

APPENDIX A
Meeting Minutes and Response to Comments

APPENDIX A-1

Meeting Minutes

C-51 Rule Study

Meeting Summary

September 9, 2003

10:00 AM to 12:30 PM

To: Suelynn Dignard, Project Manager, SFWMD

From: Alan Hall, Project Manager, TBE

Subject: Review of Task 3 Preliminary Results

Attendees: Alan Hall, TBE
Bijay Panigrahi, BPC
Ron Mierau, SFWMD
George Hwa, SFWMD
Cal Neidrauer, SFWMD
Tony Waterhouse, SFWMD
Suelynn Dignard, SFWMD
Ken Todd, Palm Beach County
Jay Foy, ITID
Patrick Martin, LWDD
Alan Wertepny, Mock-Roos
Kathy Collins, SFWMD

The purpose of this meeting was to discuss the hydraulic data and assumptions which have been developed by TBE for the simulations for Task 3 of the study.

TBE/BPC representatives used a screen presentation to display our first-cut results from the initial simulations of the 10-year and 100-year design storm events with the federal project completed and operational. A key assumption of these first simulations was that no inflows from the sub-basins were artificially restricted to any pre-set values, in other words free-flow into C-51 was allowed limited only by the secondary control structures and the receiving water tailwater stages. Except for some uncharacteristic cycling on and off of the individual pumping units at S-319, everyone felt relatively comfortable with the performance of the model during these simulations.

It was agreed that these events would be re-run with a step-function for the 5 pumping units of S-319 as follows:

Pump Unit 1 = 550 cfs; Pump Unit 2 = 550 cfs; Pump Unit 3 = 960 cfs; Pump Unit 4 = 960 cfs; and pump Unit 5 = 960 cfs:

Pump Unit Number	On Stage	Off Stage
1	11.1	9.6
2	11.2	9.7
3	11.3	9.8
4	11.4	9.9
5	11.5	10.0

If these stepped criteria do not resolve the pump cycling then TBE/BPC will adjust the operational criteria such that a simulation which reflects Big Storm Operations will result in continuous pumping throughout the peak inflow period, approximately hours 60 through 80.

There was also significant discussion about the computed hydraulic profile between S-319 and S-155A. It was determined that, in addition to the pump triggering problems, the use of a calibrated channel roughness factor of 0.040 instead of the COE design value of 0.030 could be a contributing factor. It was decided that the best approach for the next phase of modeling is to stay with the calibrated factors but to perform a single run with the design value of 0.030 in the western reach for comparative purposes.

In accordance with the contract scope of work several additional simulations will be made over the next few weeks:

1. A “Baseline” Simulation will be made which assumes that the federal facilities are completed and fully operational and inflow from sub-basins will be artificially restricted in the model to that discharge rate that would be allowed under the existing Basin Rule criteria.
2. A “with Project” Simulation that assumes the federal facilities are completed and fully operational and inflow from sub-basins will be artificially restricted in the model to that discharge rate that was assumed by the Corps of Engineers in their design documents.
3. The initial simulations that were presented today will be re-run with revised pump operating criteria to simulate Big Storm operations, as discussed.
4. Three simulations including Sub-basin 14, Acme Basin B, as delineated in the contract scope:
 - a. Sub-basin 14 discharges into Sub-basin 13 via enhanced culvert connections, as described in the contract amendment, which in turn will discharge into C-51 with increased pumping capacity at the two western pumping stations of 120,000 GPM and 100,000 GPM respectively.
 - b. Sub-basin 14 discharges directly into STA-1E via 220,000 GPM pumping station.
 - c. Sub-basin 14 discharges directly into C-51 via a new canal along the west side of Sub-basin 13 with a 220,000 GPM pumping station.

A draft Technical Memorandum #3 which will include these simulations and draft criteria for the new Basin Rule will be delivered to the District on or about September 30, 2003. This committee will reconvene at 10:00 AM on Friday October 10, 2003 to review all of this and discuss next steps including rule-making schedules.

APPENDIX A-2

Response to Comments

C-51 Basin Rule Reevaluation Contract (C-13412)

Comments on Draft Deliverable #3

The comments listed below are compiled based on review of the revised draft deliverable by the internal SFWMD Team (Part A) and the external Technical Review Team (Part B) for the C-51 study.

Part A: SFWMD Internal Review Team Comments

The following comments on draft Deliverable #3 are provided by SFWMD's Internal Review Team for the C-51 study.

Comment A-1: Section 1.2, Page 1, Second Paragraph, Second Sentence:

- Replace “storage reservoir” with “stormwater treatment area”.

Response: *Revised*

Comment A-2: Section 1.2, Page 2, Task 3:

- This scope for this Task also included revised Figures for the rule 40E-41.263 (similar to 41-8 and 41-9 of) and required revised rule language to be drafted by the Contractor.

Response: *Revised*

Comment A-3: Section 1.3, Page 4, Task 3 scope of work bullets:

- Task 3 sub-tasks state (includes ACME Basin B). Remove these statements completely as these original Task 3 sub-tasks do **NOT** include ACME Basin B. The ACME Basin B scenarios are for the contract amendment as identified in the paragraph following the Task 3 sub-tasks.

Response: *Revised*

Comment A-4: Section 1.3, Page 4, Task 3 amendment scope sentence:

- Add “CERP Project” to the end of the sentence as follows: “The contact amendment for Task 3 includes evaluation of the following three (3) alternatives for the ACME Basin B **CERP Project**.”

Response: *Revised*

Comment A-5: Section 2.1, Page 6, Second Paragraph First Sentence:

- Missing word: “ As shown on Figure 2-1, **the** C-51 basin ...”

