

San Francisco Bay Conservation and Development Commission

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September 12, 2018

TO: All Engineering Criteria Review Board Members

FROM: Lawrence J. Goldzband, Executive Director (415/352-3653; larry.goldzband@bcdc.ca.gov)
Rafael Montes, Senior Staff Engineer (415/352-3670; rafael.montes@bcdc.ca.gov)sprinting

SUBJECT: Draft Minutes of November 1, 2017, BCDC Engineering Criteria Review Board Meeting

1. **Call to Order.** The meeting was called to order by the Chair, Dr. Roger Borchardt, at 1:03 p.m., at the Port of San Francisco - Pier 1 Bayside Conference Room, The Embarcadero, San Francisco, California.

The following Board Members were present: Dr. Roger Borchardt, Board Chair, Robert “Bob” Battalio, PE, Professor Mary Catherine Comerio, James “Jim” French, PE, GE, William Holmes, SE, Frank Rollo, PE, GE.

The following Board Members were not present: Richard B. Dornhelm, PE, Professor Martin Fischer, Lou Gilpin, PhD, CEG, and Professor Jack Moehle

BCDC Staff Members present were: Ms. Jaime Michaels, Chief of Permits, Rafael Montes, Senior Staff Engineer and Board Secretary.

The audience included the following: Cleve Livingston (Laconia Development LLC), Jeff Fippin (ENGEO), Pedro Espinosa (ENGEO), Uri Eliahu (ENGEO), Angelo Obertello (Carlson, Barbee & Gibson), Marc Percher (Moffatt & Nichol), Mike O’Hara (North Waterfront Cove LLC), Dilip Trivedi (Moffatt & Nichol), Sam Tooley (Moffatt & Nichol), Brad Porter (Moffatt & Nichol), Brian Lewis (Brickyard Cove Alliance for Responsible Development (BCARD)), Susan Hubbard (Brickyard Cove Alliance for Responsible Development (BCARD))

2. **Approval of Draft Minutes of August 8, 2017 Engineering Criteria Review Board (ECRB) Meeting.** Chair Borchardt asked for a motion and a second to adopt the minutes of August 8, 2017.

MOTION: Mr. Rollo moved approval of the minutes, seconded by Ms. Comerio.

Chair Borchardt noted that Mark Fischer was marked as both attending and not attending the August 8th ECRB meeting and Brad McCrea as attending the meeting. Mr. McCrea was not at the August 8th ECRB meeting. He asked that these items be corrected.

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State of California | Edmund G. Brown, Jr. — Governor



ECRB MINUTES
November 1, 2017

Board Member French stated that there was a typo on page 7. After liquefaction it should be S with a little e after it. On page 12 in the second to the last paragraph, first line change “deflect backwards” to “reflect backwards”.

VOTE: The motion carried with a vote of 6-0-0 with

Chair Borchardt, Mr. Battalio, Ms. Comerio, Mr. French, Mr. Holmes and Mr. Rollo, voting, “YES” and no “NO” votes.

3. **Public Announcements.** Mr. Montes announced that early next year Caltrans is going to present a project in the Bay that involves the retention of the piers and building of public access.

Chief of Permits Jaime Michaels introduced a new BCDC permit analyst Rebecca Coates-Maldoon.

Regulatory Director Brad McCrea stated that Jaime Michaels will be leaving BCDC soon. Jaime is very involved behind the scene in many decisions. We will sorely miss her.

4. **Latitude Project (Pre-Application).** Chair Borchardt announced that Item 4 was the Latitude Project and that it had come before the Board on four separate occasions. The project was reviewed at the last Board meeting. There were 12 issues that were raised that needed further attention. It is back before the Board to discuss these issues.

The applicant and the applicant’s consultant have provided information in response to those comments. These attachments have been distributed to the Board. ENGEO is the consultant for the applicant.

Board Member Frank Rollo stated that there were three areas of inquiry. These included elevation, information to clarify existing conditions on the west side, strength parameter used on impacts of stability and ground motion.

He added that the applicant had modified the buttress configuration and length. They reclassified the soil as sand with clay and concluded that it was no longer liquefiable. They justified the strength values used by referencing the appropriate engineering criteria.

Finally, he said to be satisfied with the additional boring data.

Board Member Battalio noted that as a coastal engineer he was satisfied with the applicant’s responses and he did not have any further questions. However, he did not hear the applicant’s response to the recommendation that some piles in the “major” damage category may need to be repaired, in addition to those in the “severe” damage category.

Chair Borchardt stated that the Board just wanted a narrative on how the applicant came up with the parameter for the seismic stability evaluation.

Board Member French stated that in Item 5 the Board had requested a longitudinal section. He did not see a longitudinal section provided. The top of Bay mud contours that are illustrated for the area where the channel is supposed to begin don’t appear to reflect an ancient channel.

Mr. Jeff Fippin with ENGEO stated that the longitudinal section is similar to the cross sections that are perpendicular to the shoreline. We did not see anything different in the various cross sections.

Mr. Pedro Espinosa of ENGEO explained that they did not see a difference when they looked at the sections. The surface information was sporadic; therefore, they trusted their use of historical photos.

Mr. Fippin added that the Bay mud contours were at the bottom so the green lines on our display are the bottom of the fill. They represented their estimates of the thickness of fill. The blue lines represented the bottom of the Bay mud.

Board Member French noted that if this were true, the center of the channel would be mid-way between Sections 1 and 2 meaning the deepest liquefiable soils would be there.

He said that the longitudinal sections along the wharf-front were not provided; therefore, it was difficult to make an assessment without them. He was not sure exactly where the limits of the channel along the wharf were but that there seemed to be a little bit of a discrepancy here and there. Mr. Rollo inquired about any differences from where they had used the same design parameters for the materials underground and on the spacing of the DSM cells and where there was a channel present if present. He thought there was a difference. Mr. Rollo and Mr. French tried to provide further guidance to the additional information they sought.

Mr. Livingston requested to know any additional conditions to satisfy the Board's requirement regarding the DSM design and questions about the longitudinal sections.

Mr. French responded that the Board wanted certification and assurances that the stability analysis had been comprehensive and checked and inclusive of the wharf's most critical sections. Further, there was some discussion about requiring details of the configuration of the DSM cells on the cross-sections.

