolve**
These have been correct in final report.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172574	Geotechnical	"Chapter 5, DEVELOP TYPICAL HSDRRS FLOODWALL	Pages 75 and 76	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

Figures such as 5.4 and 5.5 are too small to read well. Also, in Figure 5.4, the various strata can't be identified.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Concurred**
We intended to revise these but it got left out of the 100% submittal. This will be revised.

Submitted By: Kent Hokens (651-290-5584) Submitted On: 16-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Concur. The reviewer has not seen the revised figures that the evaluator's response indicates will be substituted to address the reviewer's comments. However, the reviewer's response of "Concur" is provided assuming that the revised figures will address the reviewer's comments.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172577	Geotechnical	Chapter 5, DEVELOP TYPICAL HSDRRS FLOODWALL	n/a	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

For the 75% IEPR effort, the reviewer made multiple comments about the soil parameters, the approaches used to develop them, and some aspects of the data presentation. The review comments and follow-up backcheck comments that are unresolved from the 75% review are still applicable to this 100% submittal document.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
Please submit the 75% comment IDs that were not addressed to your satsifaction since all comments were addressed at 75% with a response.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Subsequent to the evaluator's comment, evaluator comments were made in response to related comments from the 75% review effort that the reviewer has now closed. Therefore, this comment will be closed.

Submitted By: David Lourie (5044580431) Submitted On: 15-Jun-10
Current Comment Status: **Comment Closed**

3172580	Geotechnical	Chapter 5, DEVELOP TYPICAL HSDRRS FLOODWALL, 5.3.1 PRO Fronting Protection Dolphins	Page 77	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

For clarity, the reviewer recommends adding text to the second paragraph that indicates the location of the Hero Pump Station project.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
This sentence has been added to the final report: "The dolphin structure used in the pushover analysis is taken from the WBV-3a Hero Pump Station project which is shown at the top of Figure 5.7".

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**
On April 22, 2010, IEPR team members had a conference call with representatives from Battelle and the USACE to discuss this comment and the evaluator response. Based on the discussion, the reviewer understands the evaluator will add text that specifies the physical location of the pump station. It is further understood that this information will be presented in the revised 100% submittal. Assuming that the stated change will be made by the evaluator as indicated, the reviewer has closed this comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172582	Geotechnical	Chapter 5, DEVELOP TYPICAL HSDRRS FLOODWALL, 5.3.1 PRO Fronting Protection Dolphins	Pages 77 and 79	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

In the second paragraph, it is stated that the pipe piles are driven to a depth of -135 feet. However, the Figure 5.8 shows the pile tips at El -135. Therefore, for clarity and accuracy, the differences between the text and figure need to be reconciled, i.e., Does - 135 refer to depth or elevation?

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**

This has been changed to EL (-) 135 in paragraph and accompying table in final report.

Submitted By: Robert Patev (9783188394) Submitted On: 19-Apr-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10

Current Comment Status: **Comment Closed**

3172583	Geotechnical	Chapter 5, DEVELOP TYPICAL HSDRRS FLOODWALL, 5.4.1 HPO Wall	Page 88	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The text states that pile loads and the forces in the concrete are not very sensitive to the spring constant. This is a subjective statement and the reviewer recommends quantifying the sensitivity.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Concurred**

The statement is based on iterations for pushover analysis that were not docuemnted. The report will be rewritten "In the iteration of spring stiffness performed to align the deflections used to compute the stiffness from the LPile results and the deflections computed by the STAAD model, The affect of the spring stiffness was checked and the pile loads and the forces in the concrete were not found to be very sensitive to the magnitude of the spring constant. "

Submitted By: Kent Hokens (651-290-5584) Submitted On: 22-Apr-10

1-1 Backcheck Recommendation **Close Comment**
The evaluator's proposed response improves what is now in the document and would be even better if the sensitivity was quantified numerically rather than subjectively.

Submitted By: David Lourie (5044580431) Submitted On: 25-May-10
Current Comment Status: **Comment Closed**

3172586	Geotechnical	Chapter 5, DEVELOP TYPICAL HSDRRS FLOODWALL, 5.4.1 HPO Wall	Page 88	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The text states that pile loads and the forces in the concrete are not very sensitive to the spring constant. This is a subjective statement and the reviewer recommends quantifying the sensitivity.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Concurred**
repeat of previous comment

Submitted By: Kent Hokens (651-290-5584) Submitted On: 16-Apr-10

1-1 Backcheck Recommendation **Close Comment**
The evaluator's proposed response improves what is now in the document and would be even better if the sensitivity was quantified numerically rather than subjectively.