Response: *Revised*

Comment A-6: Section 2.2, Page 6 Paragraph 1:

- Only the C-51 canal is considered a “primary” canal. The others are secondary and tertiary.
- This comment applies to the first paragraph on Page 12 as well, since the main secondary canals are considered in this study as well.

Response: *Revised at both places*

Comment A-7: Section 2.3, Page 12, Methodology, Paragraph 1, Second Last Sentence:

- Missing word: “The outflow from the basin or reservoir is then conveyed to a discharge point through....”.

Response: *Revised*

Comment A-8: Section 3.0:

- Remove Without ACME Basin B Reference. The original scope does not include ACME Basin B. Address ACME Basin B as the contract amendment in the separate ACME Basin B Section.

Response: *Revised*

Comment A-9: Section 3.1.1, Page 20, First Paragraph and Section 3.2.1, Page 24, Paragraph 1:

- Second Sentence: S319, S361 and S362 should be S-319, S-361 and S-362.
- Fourth Sentence: missing “s” as follows: “... currently used for permitting purposes”.

Response: *Revised*

Comment A-10: Section 3.1.2, Page 20, Last Paragraph:

- Second Last Sentence states: “ The results for this alternative are summarized in Table 3-2 that presents a comparison of the simulated peak flow with the existing rule peak flow.” However, NO comparison is provided in Table 3-2. This table can be compared to Table 3-1.

Response: *Revised*

Comment A-11: Section 3.2.1, Paragraph 1, Sentence 1:

- This sentence is misleading as it is not the simulation identified in the scope of work that the basin rule would be based on for the 10-year, 72-hour design storm event.

Response: *Revised*

Comment A-12: Table 3-2 and other exhibits:

- ACME Basin B is not part of the C-51 basin rule at this time. An appropriate note needs to be made on this and similar exhibits.

Response: *Revised*

Comment A-13: Section 3.2.1, Page 24, Paragraph 1, Last Sentence:

- This last sentence “In addition, sub-basin 14 (ACME Basin B) is not considered part of the C-51 West, and is modeled to discharge to the WCA as

described in TM#2) should apply to section 3.1 as well. Confirm the modeling was done in this manner.

Response: *No revision needed*

Comment A-14: Section 3.2.2, Page 24, Paragraph 1, Last Sentence:

- The sentence is “Figure 3-2 also presents the water surface profile that corresponds to the lowest stage in C-51 at pump station 319 (river station 97360).” My question is why? Explain the usefulness of this.

Response: *Figures modified and the text revised*

Comment A-15: Section 3.2.3:

- Provide a discussion on why this run was simulated, and what it shows.

Response: *Revised*

Comment A-16: Section 3.2:

- Where is the intended basin rule run, with allowable discharges restricted as per the scope of work?

Response: *Revised, see Section 3.0*

Comment A-17: Section 3.3.1, Page 27, Paragraph 1, First Sentence:

- Missing word: “This model application establishes the basin rule simulation for the 100-year, 72-hour.....

Response: *Revised*

Comment A-18: Section 3.3.2, Page 27, Paragraph 1, Second Sentence:

- Replace “as described above” with the “as described above in Section XX” – use appropriate Section #.

Response: *Revised*

Comment A-19: Section 4.2.1, Page 32, Paragraphs 1 and 2, Several Sentences:

- In a number of places Sub-basins 13 and 14 are referred to as basins 13 and 14. Please correct.

Response: *Revised*

Comment A-20: Section 4

- Take out all reference to the basin rule in this section. This should be a stand alone section that presents and discusses the impacts to the C-51 canal and basin the three ACME Basin B CERP scenarios.
- **Section 4.2.2, Page 34, Section Title:** Revise to “ACME Basin B Alternative 1 Simulation for Peak Flow” Note – this applies to Sections 4.2.3, 4.3.2, 4.3.3, 4.4.2 and 4.4.3 as well.

Response: *Revised*

Comment A-21: Section 4.2.2, Page 34, Paragraph 1, Sentence 2 and other locations:

- Wording is awkward. Sounds like this is different than the Section 3 run. Is it? Explain better.

Response: *Revised; Yes, the Section 4 runs are different than runs of Section 3*

Comment A-22: Section 4.3.1, Page 34, Paragraph 1, First Sentence:

- Should be sub-basin 14.

Response: *Revised*

Comment A-23: Section 4 General:

- Where is the summary and conclusion of potential impacts of draining from ACME Basin B on the stage and discharge of the C-51 canal and sub-basins? There should be a discussion on the modelers' conclusion to Alts 1-3 runs and impacts to the Western C-51 canal reaches. Provide a discussion on how these additional scenarios impact the original scope of work results, if at all.
- There is no way to easily compare the different water surface profile. Tables and graphs of the resulting runs combined are needed. Provide a single plot that shows all three alternatives along with the model run without ACME Basin B. Provide the above comparison in tabular form as well.
- Provide duration comparisons in C-51 Canal as they relate to the stages.
- There should be combined hydrographs of points in C-51 for the model runs.
Points like
 - C-51 at S-5A-E (river station 109730)
 - C-51 at pump station 319 (river station 97360)
 - C-51 at Flying Cow Road Bridge (river station 88162)
 - C-51 at G-124 (removed) (river station 75176)
 - C-51 at Wellington Road Bridge (river station 65500)
 - C-51 at S-155A Headwater (river station (approx. estimate)58000)

Response: *Revised and updated to address all the above comments*

Comment A-24: All Water Surface Profile Plots:

- Same comment as previously provided for Deliverable 2 – plot the left and right canal banks.
- On the Water Surface Profile figures the Flow Direction arrow always goes from the western reaches toward the outfall. This is misleading. Flow directions are not always in this direction and the figures should show the different flow directions (i.e.. S-155A to S-155 (east from S-155A tailwater to S-155) and flow towards S-319)

Response: *Revised; see the revised figures*

Comment A-25: Appendices A-1, Page 2, Item 2:

- This item was not provided in the deliverable.