Mr. Fippin stated that it was the applicant's intent to refine the actual design of the closed cells. He thought there was some inconsistency in their map scale and what the data showed. However, he opined they had been conservative in the mapping of the swales.

Board Member Rollo observed that it would not be conservative if, in fact, the channel was extrapolated in such section. Maybe, he thought, it should provide BCDC with the results of your detailed evaluation and the details of the buttress design all the way to cross-section 2.

Mr. Espinosa related that there was still fill on the site. The bigger fill was where the channel was located. The contours dramatically dropped as it got to the channel.

Board Member Rollo noted that the applicant was arguing that the sand layer at elevation -32.0 feet was not liquefiable; it was sand with clay. He pointed out that this was what their analysis showed. In response, Mr. Espinosa provided additional information that the Board had not been privy to before.

Board Member French stated that the Board needed a longitudinal section to help resolve such skepticism. He was not saying that the team was wrong in the analysis or in the results; however, he thought it was difficult to assess it with a degree of certainty. He thought there had been a commitment by the applicant to include a longitudinal section since this would have resulted in an easier discussion.

Chair Borchardt asked if there was a plan for a DSM for the Board to see.

Mr. Espinoza replied that this detail had not been provided.

Chair Borchardt further observed the significance of the DSM with respect to the safety of this project in terms of retaining the boundaries and the potential risk of its failure in preventing material moving out onto the wharf pilings. He thought that the ECRB should be able to see a plan to address any issues that may be revealed.

He explained that the Board needed to address all issues with respect to the DSM criteria used to design it and its adequacy for the intended purposes. He requested to know when the plan for the DSM would be available.

Mr. Fippin stated that the DSM was a design/build element. However, they have established the criteria for the performance of that design. The contractor had not been contracted yet, and they are not likely to hire a contractor until issuance of entitlements.

Chair Borchardt asked what would govern the design and of prior evidence with respect to the response of a DSM under heavy earthquake loading such as this was the case. Were there sites to point to with evidence?

Mr. Espinosa stated that a very famous hotel surrounded by DSM that held up during the Kobe Japan Earthquake was evidence supporting their assumptions. In such case, everything waterward of the DSM liquified during the earthquake while all the structures behind the DSM held up.

Chair Borchardt thought this would be extremely important evidence to bring forward to the Board to see the criteria. His observation experience in Kobe, if that was the case, was that near the quay walls there had been an extensive amount of liquefaction in several places and pore pressures had built up because of the contrast in density. As a result, some of the walls had failed. He asked whether there were any DSM protected structures during Loma Prieta Earthquake in 1989.

Mr. Eliahu explained that a DSM diameter was assumed and that a preliminary design was based on some relatively simple analytical methods. Once the proprietary technology is identified, a full dynamic modelling using the same performance and design criteria would follow. This was done to optimize the DSM geometry.

He added were they to assume anything today regarding the specific geometry of the DSM it may be wrong. He said his aim was to present the design and performance criteria for the DSM as a tried-and-true method. Finally, he said there was nothing new about DSMs.

Chair Borchardt reminded the speaker that there were many ways to do DSMs. However, he said, the board does not have that information.

Board Member Rollo explained that you have established the fact that a DSM buttress is required. You have presented parameters that led you to that conclusion. He added that the Board had signed off on those parameters shown to it, a configuration which has been used before. He said this was similar to what was used at Pac Bell Park to buttress the whole right field side.

He thought this project would go through permitting and through a peer review with geotechnical engineers sitting on that.

He added that he was satisfied with them for taking the right approach, that the criteria were correct. However, he said they had not adequately defined the limits of the DSM in the longitudinal space because they had not provided the board with a longitudinal section that showed the details along that dike and channel.

He said, "we have already sat here and concluded that you are probably going to have to extend the DSM section further than what is shown on the conceptual drawing."

Mr. Eliahu answered that part of the final design process would be to extend it in plain view in both directions as necessary to protect the area we are trying to protect.

Chair Borchardt added that since this plays such a central role with respect to the safety of this project it seemed that the ECRB is in a position to see what that final DSM configuration was going to look like whether there would be cement columns going all the way down to the bottom baymud or not.

Mr. Eliahu explained that this is not determinable today. That depends on the diameter of the columns that make up the shear panels. Those might range from two feet to eight feet or even ten feet. There may be multiple augers or a single auger that would depend on the specific technology used by various contractors.

Mr. Fippin added that the seismic stability report provided the criteria which included the maximum spacing density based on the diameter of the piers so as to create overlapping columns that create perpendicular walls; the tolerable displacement should be analyzed by the design/build entity. If the contractor did his own engineering, his team would specify their expectations.

Board Member Rollo agreed with Mr. Fippin's statement but added that the length of the buttress had not yet been established. He said Mr. Fippin had established the depth of the buttress but not the length. An additional issue was regarding the uncertainty used for the seismic parameters. He said to be satisfied with the criteria of the DSM provided that Board question 5 had been addressed. Board's comment 5 referred to a request to provide information about the subsurface profiles in different part of the site including longitudinal profiles along the wharf-front.

Chair Borchardt felt there was some vagueness about the DSM's final version, and that although the Board wanted to review the general criteria, it didn't have the specifics of what the DSM would look like.

He thought that the team could move forward with the project suggesting to consider this design/build process taking place and how the plan would materialize with respect to the DSM. Further, he suggested that a final plan should be documented and a copy sent back to the Board.

Mr. Eliahu agreed that it would be no problem to meet the chair's demands. But he also said that it was a bit of a misnomer to talk about this as being a design/build; they were not only establishing performance criteria but also certain geometric criteria such as replacement ratios and depths and things like that; they were not leaving it to another party to pass judgement on the stability aspects of it. In addition, he said, they could provide the final design information to Mr. Montes for distribution and he felt there was absolutely a firm record of what was to be built.

Chair Borchardt stated that he suggested that BCDC receive final documents showing the plan of what the DSM will look like but also that you provide the evidence that documents the performance of these structures under a large earthquake loading.

Board Member French added that from a geotechnical perspective the design is not far enough along for us to approve the design but as far as the criteria is concerned it is more-or-less adequate from a geotechnical perspective. He was supportive of the chair's idea of providing evidence of the DSM performance elsewhere. It will be the task of the peer review panel to investigate the final design details.

