

WEST Sacramento Levee Improvement Program
Board of Senior Consultants

Comments and Recommendations
Following Meeting No. 2
Of the Board of Senior Consultants
On January 27-28, 2010

Report Prepared by:

Board of Senior Consultants:

Dr. David T. Williams
Dr. Ray E. Martin
Mr. George L. Sills

April 1, 2010

April 1, 2010

Mr. Ken Ruzich
General Manager
West Sacramento Area Flood Control Agency (WSAFCA)
1110 W. Capitol Ave.
Sacramento, CA 95691

Dear Mr. Ruzich:

I. Introduction

This report presents the comments and recommendations for the West Sacramento Levee Improvement Program (WSLIP) by the Program's Board of Senior Consultants (BOSC) following a meeting held for, and with, the BOSC on January 27-28, 2010. This meeting was the second formal meeting of the Board and was held to provide to the Board the progress to date of the analyses and designs being developed as part of the effort to provide 200-year flood protection to the Program.

During this meeting, presentations were made to the Board regarding the following subjects (the agenda is attachment 1):

- CHP Academy Design Status
- The Rivers design status
- The Rivers alternatives analysis
- Design Criteria (lessons learned by BOSC on other projects)
- Review Comments

The following comments are related to the meeting proceedings and the issues rose during the meeting with specific comments, by project location, related to submitted reports, plan documents and presentations at the meeting. Also, the BOSC responses to the updated "Instructions to the Board" are shown in Attachment 3.

Please note that a supplemental report may be produced for the evaluation of the 90% submittal should it be deemed appropriate before the next BOSC meeting.

II. General Comments

A. Check and Back check Spreadsheet

Add into the Check and Back check spreadsheet a column for the BOSC to say it looked at the item but there is not action to be taken by the BOSC until what is proposed is completed.

III. CHP Academy Site

A. Drainage Layer on Riverside Slope Protection

It is possible that the existing drainage layer filter system may have failed or will fail in the future due to the updated design criteria. The BOSC considered several options for mitigating this problem and concluded that it should not be relied upon to maintain the required phreatic surface through the levee. It is recommended that the system be abandoned in place and that suitable alternative designs be developed to meet the needs of this segment of the levee system.

B. Riprap Design

There is an existing riprap bank slope protection on the riverside of the Sacramento bypass. This riprap should be examined to assure that the thickness, gradation and toe down depths are adequate for the 200 year design condition. The MBK unsteady flow hydraulic model should be used to determine the most critical design conditions, which may not be at the peak discharge. If there is an existing basis of design, it should be examined to see if it meets the 200 year event hydraulic criteria along with the wind and wave forces on the riprap. If the basis of design cannot be found, a riprap design should be developed, compared to the existing riprap gradation and thickness, and remediated if necessary.

C. SB-Wall Lead in Trench Specifications

The maximum slope should be specified for the lead-in trench.

D. Expanded Slope Protection

A filter system, below the concrete block slope protection, should be design to prevent piping of embankment material when the flood level declines and drawdown seepage occurs from the embankment. If filter fabric is to be used, non-woven material is preferred. The design should be provide to the BOSC for review.

E. Existing Concrete Liner

A portion of the existing concrete slope protection will remain in-place; therefore it should be evaluated using the new design standards to make sure the system will be effective during the design life of the planned levee improvements.

IV. The Rivers Site

A. Relief Wells

During the presentations, Kleinfelder had recommendations on the next steps for the Rivers relief wells study, as follows:

- 1) Perform additional geotechnical investigations to confirm the extents and continuity of the confining blanket layer; provide cross sections so the BOSC can adequately evaluate the relief well design.
- 2) Meet with representatives from the California Department of Water Resources (DWR), the Sacramento District Army Corps of Engineers, and the Central Valley Flood Protection Board (CVFPB) to review the design and required O&M activities and easement boundaries, and
- 3) Meet with the Regional Water Quality Control Board (Region 5S) and review the 15% design to obtain their input regarding management of collected seepage waters and any other concerns they may have.

The BOSC agrees with these steps but urge that the meetings proposed in items 2 and 3 be conducted first before item 1 is performed. Should the meetings indicate that the use of relief wells is a viable alternative, the BOSC recommends that a well designed and instrumented field pumping test be conducted. Instrumentation should include sufficient number of piezometers to monitor both design pumping tests and performance during flood events.