Response: *Revised as appropriate*

Comment A-26: Recommended Rule Language and Figures:

- Include Recommended Revised rule language and figures. Note on exhibits that ACME Basin B is not in the C-51 basin at this time.

Response: *Revised; See Section 5.0*

Comment A-27: General Comments:

- The uncertainty in model output as it relates to decisions about rule making has not been addressed. As you are aware, there can be more than one set of parameters that results in a "calibrated" model, thus providing more than one version of the calibrated model. It is possible (but certainly not definite) that each of these calibrated versions of the model could provide different results for the application scenarios. So, there needs to be some quantitative assessment of how this model can support the types of decisions required for the new rule making. The mere fact that the model is "calibrated" is not sufficient.
- Do not see how the model applications discussed in the report evaluate the new, proposed basin rules. This is partially because the report provides no summary of exactly what the new rules are, although it does do a good job of summarizing the existing rules as well as the results of the model development process. All that can be gathered from the alternative descriptions is the structural or operational changes mentioned along with all or most of the existing structures being left wide open.
- The water surface profiles associated with the various alternatives should be plotted together along with the water surface profile associated with the base condition. This would greatly facilitate their comparison. A similar suggestion would apply to the tabulated results.
- What exactly are the PM's used to evaluate each of the rules? Are there maximum allowable stages at various locations along C-51? Or, are restrictions based primarily on structure capacities? Also, I don't recall reading much discussion on comparing the various alternatives.
- Where are the electronic files containing the input data sets? These should be submitted along with the DSS files containing model output.

Response: *Revised; see the discussion sections in Section 3 and Section 4*

Comment A-28: Page 17:

- The Manning's n value of 0.03 is probably too low for the LWDD lateral channels. These channels generally have a smaller cross section than the other channels indicated (e.g. M2, E1, etc.) and should therefore have a higher value of n . Instead, it appears that they have lower values reported. This seems counter-intuitive. How was this previously explained (I don't recall)? Also, how sensitive are the model results (in light of whatever PM's are used) to the value(s) of n for these laterals?

Response: *Please refer to TM #2 for discussion on the n values*

Comment A-29: Page 18:

- I thought the primary control structure for basin 15A was the Amil gate located next to U.S. 98. Where is it listed in table 2-5?

Response: *Amil Gate is an In-line Structure as documented in Section 2.6 of the report. Table 2-5, as the title indicates, lists only the Lateral Structures and Pump Stations.*

Comment A-30: Page 19:

- Why was a tidal boundary not applied to the downstream end of C-51? This would impose the appropriate tail water condition to S-155 which, for the purposes of model application, should be operated in the model as closely as possible to its operational protocol.
- For what hydrologic conditions did the COE derive the seepage estimate of 300 cfs from STA-1E? Is this estimate also valid for the hydrologic conditions associated with the alternative scenarios? Also, seepage from STA-1E should be laterally distributed along the reaches of C-51 that are located adjacent to the reservoir.
- Are model results insensitive to the Initial Conditions cited?

Response: *Please refer to TM #2*

Comment A-31: Page 20:

- The second paragraph indicates that figure 3-1 shows canal cross sections. I do not see any canal cross sections in the figure.
- How were the discharge hydrographs modified?

Response: *Revised; please see the revised text and figures*

Comment A-32: Page 24:

- Why is basin 15B being treated differently from the rest of the basins?
- How does the described scenario reflect the proposed basin rule? How does it compare to the base scenario?

Response: *Revised; please refer to TM #2*

Comment A-33: Page 27:

- In this alternative, it was stated that a lower value of n was used for the reaches of C-51 located west of S-155A while no other changes to the base alternative were made. However, it appears that the water surface profile associated with the lowest stage at PS 319 increased throughout all reaches of C-51 west. With a lower n , I can understand the stages going up at PS 319, but they should decrease at locations further away. The results in figure 3-3 do not seem intuitive and should be clarified.

Response: *Revised; please refer to the revised text and figures*

Part B: External Technical Review Team Comments

The following comments are compiled based on review of the draft deliverable by the external Technical Review Team for the C-51 study.

Comment B-1: Page 20, Section 3.0 Model Application Without ACME Basin B:

- My opinion is to drop the "WITHOUT ACME BASIN B" – This is a contract add on not the main purpose of the study. Would also prefer the Acme B Alternates in an Appendix.

Response: *Revised*

Comment B-2: Table 3-2:

- Table 3-2 depicts a peak stage of 20.72' with 0.0 discharge for Basin 15B (ITID). This is misleading because there is outflow, not to C-51 but pumped discharge to L-8. All other tables also represent 0.0 discharge for Basin 15B. These other results are also misleading, however if we can get a run with discharges to C-51 they can be used for comparison. ITID may formally ask for this in the near future.

Response: *Revised*

Comment B-3: Section 3.1.3, Page 24:

- "The simulated peak stages for this alternative are summarized in Table 3-2 that presents a comparison of the simulated peak stage with the existing rule peak stage for each sub-basin." Table 3-2 DOES NOT COMPARE THE RESULTS, Table 3-2 CAN BE COMPARED TO Table 3.1.

Response: *Revised*

Comment B-4: Section 3.2.2, Page 24:

- "Figure 3-2 also presents the water surface profile that corresponds to the lowest stage in C-51 at pump station 319 (river station 97360)." ???WHY???