Board Member Rollo observed that in response to question 5 they have indicated that the DSM would be about the back of the rock dike and likely have a one-to-one depth/width ratio and terminate a minimum of five feet below the bottom of the young Bay mud.

He was referring to the lack of information about the dimensions of the closed cells and where they will be required. The question was in reference as to the open/closed cells replacement ratio. Would the replacement ratio be 47 percent, 55 percent? Therefore, he suggested the answers would be determined on the basis of more rigorous analysis. Mr. Espinosa alluded to a study done by UC Davis regarding the issue and suggested they could provide copies of the study to Rafael for distribution to the ECRB.

Chair Borchardt requested to know whether there had been questions regarding ground motions at the last meeting.

Board Member French noted that in Item 6, as noted in the staff project summary, it indicated that you would provide deaggregation (De-Ag) of the hazards, which had not been provided. He did a brief check on the hazards before the meeting and as a result opined that some 20 percent of the long-period hazards will come from the San Andreas Fault which means

that when you are doing the deterministic hazard you need to look not just at the Hayward source but at the San Andreas also and basically envelope those two. The way you describe it here you took just hazard from the Hayward Fault.

Mr. Espinosa explained that what they did was use software that deterministically looked at all the faults within 100 miles of the site. It develops the envelope and looks at both the San Andreas Fault and the Hayward Fault.

He said to have looked at the Hayward Fault and deterministically looking at the one fault that controls. He said, "because we are so close to the Hayward Fault the ground motion from this fault is higher than the ground motion from the San Andreas Fault at all periods."

Board member Rollo requested to see documentation of how it was disaggregated and what the contribution of each fault is. And if the San Andreas is evaluated and everything is below the Hayward then just say that in your report.

Board member French stated having asked during the last meeting to include the search constraints on your soil stability so the Board could know how the team was doing that but did not see anything that shows what the search constraints were.

Mr. Fippin explained that the search constraints were shown graphically. The final searches were referred to as slope search which was similar to what X-Table used to do. He elaborated on this explanation on the search constraints.

Board Member Rollo noted that to achieve the factors of safety in the analysis you assumed a configuration of the cells and then used that in your analysis. Would the minimum composite strength to be part of the performance criteria?

Mr. Fippin agreed and stated that it was a minimum composite strength of the treated and untreated soil. We described that in a previous letter as 35 percent design criteria.

Mr. Espinosa added that if they could not achieve the shear strength that were assumed, they had to increase the replacement ratio to achieve such strength.

Chair Borchardt recommended that the response regarding the site soil class to be changed to Class F and the responsibilities of the engineering groups on how to fill or treat a site Class F area. This, he opined, was very important.

He added that their reply claimed that details of the analysis and response to Comment 6 would be provided. However, he said he was not able to find any site-specific response with respect for a soft-soil site similar to what we've got at this site.

He urged the team to think about what happened in the Bay Area during the Loma Prieta Earthquake and all the severe damage that occurred on soft soils. This site is one of those sites that I expect this kind of situation to take place in the event of a big earthquake.

He said there were two phenomena involved here: The amplification of the ground motion (high ground motions) that is going to transpire as a result of the clays at the site that are not going to liquefy and the displacement associated with the amplifications, which would generate some potential liquefaction. It seems to him that the potential risks associated with these amplifications will be ground motion generated on the San Andreas Fault.

He said that as a minimum it would be prudent to include at least a few time histories from the San Andreas from the MCE event with longer period motions; as a result, they would definitely see longer durations that go into developing the estimates of site-specific response, one that could be gotten at a specific site with a well-known soil profile under a particular soil boring.

Mr. Espinosa stated that the question they received from the ECRB regarding a soil stability analysis being looked at from the ground motions perspective for the project was, why did you match the ground motion to a code-based spectra and why didn't you use a site-specific one (PSHA spectra)?

He said they matched the ground motions in five actual time histories so as to match it to the actual MCE event that is going to happen at the site. Time histories tend to be much more than what they were designing for; therefore, they had to scale them up.

The code controls were spectra not the site response. The code envelopes were site-response spectra. He said they would do a site-specific hazard at the rock level and compare it with a map-based spectral. And those were the analysis shown on Appendix B.

He said they did not redo the site response analysis but compared the hazard of one to show that there was not much of a difference.

Board Member Rollo explained that what made this a site soil Class F Site was not the thickness of the deposits; it was the liquefaction. If they took out the liquefaction phenomena, the thickness of the soft soil would be consistent with the existing conditions at the site.

Board Member French stated that there was no velocity profile provided and whether once it liquefied would it change the velocity profile? And if liquefaction changed the velocity profile, would that in turn change the response analysis?

Mr. Espinosa stated that they were dealing with that in other projects. The intent was that the DSM being proposed would prevent the liquefaction from happening. Building improvements are being looked at differently than the shoreline. Further discussion ensued.

Board Member Rollo stated that the Board has raised some questions that needed to be answered but a vote of approval, if appropriate, could still be had provided the longitudinal section requested is submitted.

Number 2, he said, the design team should address in more detail the DSM.

Number 3, the applicant needed to respond to the impact of the San Andreas on the hazard and the site response analysis.

And number 4, the Board needed the impact analysis from a soil classification E to an F and what effect it would have on the behavior of this change, if any. Further, the Board would like to see the shear wave velocities analysis.

Chair Borchardt stated that he would like to see the accumulation of evidence with respect to the response of these DSMs in different events.

The concept was to move forward with the project with these provisions and additional information on these topics. The Board needed to have the information provided in writing without necessarily having another meeting on this.

Mr. Eliahu emphasized that some of the Board's comments could not be met, especially in relation to the DSM design. Such work would only be resolved until later on during post-contractor design.

In response, Board Member Rollo noted that he would like to see the criteria being established for the contractors to bid. That they should know, he said.

Ms. Michaels asked whether of the six or seven things being requested would be the basis of the Board's approval of the seismic criteria on receipt and review of those or whether it was approving the seismic criteria today.

Boards Member Rollo and French stated that he thought they would approve the seismic criteria contingent on receipt but not necessarily re-review of it. The Board wanted it in the files. Ms. Michaels tried to confirm that the Board only wanted assurances of the team's response given to BCDC with a copy forwarded to the Board. Mr. Montes asked whether the Board saw a need for further discussion once it saw the written response given to BCDC.