In addition, the BOSC wants to be assured that the relief wells alternative is not rejected due to easement issues. The wells could be placed in numerous locations along a rough alignment that addresses the easement issues and still be effective.

B. Levee Toe Trench

The BOSC questioned the need for the planned toe key trench. The designers should justify the need for this feature or delete it from the design.

C. Compacted Fill Lift Thickness

The planned lift thickness for construction of the levee embankments was discussed. The BOSC agreed that an 8 inch loose lift should be used to provide an approximate compacted thickness of 6 inches.

D. Boring Log Legends

At present, the Kleinfelder boring logs and the URS boring logs use two different legends to define the material types. The BOSC suggests that one legend be selected and used on all documents.

V. General Comments

The specifications should limit the number of items that the owner is required to approve. The specifications should be as specific as possible to avoid owner approval.

VI. Closing Remarks

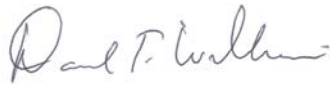
The BOSC has not had time to review all the pertinent documents; therefore, the BOSC cannot make a final determination of the adequacy of the design(s). However, the Board feels that from the review of the documents to date and the progress presented in the meeting, the project is well designed and well thought out. The comments and suggestion presented in the report are meant to enhance the project for efficiency and safety. When the additional documents and plans are reviewed, the Board will present another report.

The Board appreciates the efforts of the design team members who prepared and presented numerous valuable summaries of the designs completed to date. The various presentations and discussions were informative to the Board and helped introduce and clarify the design teams' thought processes.

The Board looks forward to future meetings, briefings, and discussions on this project.

Very truly yours,

**West Sacramento Levee Improvement Program
Board of Senior Consultants**



Dr. David T. Williams, P.E. CFM.



Mr. George L. Sills, P.E.



Dr. Ray E. Martin, P.E.

Attachments:

- Attachment 1: Meeting Agenda
- Attachment 2: Charge to the Board
- Attachment 3: Instructions to the Board

Attachment 1

**WEST SACRAMENTO LEVEE IMPROVEMENT PROGRAM
BOARD OF SENIOR CONSULTANTS
MEETING NO. 2**

Date: January 27-28, 2009
Time: 8:00 am to 5:00 pm
Location: West Sacramento Boathouse; 3650 Southport Parkway, West Sacramento
95691

DAY 1

II. INTRODUCTION

8:00 AM-8:30 AM

- Welcome and Opening Remarks (WSAFCA)
- Meeting Purpose & Expectations (MBK)
- Agenda Overview (HDR)
- WSLIP Program Schedule (WSAFCA)

III. CHP ACADEMY DESIGN STATUS

8:30 AM-11:30 AM

- General Overview of Site Deficiencies and Corrective Measures (HDR)
- Design Modifications since 60% submittal (HDR)
- Interior Drainage Layer – condition and fate (Kleinfelder)

IV. LUNCH *(To Be Provided)*

11:30 AM-12:30 PM

V. CHP ACADEMY DESIGN STATUS (Continued)

12:30 PM-2:30 PM

- Re-use of On-site Material (HDR and Kleinfelder)
- Easement Boundaries, Access and Utility Relocations (HDR)

VI. THE RIVERS DESIGN STATUS

2:30 PM-5:00 PM

- Project Extents and Alternatives Analysis (General) (HDR)
- Design Status for Riparian Offset (Station 71+00 through 101+50) (HDR)
- Termination Point for Truncated Levee Upgrade (HDR/Kleinfelder)
- Recreation Features (HDR)
- Easement Boundaries, Access and Utility Relocations (HDR)

DAY 2

- VII. THE RIVERS ALTERNATIVES ANALYSIS** **8:30 AM-10:00 AM**
- Overview – Purpose and Scope (HDR)
 - 15% Relief Well Design/Feasibility Assessment (HDR and Kleinfelder)
 - Other Alternatives (HDR)
- VIII. DESIGN CRITERIA** **10:00 AM–11:30 AM**
- SAFCA Experience (BOSC)
 - Applicability to WSLIP (Open Discussion)
- IX. LUNCH/BOSC Working Session** **11:30 AM – 2:30 PM**
- Note: Design team to be available, as needed, to address BOSC questions
- X. REVIEW COMMENTS** **2:30 PM – 4:30 PM**
- Overview of Comments
 - Comment Clarification & Discussion
 - Summary of Actions for Comment Resolution
- XI. CONCLUSIONS & ACTIONS** **4:30 PM – 5:00 PM**