Response: *Revised*

Comment B-5: Figures 3-2, 3-3, 3-4, 4-2, 4-3, 4-6, 4-8, and 4-9:

- Figures 3-2, 3-3, 3-4, 4-2, 4-3, 4-6, 4-8, and 4-9 need to have y-axis grid lines and the scale from about 8.0' to about 18.0'. Show another graph with the bottom elevations if you choose, but these graphs need to focus on results. Results are the water surface profiles. I can't comment on these results because it is too difficult to see what the results are as presented. I respectfully request you consider a table depicting the water surface profiles in West C-51 for the various storms and analyses.

Response: *Revised*

Comment B-6: Sub-Basin 15A stages:

- The results appear to be too high for the Village of Royal Palm Beach, Basin 15A. Experience doesn't support 17.5' or higher in the VRPB for the 10 year 3 day storm. Previously requested the Amil gate discharges be checked. If the discharges are correct, it may be worthwhile to verify the stage storage relationship in this basin. The peak stages in the VRPB have been less than 1' higher than the peak stages in C-51 for over a decade.

Response: *The results reflect the proposed condition after the construction of S-155A*

Comment B-7: Page 10, Table 2-2a, Sub-Basin 13:

- Pumps at Pump Station Nos. 3, 4 and 6 are on at 12.1' and off at 12.0'. Below 12.0' gravity facilities lower the lakes/canals stages to the control elevation of 11.0.

Response: *No response needed*

Comment B-8: Figures 3-2, 3-3, 3-4, 4-2, 4-3, 4-6, 4-8, and 4-9:

- I concur with the comments regarding expansion of the vertical axis for Figures 3-1, 3-3, 3-4, 4-2, 4-3, 4-5, 4-6, 4-8, and 4-9.
- The tables for these graphs would also be helpful to identify actual stage information.
- Since the G-24 structure has been removed, the identification of this structure on all these figures should be replaced with the Big Blue Trace Bridge.

Response: *Figures have been modified*

Comment B-9: Sub-Basin 29 B Results:

- The analysis for Sub-Basin 29B, severely restricts discharges from this area. It is noted in Table 2-2b, that the structure is a 6' wide weir with six gates. It is recommended that this area be re-evaluated using operation of these gates. In pre-storm events, the gates are opened with permission of South Florida Water Management District (SFWMD) operation personnel stages are lowered upstream 1 to 1-1/2 feet. During storm events, the gates are opened only on permission with SFWMD. To simulate operation during the 10-year and 100-year storm events, I suggest that the gates be allowed to be opened to provide the allowable discharge of 24 cfs for the 10-year event. During the 100-year event the gate would be opened to the same height as for the 10-year event. Consequently, additional flow above 24 cfs would be experienced. The impact on the C-51 would be insignificant and could be simulated without using the full C-51 model. Table 3-5, Sub-Basin 29b, should be revised to reflect an increase in flow for the 100-year event along with the corresponding lower peak stage. Granted this may only lower the stage by 1/2 foot; however, it will lessen the impact on Sub-Basin 29B which is the only one of the sub-basins showing an increase from the C-51 Basin Rule.

Response: *Revised model run and text to reflect the correct information*

Comment B-10: Comparison to 1987 Rule:

- To clearly identify the impact of this 2003 Study with the C-51 1987 Rule, I suggest that you add the attached table. Please note that the peak stage for the 100-year event for all sub-basins, except Sub-Basin 29B, shows a significant drop in elevation.

Response: *Revised; please refer to the discussions in Sections 3 and 4*

Comment B-11: Tables 4-1, 4-3 and 4-5:

- Tables 4-1, 4-3, and 4-5 are labeled as summary of results for the 10 year design storm for the three alternatives, however, the table itself labels the

columns as the 100 year values. I'm sure it is just a typo, but it still needs to be corrected.

Response: *Revised*

Comment B-12: Comparisons:

- I made a table with the results of all the runs so I could compare each storm event together. It is much easier to evaluate that way. I will bring copies on Friday for those that would like a copy. There were some stages that didn't make sense to me that I thought we could discuss.
- The comparison of the COE 10 year results with the existing system 10 year results shows a substantial ($>0.5'$) difference in water profiles at the following locations:
 - Eastern C-51:** Sub-basin 17, sub-basin 25A, sub-basin 25B, sub-basin 27, sub-basin 28, and sub-basin 34.
 - Western C-51:** Sub-basin 11, sub-basin 12, sub-basin 13, sub-basin 16A, sub-basin 20A.
- Also, the 100 year water surface elevations for sub-basins 25A, 25B, and 26 are lower than the 10 year water surface elevations. On the surface (pardon the pun) that seems to be in error, but there may be some explanation.

Response: *Discussed and No Response needed*

C-51 Basin Rule Reevaluation Contract (C-13412)

Comments on Revised Draft Deliverable #3

The comments listed below are compiled based on review of the revised draft deliverable #3 by the internal SFWMD Team (Part A) and the external Technical Review Team (Part B) for the C-51 study.

Part A: SFWMD Internal Review Team Comments

The following comments on the revised draft Deliverable #3 are provided by SFWMD's Internal Review Team for the C-51 study.

Comment A-1: Section 1.3, Page 4, Task 3 scope of work bullets:

- Task 3 sub-tasks still state (includes ACME Basin B). Remove these statements completely as these original Task 3 sub-tasks do **NOT** include ACME Basin B. The ACME Basin B scenarios are for the contract amendment as identified in the paragraph following the Task 3 sub-tasks.

Response: *Removed*

Comment A-2: Section 2.1, Page 6, Editorial:

- Paragraph 2: Square miles to one decimal place is sufficient. Please replace 177.83 with 177.8.
- Paragraph 3: Second sentence – add “the” before C-51 canal.
- Paragraph 4: Second sentence – add “the” before C-51 canal.

Response: *Replaced; Added; Added*

Comment A-3: Table 2-2b, Page 11:

- The S-155 structure should be listed.