Submitted By: David Lourie (5044580431) Submitted On: 25-May-10
Current Comment Status: **Comment Closed**

3172587	Geotechnical	Chapter 5, DEVELOP TYPICAL HSDRRS FLOODWALL	Pages 89, 93, and 96	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

These pages contain ultimate compression and tension pile capacity values. For clarity and completeness, the reviewer recommends citing the source of these values.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Concurred**

The source of the pile capacities was added. The capacities were incorrectly stated in the report and will be corrected (they were correct in the analysis)

Submitted By: Kent Hokens (651-290-5584) Submitted On: 16-Apr-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10

Current Comment Status: **Comment Closed**

3172589	Geotechnical	Chapter 5, DEVELOP TYPICAL HSDRRS FLOODWALL, 5.4.2 PRO Fronting Protection Dolphin	Page 91	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

Several passages state that certain things may need or need to be investigated further. The reviewer recommends clarifying if these statements are recommendations for future study or if they were addressed in the current study.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**

This is for future study since headlog impacts will occur at less than SWL levels and therefore would be more a daily barge impact event not included as part of this work effort. This has been changed in the text.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**

On April 22, 2010, IEPR team members had a conference call with representatives from Battelle and the USACE to discuss this comment and the evaluator response. Based on the discussion, the reviewer understands the evaluator will include additional language in the text and add the same to the Recommendations section of the report. It is further understood that this information will be presented in the revised 100% submittal. Assuming that the stated changes will be made by the evaluator as indicated, the reviewer has closed this comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10

Current Comment Status: **Comment Closed**

3172591	Geotechnical	Chapter 5, DEVELOP TYPICAL HSDRRS FLOODWALL, 5.4.2 PRO Fronting Protection Dolphin	Page 92	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The text states that spring constants below El -116 "were extrapolated to El -135. For clarity and completeness, the basis for the extrapolation should be discussed.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**

This should of read "extended" instead of extrapolated since soil data was limited in this area down to El (-) 135. This has been changed in final version.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10

Current Comment Status: **Comment Closed**

3172597	Geotechnical	Chapter 5, DEVELOP TYPICAL HSDRRS FLOODWALL, 5.4.3 PRO Floodwall – Algiers Canal	Page 96	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The text states: "Since the impact load is instantaneous, a relationship between the soil capacity versus instantaneous loading will need to be investigated." For clarity and completeness, please indicate if this investigation has been done or remains to be done and revise the text accordingly.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**

Text has been removed from section as the soil capacity and load has been included in the model itself.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172602	Geotechnical	Chapter 6 REFINE BARGE EMPTY/FULL COUNT FOR RISK	Page 101	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The text now reads: "These barges were considered aberrant if they were not in a location where previous barges were not moored or offloaded." The reviewer believes that first "not" between "were" and "in" should be deleted if they are to be considered aberrant barges.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
The word "not' has been removed.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172605	Geotechnical	"Chapter 6 REFINE BARGE EMPTY/FULL COUNT FOR RISK	Page 103	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

In the reviewer's opinion, the following statement is significant and should be emphasized in the abstract/executive summary and in the conclusions: "Given the there are a number of floodwalls that surround the downtown New Orleans area that have not been designed for any hurricane barge impact loads, this new USCG regulation should be carefully implemented so as not to move the risk from the lower areas to the upper areas, which are nearer to the higher-populated areas."

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Concurred**
The PDT agrees and this will be strongly emphasized as part of the executive summary.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172608	Geotechnical	Chapter 6 REFINE BARGE EMPTY/FULL COUNT FOR RISK	Page 109	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

In the reviewer's opinion, these two paragraphs need to be rewritten to increase their clarity. In the first paragraph, it is stated that many aberrant barges came into contact with flood walls. In the second paragraph, the conclusion is that only about 2% of barges were aberrant. If the 2% value is correct, this seems inconsistent with the "many" used in the first paragraph. Finally, the second paragraph states there were an estimated 2668 barges and 338 were estimated to be aberrant, this represents about 12.7% of the barges were aberrant. Elsewhere in the document is a statement: "The probability of an aberrant barge during a hurricane in New Orleans was estimated at 2 percent." This statement appears to conflict with the data that have been presented.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
The word "many" have been changed to "some" and the sentence modified to "that some of these barges in Category #2 did come in contact with the flood walls". A table has been added to define each category and the number of barges in each to show that the Category #2 aberrant barges give a probability of 2%.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172611	Geotechnical	Chapter 7 DEVELOP BARGE MOTIONS FROM NUMERICAL	Page 111	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The first paragraph states that only the empty barge condition was considered. For completeness, the reviewer recommends explaining the rationale for considering only empty barges.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**

This sentence has been added to the end of the first paragraph "The empty barge condition represents a significant portion of the aberrant barges documented during Hurricanes Katrina and Gustav as discussed in Chapter 6".