Chair Borchardt noted that the Board needed to do things in a public forum setting. He wondered if it would be possible to put on the next meeting's agenda an item that would be comments from the Board with respect to the response received on the project.

Mr. Montes replied that this could be done and he wondered if the Board preferred an in-house discussion or in what fashion the Board would want to handle this.

Chair Borchardt stated that they wanted the discussion to be agendized so it was in a public forum setting. The project proponents would be welcomed to attend but would be their option.

Mr. Brad McCrea added that if the outcome of this was that the Board did not like what was received whether it was suggesting that the approval of the criteria would stand or would provide further comments on the information it received.

Board Member Rollo informed Mr. McCrea that this was correct.

In an attempt to reiterate the Board's comments, Ms. Michaels tried to get confirmation from the Board that its comments would not change the approval or the criteria.

Board member Rollo assessed that the information that was being requested was already there. It was just that the Board had not received this information.

Mr. Livingston asked: "If we take the approach that you are discussing would we be able to pursue our full application at a BCDC full Commission hearing?"

Ms. Michaels answered that this would be possible.

Board Member Holmes wanted the record to reflect that the information in Item 10 regarding the disclosure of an inspection program whose purpose would be to monitor the degradation of the existing piles had been promised but not acted upon since the Board has not received it in spite of its request.

Ms. Michaels stated that BCDC staff could work with the applicant to develop an appropriate condition for the permit. All of this would go to the Commission.

Board Member Battalio added that he had recommended during the prior ECRB meeting that the applicant consider repairing some of the piles in the "major" damage category: Mr. Battalio reiterated that the engineering firm in charge should address this question as part of the design to be completed.

Board member French stated that Mr. Holmes was not asking for anything different – just that the applicant's response be remembered. No one wanted to lose this information.

Mr. Fippin acknowledged this and stated that they would be happy to provide the information being requested.

MOTION: Board Member Rollo made a motion that additional information on the seven items inclusive of the pile inspection monitoring program formerly discussed be provided to BCDC staff by the applicant and that the ECRB approve the project to move it to the permitting stage. This was seconded by Board Member French. The motion was approved by a voice vote with no opposition or abstentions.

Mr. Brian Lewis had a public comment to share with the ECRB. Mr. Lewis was representing the Brickyard Cove Alliance for Responsible Development (BCARD). He mentioned that this site has been remediated and is being cleaned up. The facility was noted to be out of compliance in 2015 with the Regional Water Board order.

Along the area that would have the deep-soil mixing there were documented releases. BCARD had been asking the applicant for the results of the sampling being done in this area.

They had re-mobilized without providing any of the data requested. BCARD have asked repeatedly for the results for groundwater, soil and soil gas. Soil mixing was not remediation of the hazardous waste site. BCARD wanted to make sure that this facility would be cleaned up to background or human health levels before there was any soil mixing done.

5. **Encinal Terminals Project (Pre-Application).** Mr. Richard Dornhelm addressed the ECRB and informed the attendees that he was with Moffatt & Nichol. His colleagues were here to present information pertaining to the Encinal Terminals Project.

Board Member Battalio mentioned that he worked for Environmental Science Associates (ESA) who worked on the EIR for this project. He provided this information to BCDC and they had indicated that he did not have to recuse. He could participate but thought he would make this known and ask the applicant if they had any objections to his participation.

A speaker stated that the applicant had no objection to this.

Chair Borchardt had audience members introduce themselves. He also requested that the principals on this project also introduced themselves.

The attendees for this item were Mike O'Hara (North Waterfront Cove LLC), Jeff Fippin (ENGEO), Pedro Espinosa (ENGEO), Uri Eliahu (ENGEO), Angelo Obertello (Carlson, Barbee & Gibson), Marc Percher (Moffatt & Nichol), Dilip Trivedi (Moffatt & Nichol), Sam Tooley (Moffatt & Nichol) and Brad Porter (Moffatt & Nichol)

Mr. O'Hara addressed the ECRB. Mr. O'Hara was representing the North Waterfront Cove, LLC. He was hoping to get as much feedback as possible from this process today.

He gave a quick introduction to the plan and then turned it over to his expert team to talk about some of the details of the project.

He talked about the project's goals before turning it over to ENGEO for a geotechnical discussion.

The project was located in the middle of the northern waterfront for the city of Alameda. The site was a peninsula with water on three sides. It was in a part of Alameda that was being redeveloped. The property covered 32 acres of which about nine were submerged.

One of the primary tenants of this project was to promote public access. The wharf along the west side of the project was a key part of the waterfront in this area.

There were a few permits that existed already. The Wind River site had a permit. The Marina side was also permitted and the pink area in the slide was an existed permit that existed on their side for a project that was no longer being proposed.

Board Member Rollo wanted to know what Wind River was.

Mr. O'Hara explained that Wind River was acquired by Intel (Corporation). It was now owned by a company known by Simeon Properties. It was offices.

Of the 23 acres, 14 of them was in public space. It included roads, gathering areas and about five acres of promenade area, two acres of the waterfront park, a large plaza and a nice width of area that exceeded the 100 feet in most areas along the west part.

His company introduced the Alaska Basin Maritime Mixed-Use District which was their commercial core right in the middle of the site. This slide showed what it would look like.

They were getting their entitlements with the city of Alameda and had been working with their professionals for a number of years now. Their primary goal was to walk out with as much feedback, input and review of the criteria as possible.

This would be followed up later with detailed designs to be shown to the Design and Review Board soon. This was their first step to make sure that the criteria as established was approvable and in the right direction.

Mr. Uri Eliahu of ENGEO noted that Mr. Jeff Fippin was going to discuss site conditions and background information pertaining to the input parameters. Mr. Pedro Espinosa would discuss analysis and methodology.

Mr. Jeff Fippin with ENGEO stated that he was showing a drawing of the site as it currently existed compared to the same location as a historic 1885 shoreline. The sub-surface data from the site matched really well with the geotechnical situation at the site.

The site before it was developed used to be a marsh. Alaska Basin on the left was dredged in order to create the existing basin. Fill was placed along the land port side.

On the southern end of the site there was fill over Bay mud. The Bay mud was extremely thin between one or two feet of existing mud. Under the Bay mud was merritt sand, the original island of Alameda.

Most of the marsh was tidal, and in high/high water it would be underwater.