Response: *Added to the Table*

Comment A-4: Table 2-5, Page 18:

- Please sort the table by the first column.

Response: *Sorted as appropriate*

Comment A-5: Table 3-1, Page 21:

- Title indicates Summary of Existing Rule (Baseline Condition). Which does this table represent - the existing rule or the baseline condition - as they are different. Believe these are the Existing Rule numbers, therefore remove (Baseline) or revise as appropriate as this title is misleading.
- Table footnote identifies -- as “did not contribute or not applicable”. The table uses both “--” and “not applicable”. Please replace the “not applicable” with “--”.

Response: *Removed; Replaced*

Comment A-6: All Tables with Alternative Results:

- In all tables showing results, the STA (sub-basin 2A) should have dashes "--" in place of flow and stage values. The values are not appropriate to the purpose of these results.

Response: *Tables 3-2a, 3-2b, 3-3a, 3-3b, 3-4a, 3-4b, 3-6a, 3-6b, 3-7a, 3-7b, 4-1a, 4-1b, 4-2a, 4-2b, 4-3a, 4-3b, 4-4a, and 4-4b are modified as suggested*

Comment A-7: Section 3.1.3, Page 23, Second Sentence:

- Suggest adding peak stage to this sentence: "This is consistent with the existing rule peak stage conditions as presented in Table 3-1."

Response: *Added*

Comment A-8: Table 3-2a, Page 24

- Table footnote identifies -- as "did not contribute or not applicable". The table uses both "--" and "not applicable". Please replace the "not applicable" with "--".
- This table indicates that the total sub-basin discharges for this baseline condition are approximately 110 cfs lower than the existing rule. Most of this difference is attributable to sub-basin 8 being underestimated by 75 cfs and sub-basin 33 being underestimated by 33 cfs. All of the others are much closer. Have you completed any sensitivity to determine the overall impact of underestimating the peak flows from these two sub-basins?

Response: *"not applicable or n/a" are replaced with "--";
Please refer to Section 3.1.2 that starts on Page 20 and continues on to Page 23. This is not an underestimation, but represents actual condition.*

Comment A-9: Section 3.3.1, Page 29, First Sentence:

- Remove the "a" from "...exception being the use of a different Manning's n coefficients along the C-51 canal in the C-51 West basin.

Response: *Removed*

Comment A-10: Section 3.5.1, Paragraph 1, Last Sentence:

- This sentence states "Since, the flow was restricted for Alternative 3 (according to the USACE design conditions) for the sub-basins in the C-51 West, the peak discharge values in C-51 in the restricted sub-basins are obviously lower than the other two alternatives representing unrestricted flow conditions." Intuitively this makes sense. However, when you look at Table 3-7a, there are a number of sub-basins where this is not true. For example, sub-basins 1, 2B, 7, 8, 10, 13, 16B and 36 all have higher discharge in Alternative A3 than the others. This is contradictory to the above noted sentence. Please explain.

Response: *The text has been revised and expanded*

Comment A-11: Section 3.5.2, Page 40, Paragraph 2 reference to Figure 3-3a:

- Why is the profile for Alternative A2 higher?

Response: *This is true along the C-51 canal west of the pump station 319, and is probably due to lag of pumped water from sub-basins west of the pumps station*

Comment A-12: Table 3-7a and Table 3-7b:

- Include the Existing Rule condition in the tables. This will avoid confusion and help to explain why Alternative A0 does not show a difference of 0.

Response: *Included in these tables*

Comment A-13: Figures 3-2b and Figure 3-3b:

- The scale in these figures can be expanded as there is no data plotted below the 8 ft range.

Response: *Expanded the plots for these figures with vertical scale ranging from 5 ft to 17 ft*

Comment A-14: Section 4.1, Page 44, Bullet 2:

- Add (sub-basin 13) after Basin A.

Response: *Added*

Comment A-15: Section 4.2.1, Page 44, Paragraph 1:

- Sentence 1: Remove “the” from before the second sub-basin 13.
- Sentence 2: Replace “be” with “are”.

Response: *Removed; Replaced*

Comment A-16: Section 4.2.1, Page 44, Paragraph 2:

- The increased capacities of Pumps 3 and 4 add up to the 491 cfs required for ACME Basin B. The second sentence reference to Pump Station 6 suggests that some of Basin B flows are accounted for by this PS #6, however, this is not the case. Please modify wording to clarify intent.

Response: *Modified the sentence*

Comment A-17: Section 4.2.1, Page 44, Paragraph 3, Second Sentence:

- The Figure 4-1 referenced in this sentence does not show the 3 culverts under Pierson Road as stated in this sentence.

Response: *Modified the text*

Comment A-18: Section 4.2.3, Page 46, Second Sentence:

Section 4.3.2, Page 49, Second Sentence:

Section 4.3.3, Page 49, Second Sentence:

Section 4.4.2, Page 53, Second Sentence:

Section 4.4.3, Page 53, Second Sentence:

- Sentence is awkward. Please reword.

Response: *Reworded*

Comment A-19: Section 4.3.1, Page 49, Paragraph 1:

- First sentence - Identify the C-1 canal as ACME canal.

- Replace “Canal C-1” with “C-1 canal” in first and second sentence.
- Second sentence – Add “would” immediately after Pump Station #7.

Response: *Identified; Replaced; Modified as appropriate*

Comment A-20: Section 4.4.1, Page 53, Paragraph 1:

- First Sentence - Switch “directly pumped” to “pumped directly”.
- First Sentence - Remove the “the” from before STA-1 East.
- Second Sentence - following Alternative B2, replace “and” with “but”.