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10

Current Comment Status: **Comment Closed**

3172613	Geotechnical	Chapter 7 DEVELOP BARGE MOTIONS FROM NUMERICAL	Page 113	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The text states: "Due to the configuration of the tank, it was not possible to generate waves so that their crests were parallel to the wall." For completeness, the reviewer recommends discussing the consequences of this on the study and/or the study's results.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**

This is addressed in Section 7.5.1. While the experimental study was constrained, the CFD analysis was able to capture the full range of wind, waves, bottom elevation, and orientation. The CFD data was primarily utilized as the driving data for the velocity of the barge not the experimental data.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**

On April 22, 2010, IEPR team members had a conference call with representatives from Battelle and the USACE to discuss this comment and the evaluator response. Based on the discussion, the reviewer understands the evaluator will clarify the response; see also Comment ID 3171995 and the evaluator's response to that comment. It is further understood that this information will be presented in the revised 100% submittal. Assuming that the stated change will be made by the evaluator as indicated, the reviewer has closed this comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10

Current Comment Status: **Comment Closed**

3172616	Geotechnical	Chapter 7 DEVELOP BARGE MOTIONS FROM NUMERICAL	Page 114	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The text states: "It was not possible to model the changes in base elevation approaching the levee." For completeness, the reviewer recommends discussing the consequences of this on the study and/or the study's results.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**

This is adressed in Section 7.5.1. While the experimental study was constrained, the inclusion of a levee was captured by the depth of water used in the model that reflected the elevation of the top of levee. The CFD model however does include all aspects of the levee and those number are relied upon in the final design.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10

Current Comment Status: **Comment Closed**

3172620	Geotechnical	Chapter 8 DEVELOPMENT OF DYNAMIC FINITE ELEMENT	n/a	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

For the 75% IEPR effort, the reviewer made multiple comments about the soil parameters, the approaches used to develop them, and some aspects of the data presentation. The review comments and follow-up backcheck comments that are unresolved from the 75% review are still applicable to this 100% submittal document.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**

Specific responses to each of the comments 3016677, 3016679, 3016680, 3016681, and 3016682 from the 75% review have previously been provided along with corresponding changes/clarifications in the report. Additionally, a supplementary package of information and papers was uploaded to specific comments related to soil modeling was provided on 11 March 2010.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**

Subsequent to the evaluator's comment, evaluator comments were made in response to related comments from the 75% review effort that the reviewer has now closed. Therefore, this comment will be closed.

Submitted By: David Lourie (5044580431) Submitted On: 15-Jun-10

Current Comment Status: **Comment Closed**

3172624	Geotechnical	Chapter 8 DEVELOPMENT OF DYNAMIC FINITE ELEMENT	Page 227	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The final paragraph on this page states that soil resistance values were doubled and analyses were performed. As expected, deflections decreased and maximum impact forces were not very sensitive to the substantial increase in soil resistance. If the soil resistance values were reduced substantially, the reviewer would expect deflections to increase. Have analyses been conducted with reduced soil resistance values and what would be the consequence of increased deflections?

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**

In this study, it was of interest to obtain conservative estimates of impact force, hence only increased soil stiffnesses were explored. It was reasoned that increased soil stiffness might lead to a corresponding increase in impact force. In general, however, this was not found to be the case; impact forces were not strongly sensitive to the increase in soil stiffness. Reducing the soil stiffness would increase wall deflections, but would potentially lead to unconservative estimates of impact force.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**

On April 22, 2010, IEPR team members had a conference call with representatives from Battelle and the USACE to discuss this comment and the evaluator response. Based on the discussion, the reviewer understands the evaluator will add text to the report that reflects the evaluator's response shown here. It is further understood that this information will be presented in the revised 100% submittal. Assuming that the stated change will be made by the evaluator as indicated, the reviewer has closed this comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10

Current Comment Status: **Comment Closed**

3172627	Geotechnical	Chapter 9 HSDRRS DESIGN RECOMMENDATIONS FOR	Page 264	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