The site was originally developed for berthing ships from the Alaskan salmon fleet. It was then converted into shipping associated with the Del Monte Terminal, and it was later converted for shipping containers. The site had been surcharged to some extent and used to stack containers everywhere in the mid-90s.

Mr. O'Hara mentioned that the idea with the basin was to create a marina. Up to 160 slips had been planned for a marina in this area. In the northern portion there would not be anything other than that water transit docking facility already mentioned.

Mr. Fippin continued and stated that the fill here was used to reclaim the land and consisted of a combination of clay, sand and silt. Some of the fill was liquefiable with young Bay mud directly below it. The young Bay mud ranged from 20 to 60 feet thick.

The fill thickness varies from an average of 5 feet to 15 feet.

Below the young Bay mud there is mixing of old Bay clays. The bedrock was extremely deep with something on the order of 700 feet.

Most of the marsh deposits were very similar to traditional Bay mud.

They were using a seismic site Class E to recommend mitigation of the shallow, liquefiable soil within the fill. There would be some residual liquefaction into the southern end of the site. Once the surface soil liquefaction was mitigated, there would be about an inch or so of residual liquefaction.

This was to ensure that within the development footprint lateral displacement would be in the two-to-six-inch or less range for the MCE level earthquake. This was done so as to not worry about kinematic forces for the future buildings inland. For the lateral deformations under the wharf, such estimates would be accounted for in the structural analysis. Moffatt & Nichol will elaborate on that later in this meeting. When we are adding Bay mud and new loads from buildings to address sea level rise in the streets, they would do surcharging, especially where the consolidation were expected to be large enough to be problematic, and as for the buildings they would either be on piles or the soils would be surcharged to support the buildings.

Board Member Rollo addressed the liquefaction issue. The team mentioned RIC, Rapid Impact Compaction. Vibration was a significant factor. Having any developments in proximity to this site could be quite damaging. As a part of the criteria for RIC would they be setting a big-particle velocity in accordance with the state standard?

Mr. Fippin stated that they would use a combination of criteria published by Caltrans and FHWA. A lot of the range depended on what the critical structure was. They would also establish criteria for acceptance.

Board Member Rollo noted that surcharging had been mentioned when talking about the 13 feet of fill. What was not included was the dredge portion and wick drains. When surcharge consolidates the mud, it would generate a lot of water, and he said, they did not want that water going into the Bay. Again, part of the criteria would be to establish a drainage plan that captured the water that was coming out of the Bay mud during the consolidation process.

Mr. Fippin agreed with this comment and stressed the need to surcharge because the soil was slightly over-consolidated. Adding about a foot or so of fill before would trigger virgin compression of the Bay mud. He said that as a result they didn't need to raise the grade of the site that much.

Board Member Rollo continued on the discussions of the layer of young Bay mud with sands where he had found the time rate on such soil layer as going to be very rapid. Without a surcharge program, he said, they could potentially see some severe differential settlement between very short distances depending on the presence of these sand zones. This settlement would have to be addressed in establishing some sort of criteria. He said to come back to the Board to see consolidation in that material and time rates of that material.

Potential for liquefaction would still be there when doing lateral displacement analysis along the wharf structure. The lateral displacement would be cranked into their PY curves at the start for the existing pile structures.

Mr. Fippin agreed with this assessment and proceeded to let Mr. Espinosa continue on the geotechnical aspect of the presentation.

Mr. Espinosa noted that the applicant developed a ground response analysis that required coming up with a base ground motion and to look at the effect of the sub-soils at the site. His team had developed a base ground motion based upon the DC boundary.

The strengths developing in these ground motions were site-specific and pretty high, in the realm of five percent strains and picking up some damping.

Since the northern and western side of the peninsula failed the screening level, they had to go into ground improvement mode and proposed the concept of buttressing the northern and western side of the peninsula with deep-soil mixing. In addition, they were providing the criteria for deep-soil mixing with about a 30 percent replacement ratio. One-dimensional ground-response analysis using Deep Soil modeling and time histories matched to the site-specific spectra for 3 zones based on thickness of young bay muds yielded three models for thinnest (20 feet), intermediate (30-40 feet) and thickest (60 feet) young bay muds.

Mr. Espinosa described the development of the criteria for lateral displacement of the shoreline by using a screening analysis of the stability of the shoreline, which consisted of an evaluation of the slope stability using a general equilibrium method or GLE approach as prescribed in the National Cooperative Highway Research Program 611 (NCHRP.) The analysis involved using a factor peak ground acceleration or PGA for wave scattering, reduction of the factored PGA by half corresponding to approximately 2 to 6 inches of lateral deformation, using a PGA of 0.33g per site-specific ground response and a horizontal seismic acceleration coefficient (K_h) of 0.15g.

The result of the screening analysis showed that only the eastern shoreline passed the screening check due to its setback from the shoreline resulting in a soil deformation of between 2-6 inches. The northern and western sides of the peninsula failed the screening analysis. Therefore, they were recommending the buttressing of those areas with DSM.

Board Member Rollo stated that since the DSM on the western side would be on the landside of the existing wharves, the wedge (bayward side/in front of the DSM) in proximity to the DSM would be lost during an earthquake due to lateral movement. He did not see this issue addressed in the project report.

Mr. Espinosa noted that the loss of the wedge in front of the DSM was addressed in the analysis. He would talk about this later.

The wharf on the west side of the site was on piles. They were interested in the deformation of the material underneath the wharf and how it acted with the tides. The shape and the amount of this deformation was very important for the analysis of response. When looking at the deformations they saw a lot of movement; however, the phenomenon did not mean the piles would be necessarily damaged.

Mr. Espinosa elaborated on the stability model at the wharf (a fully-dynamic numerical analysis with Plaxis) with the DSM in place whose analysis results provided an estimate of distribution of deformation (horizontal displacement) and an evaluation of 3 sections with 7 time-histories. Plaxis is a program that has been developed specifically for the analysis of deformation, stability and flow in geotechnical engineering.

Exhibits 11 and 12 of the presentation referred to the Plaxis results for cross-sections 2-2 and 3-3 in reference to the northwest and west side of the wharf showing lateral movement of 3-4 feet and 0.8 and 1 foot, respectively.