Attachment 2

**WEST SACRAMENTO LEVEE IMPROVEMENT PROGRAM
BOARD OF SENIOR CONSULTANTS**

CHARGE TO THE BOARD

The West Sacramento Area Flood Control Agency (WSAFCA) has assembled this Board of Senior Consultants (Board) to conduct an independent and external expert review of the levee improvements under design by the WSAFCA and its consultants for construction. The Board is charged with confirming that the design investigation and analysis and associated recommendations for levee improvements at each site are acceptable for providing 200-year level of flood protection in an urban environment. The Board shall consider current and relevant regulations, policy, standards, and guidance for the design and construction of flood protection measures in rendering its opinion. The Board shall document its findings that will include, but is not limited to, responding to the instructions provided by WSAFCA. WSAFCA shall be responsible for providing the Board with instructions, the historic data and records, programmatic or planning studies, and design phase data and documentation necessary to understand the technical context and natural setting within which the levee improvement recommendation has been proposed.

Attachment 3

**WEST SACRAMENTO LEVEE IMPROVEMENT PROGRAM
BOARD OF SENIOR CONSULTANTS**

INSTRUCTIONS TO THE BOARD, Meeting No.2

WSAFCA requests that the Board specifically consider the following concerns (BOSC comments in bold):

1. Has sufficient geotechnical data (quantity and quality) been collected to adequately characterize each EIP Site and support the levee improvement design alternative recommended?

Kleinfelder has submitted plans for obtaining additional data but the City has not approved the plan at this time. The BOSC will evaluate the results of these plans as they become available.

2. Are the stability and seepage models assembled analyzed for the geotechnical bases of design - including model stratigraphy, material strengths and hydraulic conductivities - considered legitimate representations of the boring log, cone penetration test, and laboratory data collected from the project locations?

Per item 1 above, analyses cannot be performed until the data has been examined.

3. What considerations are raised regarding the evaluation of the existing drainage layer at the CHP Academy?

The BOSC has a moderate degree of concern that the geotextile woven fabric can easily become clogged, and additionally, the drainage rock could become a medium for piping. There are numerous documented cases where woven geotextile material has clogged and led to failures. Therefore, an analysis should be made assuming the fabric is impervious. An inspection technique should be developed, such as a manhole, so that visual inspection can be performed to determine the source of the seepage. The BOSC recommends that this section be designed with adequate remediation such that this drainage system is not relied upon to meet design requirements.

4. What considerations are raised regarding the rationale for leaving it in place in conjunction with installation of an adjacent SB wall?

If the recommendations in item 3 above are followed, the BOSC does not see a problem in constructing the adjacent SB wall.

5. What considerations are raised regarding a) the potential re-use of on-site degrade material and b) building the levee in cross-section zones, by material type?

a) The BOSC concurs with the design team that the reuse of existing material should be maximized. The clay liquid limit (LL) can be raised from 45 to at least 55 as long as a 3H: 1V slope or flatter is maintained. Additionally, SAFCA had written a request for such a variance to the Central Valley Flood Protection Board (CVFPB) and received approval of this variance. WSAFCA is urged to obtain a copy of this letter and the approval and ask for the same variance from the CVFPB.

b) The BOSC concurs that this approach is acceptable for sandy material if it is encapsulated and economical. Clays with LL higher than 55 can also be used, if encapsulated.

6. What considerations are raised regarding the east-end termination point of the revised Rivers project extents?

This location is at a very large levee section and is an excellent location for a termination point.

7. Is the interim level of flood risk increased due to the proposed project termination points? Are any levee deficiencies magnified or created at the temporary or permanent limits of construction?

Based upon the design information provided for the Rivers Project, no adverse effects are apparent.

In providing commentary on these and other matters related to the documents reviewed for these projects, please provide the following where possible:

- A clear statement of the degree of concern;
- The basis of the concern;
- The significance of the concern; and
- The actions needed to resolve the concern