Response: *Switched; Removed; Replaced*

Comment A-21: Section 4.4.1 and reference to Figure 4-3, Page 53:

- Figure 4-3 does not show this alternative going up the C-1 canal and into the STA as implied.

Response: *Channel routing for C-1 is not simulated, and therefore Figure 4-3 correctly represents this alternative as implied*

Comment A-22: Section 4.5.1, Page 57+ and Pertinent Figures:

- The B alternatives need to be compared to the ‘new’ conditions. Please compare the B alternatives to the A1 alternative – both in the text and the figures.

Response: *As per instruction from the District, Sections 3 and 4 were kept independent from each other as much as possible; No changes needed*

Comment A-23: Section 4.5.1, Page 57, Paragraph 2, Second Last Sentence:

- Similar to Comment A-15. Previous text indicates that Pump Stations 3 and 4 were increased by the 491 cfs required for ACME Basin B water. However, this sentence implies Pump Station 6 is being used for Basin B water. Please clarify text to appropriately reflect how it was actually modeled.

Response: *Refer to Responses for Comments A-15 and A-16 above*

Comment A-24: Section 4.5.1, Page 57, Editorial:

- Paragraph 2, Sentence 1 - Remove the “the” from before “three alternatives”.
- Paragraph 2, Sentence 2 - Remove the “the” from before “water surface”.
- Paragraph 2, Sentence 3 - Remove the “the” from before “Alternative B3”.
- Paragraph 2, Sentence 5 - Remove the “the” from before “Alternative B2”.
- Paragraph 2, Sentence 6 - Remove the “the” from before “Figure 4-4a” and “Appendix C-2”.
- Paragraph 3, Sentence 4 - Remove the “the” as first word of the sentence, and remove the “the” from before “close proximity”, and “Alternative B1”.

Response: *Removed; Removed; Removed; Removed; Removed; Removed*

Comment A-25: Section 4.5.2, Page 61, Editorial:

- Paragraph 1, Second Last Sentence - Remove the “the” from before “sub-basin 13”.

- Paragraph 3, Sentence 4 - Remove the “the” as first word of the sentence, and remove the “the” from before “close proximity”, and “Alternative B1”.
- Paragraph 3, Sentence 4 and Sentence 5 - Swap “structure S-155A” with “S-155A structure”.
- Paragraph 3, Sentence 5 - Remove the “the” from before “pump station 319”.
- Paragraph 3, Sentence 5 - Add “of” to read “... two feet for all of the alternatives.”
- Paragraph 3, Sentence 6 - Remove the “the” from before “Figure 4-5b” and “Appendix C-2”.

Response: *Removed; Removed; Swapped; Removed; Added; Removed*

Comment A-26: Section 4:

- Include a Recommendation for the ACME Basin B alternatives and why.

Response: *Out of Scope Item*

Comment A-27: Section 5.1, Page 65:

- Paragraph 1, Last Sentence - Replace “lowered than” with “lower than”.
- Paragraph 1, Last Sentence - Remove the “the” from before “sub-basins” and “sub-basin 29B”.
- Paragraph 2, Sentence 2 - In two places, remove the “the” from before “sub-basins”.

Response: *Replaced; Removed; Removed*

Comment A-28: Section 5.2, Page 66:

- Last Paragraph, Second Last Sentence – quantity is spelled wrong.

Response: *Corrected*

Comment A-29: Previous B-8 Comment:

- Request was to rename the “G-24 structure location” to “Big Blue Trace Bridge”, not to remove the identification section completely.

Response: *G-24 does not exist – this structure had been removed; G-24 is not the same as Big Blue Trace bridge; this bridge has already been simulated in the model*

Comment A-30: Previous Comment B-12:

- In the Appendix, delete this comment as it is a duplicate of B-11.

Response: *Deleted; comments auto-renumbered*

Comment A-31: Page 13:

- How can the model be calibrated to stages at S-5AE when this location is already included in the model as a stage boundary? Instead, they should ensure that discharge is negligible at this boundary since the gates were closed during Irene.

Response: *S-5AE is deleted from the sentence*

Comment A-32: Page 17:

- In the first paragraph, it says that S-155A is assumed operational. I thought it was supposed to remain closed. Please clarify.
- It is still not clear why a lower n value is being applied to the smaller channels. This seems counterintuitive.

Response: *Operational means their existence in the model;
Smaller channels have frequent maintenance schedule. The model uses n values correctly, no change is needed*

Comment A-33: Page 19:

- Why was a tidal boundary not used at the downstream end of C-51?
- I was not able to locate the document or report that substantiates the cited seepage rate of 300 cfs. The specific report should be cited and included in the list of references. Also, is this seepage rate applicable to the hydrologic and hydraulic conditions depicted in these model simulations? If it is, it should be entered into the model as a distributed lateral inflow as opposed to a point discharge at the upstream end.
- Why was an initial base flow of 100 cfs applied at the upstream end of C-51 when it was stated previously that STA-1E seepage provides a base flow of 300 cfs?
- Desk top calculations along with measured canal stages and ground water levels can be used to estimate initial base flow values. These estimates could be checked against pre-storm measured canal flows.

Response: *Not relevant to the model used;
Based on communication with USACE, distribution of 300 cfs along a 3 to 4 mile long canal (from west end to pump station 319) is insignificantly small compared to total runoff inflows and the flow magnitude along C-51;
As documented in the report, 100 cfs is used as the boundary condition for C-51 East basin, while 300 cfs is used as the boundary condition for C-51 West basin;
For predictive runs like the present model applications, measurements are not available*

Comment A-34: Page 20:

- None of the structures indicated (except maybe pumps) are shown in figure 3-1.

Response: *The text has been modified to reflect the nodal diagram (Figure 3-1)*

Comment A-35: Page 23:

- It was indicated that for the baseline condition, the peak discharge from each sub-basin was limited to the permitted discharge. Therefore, shouldn't the deviations shown in table 3-2a be close or equal to 0?