Board member French asked whether Mr. Espinosa had looked at ground motions and compare those with DEEPSOIL results (a soil dynamics and earthquake engineering software that analysis 1-dimensional site response) and that the time histories were similar to the response and asked to include that into the geotechnical final report, the comparison between the 1-D and 2-D ground motion.

Mr. Espinosa related that the soil studies of ground movement were the design basis providing kinematic loads in the piles, lateral resistance of the soil parameters for the structural analysis performed by Moffatt & Nichol.

Board Member Rollo noted that the applicant was not adding any fill at the top of the bank but had shown instead a flood wall. So, he asked whether he was going to build a structure to handle tidal action, where he was referring to Figure 31 of the master plan.

In looking at the wall description with its top at elevation 10 feet and labeled "primary adaptive measure flood wall," he asked whether such flood wall in these sections would be right on the front edge of the DSM.

Mr. Trivedi of Moffat & Nichol stated that it was shown as an adaptive management strategy with some of it on the DSM itself.

Mr. Porter of Moffat & Nichol mentioned that he had worked on the wharf analysis. The first part of their report was to analyze the strength of the existing wharf and see how it stood up to these forces.

There were three parts to this structure. They had zero at the southern end and there was a bulkhead wall out to the end which was around 1500 feet.

The first one so-called the C1 structure, C for concrete, was built in 1927 along with a timber apron that went around the wharf and was built at that same time. Those portions were about 90 years old.

The C2 structure was added in 1962, a concrete section that replaced the timber section.

He said to have gathered existing drawings including drawings of the C1 structure from the 1920s. But with the C2 structure they did not have any drawings. They had some drawings of similar things that never got built and the team had to do some destructive testing to confirm existing rebar.

They looked at the structures to get a sense of their condition.

By and large the C1 structure was in fairly good shape. There was some cracking but for being 90 years old it was in pretty good condition.

Against the back of the concrete there was a bulkhead wall to retain the soil.

He said that the timber structure was now 90 years old and was pretty well damaged. This was all going to get demolished because it was past its useful life.

The C2 building was also in fairly good condition with not much concrete spalling. The concrete in fact was in pretty good shape.

Board Member French observed that the C2 building survived the Loma Prieta Earthquake without significant damage.

Mr. Porter mentioned that there might be some minor dredging done for the marina back towards the bulkhead. Whatever dredging taking place would be fairly minimal.

Mr. Tooley of Moffatt & Nichol addressed the subject of proposed criteria for the project. He said to have provided the ECRB with their basis of analysis document that had all the structural design criteria.

When the structure was constructed it was considered a Risk Category 2 Occupancy. The proposed modifications will also be Risk Category 2. There was a change of occupancy but no change in risk category.

They had selected Life/Safety as their design criteria and the ASCE 61 Guidance that addresses the seismic design for piers.

The goal of the structure post-event was that it would likely be heavily damaged but will still have a path for egress and continuous for gravity loads.

As far as our structural modelling, they were going to be using SAT 2000 to create 3D models of representative structural portions. They would do a 3D model of every structure between isolation joints.

As part of ASCE 61 we would be using 10 percent of the light load including our seismic maps. From the PY springs that ENGEO provided there was a factor for upper-bound and lower-bound. They would be using both parameters in our model so as to capture the full envelope of the response.

Their approach would include a global, modal analysis to identify locations for the isolation joints. For the seismic response the approach would be two-dimensional.

Their non-linear parameters to capture the structural damage came from ASCE 61 guidance for the concrete.

They used the PY values that ENGEO provided and applied the displacement from the PLAXIS analysis to the end of a tune-up spring.

For kinematic loads they would explore upper-bound and lower-bound properties and be using the same properties used in the PLAXIS analysis so the models would be compatible.

They would consider combined kinematic and inertial effects and do 100 percent and 25 percent combinations, which they thought to be appropriate for the site.

The timber piles could not be considered non-linear and instead considered any shear rupture to the timber piles as a disqualification from the Life/Safety objective. If any timber piles shear in ground they would be checking equilibrium at that point to make sure that there was still a gravity-load path.

Board Member Comerio noted that the applicant stated that they would demolish the timbers. Would this mean a replacement in-kind?

Mr. Tooley explained that the demolition would only be the timber portion of the larger concrete structure. Their retrofit approach, if necessary, would be to add additional stiffness or incorporate ductility into the existing structure as needed.

Mr. Trivedi of Moffat & Nichol discussed the elevation of the wharf. The proposed grade for the entire development would be about three and a half feet above the 100-year flood elevation.

The DSM would be at a 30 percent replacement ratio; therefore, there was a fair amount of it that may affect the interior of the cells rather one DSM.

Mr. O'Hara stated that they wanted to show a range of options for adaptive management that could be utilized by the city depending on a number of factors. One factor might be what the regional approach was to deal with this. They were showing walls out here on the edge and wanted to explore the approach as a possible option depending what the sea level rise is and perhaps temporal flooding may be allowable in certain areas that are strictly for access.

He said to have taken Rafael's staff report and tried to address those things of importance. There was a question raised about the seismic instrumentation. The policy talks about new major fills and since they really didn't have any fills on this site on that edge he was curious about the application of that policy to this particular project. This was something that they didn't really address and wanted to let the Board know; hence, they were not certain that such requirement applied to this site.

Chair Borchardt announced that the next item was for Board Members to raise potential questions that they might encounter when you come back. You might be technically correct on the instrumentation issue on this project.

His thoughts with respect to Policy 3 and the instrumentation comes back to the issues raised earlier with respect to the responses of these DSMs in the next big earthquake. Unless the consultants from ENGEO could point towards some real detailed instrumentation measurements of what the core pressures were like and how these DSMs responded to earthquakes, considering playing such a simple role, he would be very prudent in terms of not

considering instruments at the site. The instrumentation effort put the consultant in a position of leading the science with respect to trying to understand how the DSMs were responding and subsequently to be able to defend the steps taken. It was prudent engineering to be thinking in terms of not getting hung up on the details but to begin to collect this information.

The developer community would benefit from this and this was not just speculation about instrumentation; it had really been proven to be of great benefit among the structural engineering community.

Mr. Eliahu stated that they had a fair amount of internal discussions about this and the site was positioned between existing recording stations.

Chair Borchardt mentioned that the ground motions at the site were going to be somewhat different than these recordings at the other sites.