Tables 9.1 and 9.2 have the same titles; please resolve.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
This has been changed to "PRO" in final report.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172631	Geotechnical	"Chapter 9 HSDRRS DESIGN RECOMMENDATIONS FOR	Page 266	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

Table 9.4 presents the results and recommendations for the barge impact forces. While the reviewer doesn't necessarily disagree with the recommended values, it's not clear how they were developed from the joint probability values. In some cases, the recommended values are equal to the joint probability values and in other cases, the recommended values are greater than the joint probability values. Please comment and resolve and update the text as needed.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
The values selected in the final tables were selected by the team to account for model unertainities which required them to increase. The impact values have been changed in the final report to reflect an increase of 20% to account for the uncertainties in the model. This has also been added to the text as well.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172633	Geotechnical	Chapter 9 HSDRRS DESIGN RECOMMENDATIONS FOR	Page 267	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

In the numbered list, it is stated that: "The probability of aberrant barge is based on data collected from Katrina, a Category 3 hurricane and can be assumed to be an average probability." It's not clear the basis for the assumption that this is an average probability. Please clarify and update the text as needed.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
This is the average probability for the extreme events of categories I to V hurricanes. This will be modified in the text to reflect this.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**
On April 22, 2010, IEPR team members had a conference call with representatives from Battelle and the USACE to discuss this comment and the evaluator response. Based on the discussion, the reviewer understands the evaluator will change the word "average" to "mid-range" to avoid confusion caused by using a word with a specific numerical or statistical meaning. It is further understood that this information will be presented in the revised 100% submittal. Assuming that the stated change will be made by the evaluator as indicated, the reviewer has closed this comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172636	Geotechnical	Chapter 9 HSDRRS DESIGN RECOMMENDATIONS FOR	Page 269	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The text for EXTREME states a "300-kip load shall be applied..." Based on the Table 9.4, it should be a 310-kip load. Please resolve and update the text as needed.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
The values have been updated to correct impact load values in final version.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172637	Geotechnical	Chapter 9 HSDRRS DESIGN RECOMMENDATIONS FOR	Page 269	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

Here and elsewhere, the text provides for limiting the pile capacity to a factor of safety of 1.1. The meaning of this statement isn't clear to the reviewer. Also, what is the basis of the 1.1 value? Please clarify and update the text as needed.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
This has been changed and is updated in the design guidelines in Chapter 9. Please see final document for revisions.

Submitted By: Robert Patev (9783188394) Submitted On: 21-Apr-10

1-1 Backcheck Recommendation **Close Comment**
On June 2, 2010, an electronic copy of the revised document was provided to the IEPR panel to allow update referred to above to be reviewed. Based on the revisions shown in Chapter 9, the reviewer's comment has been addressed and the comment will be considered closed.

Submitted By: David Lourie (5044580431) Submitted On: 15-Jun-10
Current Comment Status: **Comment Closed**

3172639	Geotechnical	Chapter 9 HSDRRS DESIGN RECOMMENDATIONS FOR	Page 271	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The text contains many absolutes, e.g., optimally, minimize, and maximize. The reviewer recommends avoiding the use of absolutes because there are very few things that can be described accurately in absolute terms. Also, the use of absolutes can create or increase legal liability.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Concurred**
Agreed. This will be softened in final version of design guidelines.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10
Current Comment Status: **Comment Closed**

3172640	Geotechnical	Chapter 9 HSDRRS DESIGN RECOMMENDATIONS FOR	Page 271	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The text contains the statement: "The results from this study may require limited modifications to existing floodwalls under construction or in design in HPO or PRO but these results will not require a complete redesign of their floodwall protection structures." In the reviewer's opinion, this statement is confusing and possibly misleading because in some cases, the recommended barge impact forces developed in this study are much greater than those currently being used for design. Please resolve and update the text as needed.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
While the final impact numbers are higher, the conservative design of these structures will not create major modifications but minor modification under the unusual loads conditions and only require a resiliency check at the extreme load condition. The only redesigns will be if the extreme load condition causes the complete collapse of the floodwall. Damage will be permitted but collapse is not allowed. This will be reflected in the final report.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**

On April 22, 2010, IEPR team members had a conference call with representatives from Battelle and the USACE to discuss this comment and the evaluator response. Based on the discussion, the reviewer understands the evaluator will change the report text by deleting the word "limited" and inserting a "period" after the word "PRO." Also, the remainder of the sentence from "but" to "structures" will be deleted. It is further understood that this information will be presented in the revised 100% submittal. Assuming that the stated changes will be made by the evaluator as indicated, the reviewer has closed this comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10