Response: *Refer to responses for Comments A-8 and A-12 above*

Comment A-36: Page 32:

- In the first paragraph, it is stated that scenario A3 assumes unrestricted flow from the sub-basins to the C-51 channel. In contrast, the next paragraph states that these flows were restricted. Please clarify within the text that the restrictions were applied to C-51 West.
- Since the sub-basin peak discharges were restricted to the USACOE design rates, shouldn't the simulated discharges shown in tables 3-5 and 3-6a be equal to (or at least nearly so) these rates (see, for example, the results for sub-basin 16A)?

Response: *First sentence in Section 3.4.2 is modified; Editorial corrections made to these Tables*

Comment A-37: Page 36:

- It is stated that the sub-basin discharges for scenarios A1 and A2 are identical since sub-basin conditions did not change. However, the computed C-51 stages are not necessarily the same since a different n value was used. The C-51 stages affect sub-basin tailwater conditions which, in turn, affect sub-basin discharges. How, then, can they be identical? I agree that they can be very close, but the use of the word "identical" is misleading.
- Don't both alternatives A1 and A2 assume unrestricted sub-basin discharges? If so, why is it stated that A1 has the highest unrestricted discharge to C-51?

Response: *Changed "identical" to "similar";
The text in last paragraph is modified appropriately*

Comment A-38: Page 40:

- Given the discussion in the first paragraph, it may be more useful to report changes in surface ponding depths if land surface elevations have been modified between scenarios.
- It may be worthwhile to state that the lower n value used in scenario A2 had some effect on the water surface profile comparisons.
- It may be useful to compare PS 319 discharges and STA-1E stages across scenarios.

Response: *Not the intent of basin rule criteria; not necessary; not relevant to basin rule*

Comment A-39: Page 49:

- What are the operational criteria for the new PS #7?

Response: *Same as for existing ACME PS #3, #4 and #6*

Comment A-40: Page 57:

- In the first paragraph, the word "reveal" should be "reveals".
- In the last paragraph, some explanation of the differences in the stage hydrographs between scenarios should be provided.
- Where is PS 39? Should this read 319?

Response: *Corrected; This section is intended for 10-yr, 72-hr discharge comparison. Discussion on stage differences has been added to Section 4.5.1; Corrected*

Comment A-41: Page 58:

- Include alternative A1 results in table 4-4a.

Response: *As per the scope of services, A alternatives are not compared to B alternatives*

Comment A-42: Page 61:

- In the first paragraph, it is not clear why sub-basin 13 will have stages lower than existing conditions if sub-basin 14 discharges are being directed into it.

Response: *This is due to time lag for water to move from sub-basin 14 to pump station locations in sub-basin 13*

Comment A-43: Page 5 of Responses to Comments:

- The second and third responses given here do not address the comments/questions indicated.

Response: *Second Response (for Comment A-27):*

Out of scope Item; Already addressed in Section 5.0; Already addressed in Section 3 and section 4; Already addressed in Section 3 and section 4; All model files including DSS files will be submitted electronically in CDs in Appendix C-3

Third Response (for Comment A-28): Lateral and equalizer canals have better maintenance schedule, and thus lower n values

Comment A-44: Page 6 of Responses to Comments:

- The second response given here does not address the questions indicated.

Response: *Second Response (for Comment A-30): See Response to Comment A-33 above*

Comment A-45: Section 3.5.2, Page 40 Paragraph 1:

- Please provide additional clarification on why sub-basin 29B is 1.6 ft higher than the existing rule condition. The last sentence implies that the development since 1987 proceeded in a manner significantly different than had been anticipated in 1987. However, I believe the intent of the statement is more along the lines of the current topography is more accurate and having smaller sub-basins in this area more accurately depicts the sub-basin elevations, stage-storage relationship and ultimately the 100-year stage. Please revise the wording to more appropriately depict and clarify the intended reasoning for the higher stage in this sub-basin.

Response: *No changes made, the report correctly describes the reasons*

Part B: External Technical Review Team Comments

The following comments are compiled based on review of the revised draft deliverable by the external Technical Review Team for the C-51 study.

Comment B-1: Alternative Descriptions:

- The alternate descriptions are difficult to understand. If a simple lay description could be added it may help.

Response: *No response needed*

Comment B-2: Figure 5-1 and 5-2:

- I tried using Figure 5-2 from Draft TM#3 and found it very difficult to figure out where you are due to the background image. The same is true for Figure 5-1. These needs to be much, much more clear in the rule. The background needs to have major streets shown and named.
- The aerial background shown in previous figures would also help to identify location within the basin.

Response: *Some street references have been added to the background map*

Comment B-3: Page 44-64, Section 4 – Model Application – Acme Basin B Alternative Evaluation:

- In the September 2003 draft of Technical Memorandum No. 3 the 10-year and 100-year water surface profiles for each of the alternatives were identical. In this October 2003 draft, the 10-year water surface profiles along the C-51 are different for each of the alternatives and the 100-year difference between each of the alternatives is insignificant. Why the differences in the 10-year stage? Was the September 2003 Report in error? Please confirm?

Response: *Yes. Editorial errors*

Comment B-4: Page 66, Section 5.2 – Basin Rule Language (5):

- “Projects within the C-51 Basin shall provide ½” of dry retention/detention pretreatment as part of the required retention/detention.” Previously this requirement was applicable for only the Western C-51 Basin. What is the justification for applying this criteria for the entire C-51 Basin?