The consultant was not going to really be able to take the credit for really pushing the science forward based on these recordings. But if the consultant encourages the installation of an instrumentation array out there on the site, it would become a perk.

Board Member Rollo added that right now the Board had no idea how the material within the cells is going to behave. They didn't know how the perimeter of the cell was going to behave. Looking at the cost of the DSM versus the cost of an array of instruments within and adjacent to the cell, it would seem to him to be relatively inexpensive.

Mr. Eliahu opined that there were inexpensive means for doing this. We can certainly take that under advisement and talk to our client about it. He thought the whole CGS (California Geological Survey) process, the ECRB and then subsequently the BCDC requirement would make it an arduous and difficult undertaking. Further, there were a lot of unanswered questions about future maintenance and differences of opinion about what these things looked like.

However, he said he heard the Chair and the Board loud and clear and wanted more data as well. He could work it out with the client where they had some good ability to record and monitor data without going through that process and without having it be a formal requirement.

Board Member Rollo stated that it would take at least 10 years to build this project and the probability of an event during this period is pretty high. It would seem to him that during that 10-year period they could install several arrays and monitor them on their own because they were going to be out there working.

Chair Borchardt added that he had been on the ECRB for 35 years and although referred by Mr. Eliahu as an arduous process, he had seen many projects successfully implementing seismic instrumentation plans to their benefit.

There was a tremendous amount of expertise in the California Strong Motion Instrumentation Plan. They could lay out the whole instrumentation; they know exactly what to do. They got instruments all over the state of California. The California Geological Survey was the expert and was willing to maintain it for free. There was a tremendous benefit to the project to go forward and utilize that expertise.

Mr. McCrea suggested that they would see the project sponsors again and this would give us an opportunity to talk to them about this issue of seismic instrumentation. BCDC would also come back with policy guidance for you about that.

Mr. Eliahu stated that their hope was that they could answer enough questions today to not have to do this here again. We want to get comments and report them back to staff and the instrumentation question would be addressed separately. They were certainly happy to discuss it but with regard to the criteria for design, hopefully, between the thoroughness of the discussion and the materials and answering any questions that happen within the next half an hour, they could communicate subsequently through staff.

Mr. McCrea pointed out the importance of the public access proposal. The plan showed extensive development in the center of the site surrounded by a perimeter and public access that relies mostly on the existing pile-supported structure.

Your review today was really important to the Commission and the staff to understand because so much of this project relied on the structure for its public access component; BCDC wanted to make sure that the criteria by which it was being designed was robust.

Chair Borchardt interpreted today's meeting to be primarily a briefing.

Board Member Rollo stated that the ECRB had been informed by the criteria that this structure would not need to be viable after an event. However, it needed to provide enough safety to get people off the wharf which means that potentially 50 percent of it could fall in the water.

Mr. Percher of Moffat & Nichol mentioned that the intent here was to push for a master level plan permit. It was not detailed design, and the team was not seeking to install piles. His team did not have something finalized at this stage.

What they were trying to do was to make sure to have the right criteria and approaches so as to develop the project design. They did not have to necessarily come back to ECRB because if it was the right approach, they would just need to bring it to staff to verify the right things were done.

Once it comes to the detailed design submission happening down the line, the Board would be able to just review it. This was the reason for moving forward the criteria as early as possible, even at the master planning level.

Board Member Rollo observed when talking about surcharging or not surcharging, there was a lot of criteria associated with surcharging, one involved the handling of the residue water.

He said not to have a clue about a proposal to drain the site if wicked. He didn't know how they were going to wick that site if placing 13 feet of fill. How are they going to squeeze the water out of it; where was that water going to go, how were they going to treat it.

Board Member Holmes added that based upon similar pier structures, there were a lot of issues to consider here. The analysis as described was what other people had done before but there were a lot of issues that needed to be solved such as what was the acceptable displacement of those piers.

How were they going to figure this out? And they had said that if it did not work, they could retrofit it; retrofitting was easier than just saying, "I'm going to add stiffness." It was just not comparable to other things that the Board had reviewed and approved.

Mr. Percher explained that this would be in the detailed design.

Board Member Holmes mentioned that the ECRB never looked at the detailed design; they looked at the detailed criteria.

Board Member Comerio noted that there was a lot that the ECRB did not know yet about what you have presented. They had not even mentioned what the change of occupancy would be; how many people did they expect to be on that pier at any given Saturday afternoon? It seemed like it would be a lot and how would that be part of the criteria?

She was worried about what risk category this represented. How did she know that they were using the right category? She thought that they were asking for something that the Board had no way to give at this stage of approval. The Board could evaluate the direction they were going but there was not nearly enough information to even begin to talk about it.

Mr. Percher stated a specific risk category was in the basis for criteria. It was their assumption that it was not Type 3 structure.

Board Member Holmes acknowledged this and added that the ECRB might not agree with it. Normal criteria for something like this would be at 300 people on the same structure that could fail and this puts it in a Risk Category 3.

Board Member Comerio reiterated that she felt that there was not enough information for her to evaluate the structure occupancy at this stage. She was not convinced by what they had presented whether this was the right risk category and just not enough information to be convinced of that.

Mr. Percher added that this was the reason for bringing the project to the ECRB at this stage because going from a Risk Category 2 to a Risk Category 3 makes a very large difference in the design. They did not want to spend a lot of money running through various design concepts that did not make sense if the basic criteria was wrong.

Therefore, if the Board was not convinced of the classification, they needed to be able to sort that out and make sure that they were convinced.

The intent here was to get a high-level review and not to get into the nitty-gritty details of what size piles to use and where to be located because that was intended for the BCDC active design stage.

Board Member Rollo noted regarding the capacity to piles; he said not to have seen a strength profile used in the design and they had indicated a potential for liquefaction at depth – was there a down-drag associated with that and how will that be addressed in your design?

This was all part of the criteria. He would have thought that they were kind enough to come before us and give us a heads-up, present the project to Board, give it some overview, some idea of the direction being taken; the Board understood that but it still needed more detailed criteria.

Mr. Espinosa noted that they had provided the material strengths in their report and the analysis of the piles was also included. This was the typical geotechnical report they had submitted.

He pointed out that the geotechnical report had all the data that have been collected. The two reports, he said, included the geotechnical and the seismic criteria. If there were specific comments on the geotechnical report his team would be more than happy to address them.