Current Comment Status: **Comment Closed**

3172641	Geotechnical	Appendix A. References, COMPUTER PROGRAMS	Page 273	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft)

The list of computer programs appears incomplete. Please update and revise the text as needed.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**

Text in Appendix has been update to include the following: LS-DYNA, Livermore Software Technology Corporation FB-MultiPier, Florida Bridge Software Institute FB-Deep, Florida Bridge Software Institute

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 22-Apr-10

Current Comment Status: **Comment Closed**

3172645	Geotechnical	REACH 2 SHEAR STRENGTH DIAGRAMS	Page 12	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft; HPO Wall Pushover Design Calculations)

For the 75% IEPR effort, the reviewer made comments about the selection of soil parameters. The review comments and follow-up backcheck comments that are unresolved from the 75% review are still applicable to this document, too.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**

Please submit the 75% comment IDs that were not addressed to your satsifaction since all comments were addressed at 75% with a response.

Submitted By: Robert Patev (9783188394) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**

Subsequent to the evaluator's comment, evaluator comments were made in response to related comments from the 75% review effort that the reviewer has now closed. Therefore, this comment will be closed.

Submitted By: David Lourie (5044580431) Submitted On: 15-Jun-10

Current Comment Status: **Comment Closed**

3172646	Geotechnical	LPILE PY Curves converted to K for STAAD Analysis	Pages 20 and 56	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft; HPO Wall Pushover Design Calculations)

In the tables on these pages, it's not clear from what has been presented how the "K" values have been determined. For clarity and completeness, the reviewer recommends including sample calculations.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Concurred**

The table on page 56 was updated to explain better how the value of k was computed from P and Y values.

Submitted By: Kent Hokens (651-290-5584) Submitted On: 20-Apr-10

1-1 Backcheck Recommendation **Close Comment**

The revised table on Page 56 referred to by the evaluator adds clarity and responds adequately to the reviewer's comment, which allows the comment to be closed.

Submitted By: David Lourie (5044580431) Submitted On: 15-Jun-10

Current Comment Status: **Comment Closed**

3172647	Geotechnical	Modulus of Horizontal Subgrade Reaction	Page 8	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft; PRO Calculations and STAAD Results)

This table, which is identified as Plate 17, contains recommended design values. However, it's not clear to the reviewer what the basis for the values are because no supporting calculations are provided that show how the recommended values are developed from the measured soil properties. Please resolve and revise the text as needed.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**
Attached is the plate showing the calculations for the Kh values used in the analysis that the PDT obtained from MVN geotech.

Submitted By: Robert Patev (9783188394) Submitted On: 22-Apr-10
(Attachment: Horizontal_Subgrade_Reaction_for_Plate_17.pdf)

1-1 Backcheck Recommendation **Open Comment**
Thank you. The information presented on the attachment clarifies the values in the table. Please confirm that the equations and method will be included in the text.

Submitted By: David Lourie (5044580431) Submitted On: 25-May-10

2-0 Evaluation **Concurred**
This has been included in the PRO Calculations sheets

Submitted By: Robert Patev (9783188394) Submitted On: 07-Jun-10

2-1 Backcheck Recommendation **Close Comment**
Based on the evaluator's response, the reviewer will close the comment.

Submitted By: David Lourie (5044580431) Submitted On: 15-Jun-10
Current Comment Status: **Comment Closed**

3172648	Geotechnical	Pushover Analysis - Dolphin Structure Spring Constants	Page 11	n/a

(Document Reference: Aberrant Barge Impact Loads on Hurricane and Storm Damage Risk Reduction System (HSDRRS) Floodwalls, 100% Submittal -- Draft; PRO Calculations and STAAD Results)

It's not clear how the spring constants were developed because no supporting calculations are provided. Please resolve and revise the text as needed. Also, the KhB values below El -116 are indicated to be interpolated. Please provide the basis for the interpolation.

Submitted By: David Lourie (5044580431). Submitted On: 01-Apr-10

1-0 Evaluation **Check and Resolve**

The Kh below EL -116 was extend to El -135 since soil data was limited in this area down to EL (-) 135. See also response to comment #3172591.

Submitted By: Robert Patev (9783188394) Submitted On: 22-Apr-10

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: David Lourie (5044580431) Submitted On: 25-May-10

Current Comment Status: **Comment Closed**