Response: *The original intent of this criteria in the first Basin Rule was to protect the Loxahatchee Wildlife Refuge from water quality impacts from discharges generated within the Western Basin. During this study process several comments were made about the potential impacts on the Lake Worth Lagoon of allowing higher discharge rates from new development in the Eastern Basin in the future. Since it is well understood that the implementation of the federal project elements will significantly reduce the peak rates and volumes of discharges to the Lagoon, by virtue of the redirection of storm flows to the Stormwater Treatment Area 1 East, it was felt that the restoration of the Lake Worth Lagoon would be well-served by the implementation of this additional water quality provision, similar to what had been applied to the western areas since the mid-1980s. This is only a recommendation during this draft rule language, which may not be accepted by the District or incorporated into the final rule language.*

Comment B-5: Appendix C1 – HEC-HMW Model Results:

- A nodal diagram, a table, and a description would be extremely helpful to determine the location and significance of the hydrologic element referenced in the Summary Table. Discharges in this Table seem to be extremely high? Are these referencing the peak discharge for the inflow or outflow hydrograph (example – Sub-basin B10 references a peak discharge of 240.66 cfs whereas the 10-year, 72-hour outflow discharge for this same Sub-basin (Table 3-3A) is 3 cfs, S155 for the 10-year event peak discharge is identified as 55,781 cfs peak discharge yet the maximum peak discharge for S155 is approximately 7,700 cfs). Discharges in the Appendix C-1 Summary Table appear to be extremely high and potentially misleading. It would be helpful for both the 10-year and 100-year storm events that the peak discharge along the C-51 Canal be clearly identified. Such a table should contain the location on the C-51 (e.g., S155A, Military Trail, Turnpike, State Road 7, etc., Canal Station) and corresponding peak discharge. As far as I can tell TM#3 does not have any information on the peak discharges along the C-51 Canal. In particular, how much is being discharged into the Lake Worth Lagoon and easterly through the S155A divide structure?

Response: *Nodal diagrams for all alternatives have already been included in Section 3 and Section 4 of the report. Appendix C-1 is already in tabular form, which is a direct output of HEC-HMS model. The sub-basin runoff values in this model output are referred by “B” prefix (for example, B5 refers to runoff for sub-basin 5). As explained in great details in TM #2, all other values in this output are not relevant since the hydraulic simulation (channel routing) is not performed in HEC-HMS. All hydraulic results including peak discharges and peak stages along the C-51 canal must be obtained from HEC-RAS model output (not from HEC-HMS). No modification to Appendix C-1 is necessary.*

Comment B-6: C-51 Maximum Water Surface Elevations and Peak Discharges

- It is extremely difficult in this report to determine the maximum water surface elevations and peak discharges along the C-51 Canal for the 10-Year and 100-Year storm events. To address this it is recommended that a section (Model Application C51 Profiles) be added to the report, to include discharge and stage information for the unrestricted flow condition (Alternative A1). The current report does not clearly identify the discharges along the C-51 nor can the stage information be obtained from the profiles as shown in Figure 3-2A and Figure 3-3A. A table with this information is needed. This data will be extremely useful in the development of Federal Emergency Management Agency Flood Insurance Rate Maps for the C-51 Basin and in South Florida Water Management District permitting of future developments within the C-51. With the addition of this new section in the report, the Appendix C1 and C2 could be eliminated.

Response: *Appendix C-3 will include CDs containing complete model input and output for all alternatives along with the DSS files. Users can easily extract relevant information to satisfy their individual needs.*

Comment B-7: Project Manager Request for Response to Comments B-5 and B-6

- The C-1 and C-2 Appendices are not user friendly. I would like to see them modified, but not replaced by a new section in the report. Suggestions are:
- Appendix C-1 provides the HMS discharges, which are arbitrary as they are not the discharges from the sub-basins that make their way to the C-51 canal. I would like to see the current Appendix C-1 replaced with a table showing the discharges to and along the C-51 canal, at node locations and major roads, with an appropriate description such as road names such that the location can be determined at a glance.
- Appendix C-2 provides the RAS maximum water surface elevations in the C-51 canal, but in a way that is very difficult to read. Similar to above bullet, I would like to see the current Appendix C-2 entries related to the C-51 max water surface elevations replaced with a table showing elevations along the C-51 canal, at node locations and major roads, with an appropriate description such as road names such that the location can be determined at a glance. The Appendix could be split, or sorted such that the C-51 max profiles are together and the data tables are together. A suggestions is that C-1 could contain the peak discharges, C-2 could contain the max water surface elevations, and C-3 could contain the data tables.

Response: *For the second bullet, Appendix C-1 is a direct output of HEC-HMS model, which represents sub-basin runoff values (hydrologic model results), not discharges (discharges come from HEC-RAS after channel routing). The sub-basin runoff values in this model output are referred by “B” prefix (for example, B5 refers to runoff for sub-basin 5). As explained in great details in TM #2, all other values in this output are not relevant since the hydraulic simulation (channel routing) is not performed in HEC-HMS. All hydraulic results including peak discharges and peak stages along the C-51 canal must be obtained from HEC-RAS model output (not from HEC-HMS). Therefore, Appendix C-1 is not appropriate to present peak discharges along C-51 canal. In addition, discharges from each sub-basin for each alternative are presented in corresponding tables in Sections 3 and 4 of the report;*

For the Third Bullet, the tabular values of stages corresponding to figures (profiles) were specifically requested by the review panel. Accordingly, the figures are in the main body of the report and the corresponding tabular values (with appropriate references) are in Appendix C-2. In addition, all tables in Appendix C-2 are now titled with reference to corresponding figures. However, a new summary table has been prepared and added to Appendix C-2, which presents selected structures along C-51 canal by name, river station, peak discharge and peak stage for Alternative A1. Please refer to Response to Comment B-6 for extraction of data (flow or stage) along C-51 canal or any where else in the model area.