Board Member Rollo stated that this could not be done in 20 minutes.

Chair Borchardt mentioned to Mr. McCrea that a framework on how the ECRB was to proceed with the next crucial 20 minutes. We need to know what kind of outcome we want. The fact that this project had not been before the Design and Review Board was important.

Mr. McCrea noted that when the Commission approved a project it had to ensure that every project had to provide the maximum feasible public access. The public access that came with the development had to be permanently guaranteed.

The reliance on these old World War II structures was something that the Commission was open to. They were almost 100 years old; therefore, the idea of permanently guaranteeing the public access raised the question of whether the facility could actually be permanently maintained. In turn, it raised the question of whether the development itself could ensure that this happened. This started with the proponents and there was no retrofit that was proposed for this structure.

Further, he expressed the importance of making sure to understand what the likelihood was during an event of what it would do; the staff just wanted to understand this in order to communicate it to the Commission.

Chair Borchardt stated that it would seem to him in that context that the Board had had a lot of good information presented today and all could proceed with the understanding of providing the requested additional analyses of what needed to be done to reinforce this pier. He indicated to the project participants to heed the comments about ensuring permanency to it as important criteria.

The Board asked the project sponsors to come back before the ECRB after their presentation to the Design and Review Board, which could result in the developing of additional information. The Chair gauged the project to be at 10-20 percent design, a very early stage in the project. He encouraged the sponsors to come back at some later stage with a more developed design plan.

He said he would not feel comfortable in signing off on this project at this very early stage.

Board Member Holmes talked about a hypothetical in which if the proponents were building a new pier, with a goal of a Risk Category 2 – they would only have to design that pier for Life/Safety. He added that there was no criterion that specified the pier as public access; however, the pier had to survive a design earthquake and still be viable, and he was unaware of such criteria.

He observed that if the concept was to check the pier for Life/Safety goal, the proponents would have to view and assess it as a new structure because of the change in occupancy.

He noted that there were lots of unresolved issues but if the criterion was that all of a sudden, these public access spaces had to survive a design earthquake and be functional after it, the criterion would be completely different. The Board had never talked that this was the case before.

He added that no one was suggesting that this was a place to evacuate the island with ready-to-deploy boats after an earthquake. He did not know how else the design team could get above a Risk Category 2 other than limiting the occupancy to 300 people. If there was some policy that says it had to survive a design earthquake then he said, the Board had not used it.

Mr. McCrea noted that the current policy says that it had to be permanently guaranteed.

Board Member Holmes stated that if, in fact, after the analysis it was judged that this pier would survive but as a total loss, not repairable – it then provided and met the Life/Safety goal; however, being not repairable meant tearing it down and rebuild it if feasible. Would anybody do that?

A judgement as to whether something that was damaged and repairable or not was a difficult one for engineers and it had a lot to do with what kind of damage you expect.

And if they were going to retrofit it, how much were they going to retrofit it? How much more stiffness or ductility were they going to put in there? There is a whole range of issues that would need to be solved before he could say it was repairable.

Mr. Brad Porter stated that these were the criteria that they were using. Only at the point after a major event would they be able to make that determination whether it was repairable or not. There was a possibility that after a major earthquake the pier might have to be replaced.

Mr. McCrea added that on this project most of the public access was on this 100-year old structure.

Board Member Holmes stated that the ECRB had looked at very similar analysis of piers before; of those there was more known about the structures involved and they weren't as old. There were differences between what the Board had seen before and this one.

He added that based on the age and deterioration, how confident were all that what they saw in certain places was true everywhere? There was a lot more uncertainty involved here.

Board member Battalio mentioned that perhaps it would be beneficial to have this extensive public access and then after a seismic event have some reduced amount of access that would be acceptable so that they were not being asked to repair the structure because of the expense.

He said that looking at this from a flood control standpoint it appeared that the flood control was connected with the structure that as talked about. This was another issue from his perspective as a coastal engineer; if all were saying this structure was not going to be serviceable, did it mean that the flood protection was not going to be functional as well?

Board Member French stated that he would like to see de-aggregation in the report and discuss what level of contribution there would be from San Andreas or something besides Hayward.

He said he would like to see the comparison of the 1D and 2D response analysis and the slip stability the same request as before – to provide the constraints of the slip stability geometry.

If the project came back again he would be interested in discussing the PLAXIS criteria.

Board Member Comerio noted that she would like to see some analysis of where this statement of there-will-never-be-more-than 300 comes from. How did they get to that number and what did it look like? She thought, “are you going to stop people from coming out there?” She asked the team to present a case for that number if that was going to be your criteria.

Even if it was, then, what was your analysis of the building code mean in terms of change of occupancy for this kind of structure? What did the building code require to do for this structure? What are the issues in the building code that the team was responding to in terms of the work being proposed?

She said that they had clearly said that it was a change of occupancy not a change of risk category; what did that mean in terms of the design going forward?

Board Member Holmes added that they were suggesting that unique new pier criteria was needed because of a change in occupancy; but ASCE 61 was for new structures and the team had old structures; therefore, they used MOTEMS (Marine Oil Terminals and Engineering Maintenance Standards). What criteria in MOTEMS were they going to use? This was not straight forward at all and their report as submitted was not very definitive.

Mr. Percher explained that the reason MOTEMS was used was because it was an existing structure. ASCE 61 was the most appropriate methodology as far as evaluating the existing structure. However, ASCE 61 had a limitation that is specific to new structure design not to existing.

What they were trying to do was to get all the comments to make sure that when upon coming back they had criteria that satisfied the performance. He would like to dwindle this down to the point where they could actually develop the design which satisfied the criteria.

Board Member Battalio noted that he had not been able to provide his input for the purpose of this meeting. I don't think we can end it here.

Chair Borcherdt stated that the work structure was very important. It was going to be important to expand on the comments on criteria when the sponsors returned.

He was curious about what the role of the DSM was and how it was going to interface with this structure.

Board Member Holmes added that when they were negotiating between all these codes, that this structure should be criteria for new piers or wharves because it was a change in occupancy.

Chair Borcherdt thanked the applicant for their presentation with the expectations to come back to the Board with another presentation of a more advanced design level.

6. **Adjournment.** There being no further old or new business, the meeting was adjourned at 4:34 p.m.

Respectfully submitted,

RAFAEL MONTES, P.E.
Board Secretary