Willamette River Bridge Advisory Committee Meeting

September 16, 2008

Meeting Notes

WRBAC Members Present:
Mayor Vera Katz (Chair)
David Knowles (Facilitator)
Richard Brandman, Metro
Bob Durgan, Andersen Construction
Thomas Hacker, Thomas Hacker Architects Inc.
Art Johnson, KPFF Consulting Engineers
Sue Keil, Portland Department of Transportation
Pat LaCrosse, Oregon Museum of Science and Industry
Neil McFarlane, TriMet
Guenevere Millius, SRM Architecture and Marketing, Inc.
Karl Rohde, Bicycle Transportation Alliance
David Soderstrom, Portland Opera Board
Mark Williams, Oregon Health & Science University
Rick Williams, BPM Development
Mike Zilis, Walker & Macy
Chuck Steinwandel, Ross Island Sand and Gravel

WRBAC Members Absent:
Christe White, Williams & Dame Development

Alternates Present:
Kathleen Cosgrove, Skyline Consulting Group (for Mark Williams)
Brian Newman, OHSU (for Mark Williams)
Ross Roberts, Metro (for Richard Brandman)
Paul Smith, Portland Department of Transportation (for Sue Keil)
Rick Saito, Insite LLC (for Bob Durgan)

Welcome and Introductions (Mayor Vera Katz, WRBAC Chair)

Mayor Vera Katz (Chair) welcomed everyone and pointed out that Milwaukie Mayor Jim Bernard was in attendance at the table. Mayor Katz said the major task was to get down to a number of bridges, raise questions, and hopefully have answers to those questions.

Katz pointed out that issues popped up during the work sessions and wanted to make sure that the issues were being responded to as the number of bridge designs were narrowed down. Katz wanted to see a quick slide of designs rejected and the reasons why they were rejected.

David Knowles (Bridge Study Facilitator) highlighted that in terms of the general project timeline, we have submitted our application to FTA to enter preliminary engineering (PE). After FTA approval, we will begin Preliminary Engineering and work with Metro on the final environmental impact statement (FEIS). The bridge is a major cost center for the project.

Since the last meeting, the working group (consists of technical team, consultant team, and representatives from jurisdictions) has been reviewing technical information about the bridge types. They have been narrowing the bridge types from 15 to 6, which will be recommended today and advanced to the next level of analysis.

Since the last meeting, there has been a lot of attention from TriMet staff to address the horizontal clearance to see if there are any options to the asserted need for a 600-foot clearance. **Dave Unsworth (TriMet Project Development Senior Manager)** will talk about the process, which relates to EIS work in the spring when TriMet collaborated with river users to gain a clearer understanding of river issues.

He noted that those issues have an impact on the cost, which presents a major challenge to the project because it creates a difficult funding environment towards getting to Park Ave. **Mayor Bernard** is here to talk a little bit about the effect on Milwaukie at the other end of the alignment.

City of Milwaukie Mayor Jim Bernard said that the city strongly supports the Portland–Milwaukie light rail project. They also understand the need for the bridge to be beautiful, functional, and affordable. Despite new information that might make this a difficult goal to reach, the city wants the committee to understand that it's important for light rail to reach Park Ave. and any additional costs that would prevent that would be of great concern to the city. The city would like the committee to keep in mind that this project is very important to Milwaukie and Clackamas County. Mayor Bernard has been pushing for seven years and if light rail gets to Park Ave and McLaughlin Blvd., he assures that the project will move forward.

Richard Brandman (Metro) explained that elected officials on the project steering committee, including **Milwaukie Mayor Bernard, Portland Mayor-elect Sam Adams, Metro Council President David Bragdon, and TriMet General Manager Fred Hansen**, adopted a locally preferred alternative (LPA) that set the project's goal as getting light rail to Park Ave. Although WRBAC hasn't been through much of this process, Brandman said there is a substantial amount of revenue that has already been committed to this project. This includes $250 million from the Oregon Legislature and $72 million of federal funds allocated through Metro's collaborative JPACT process.

They are also counting on a large investment from the federal government. There is still a funding gap and they are working with funding partners to fill the gap.

Brandman: From Metro's perspective, let's have a bridge that is certainly appropriate and makes the community proud, and let's also get to Park Ave. We'll have to deal with other tradeoffs.

Vera Katz elaborated that WRBAC's responsibility is the design of the bridge and that there will be tradeoffs because of a limited budget.

Dave Unsworth reviewed slides 2-10 of the PowerPoint presentation to explain where we've been and the navigational situation with Ross Island Sand & Gravel (RISG).

The Presentation is posted on trimet.org/WRBAC for review.

Unsworth: Earlier, Willamette River Partnership Committee helped pick the right alignment. TriMet and its consultants sent public notices asking river users how they used the river. Their comments have informed the process and the challenge now is how to pick the right one for them in balance with picking the right one to address other issues. Different bridge types have different span lengths and required number of piers.

The process is about to enter preliminary engineering (PE). We're ahead of where we normally are because this is such an important and complex element of the Milwaukie project. We've also been talking to environmental groups and NOAA fisheries about the bridge. Chuck Steinwandel (Ross Island Sand & Gravel) raised a concern at the last WRBAC meeting about the horizontal clearance and pier locations. Since then, we've met with RISG and their contractors' tug drivers to better understand this concern and potential impacts to bridge types.

Unsworth presented a diagram of Ross Island and explained to the audience that Ross Island has two distinct operations.

One operation is mining of aggregate, which will continue for up to 14-15 years. There are legal requirements to recreate shallow water habitat in that portion. The other operation is washing and sorting aggregate. This material comes from other locations up the Columbia River. The cheapest way to move aggregate is by barge. There is a consistent market for aggregate in the region and this operation is not going away.

The other things we heard were from the people who drive the tugs that move the barges. This includes parties other than Ross Island Sand & Gravel such as SDS Transportation. Ross Island moves more tonnage in this area than anyone else. That will be important when the project seeks a permit from the U.S. Coast Guard (USCG). The project cannot seek a USGC permit until the Final Environmental Impact Statement

(FEIS) has been recorded. This Record of Decision is anticipated to occur in the spring of 2010.

Ross Island Sand & Gravel uses a bridge span located on the far east side of the Ross Island Bridge to move north on the river and line up with the Marquam and Hawthorne Bridges. A new bridge between the Ross Island and Marquam means these barges have to turn more toward the center of the river in an area where current and wind can affect their movement. (The current and wind tend to push the barge to the east bank as they attempt to maneuver toward the middle for the river). Unsworth pointed out a barge on the slide (slide 3) that was fighting against the main current and wind in order to navigate through the main spans of existing bridges. A bridge with a narrower span, say 300' to 420' clear centered on the river would be very difficult, in their opinion, to drive a barge through. Although Steinwandel (Ross Island Sand & Gravel) originally wanted a 680-foot clear main span, he agreed to a 600-foot clear span that covers the two main channels on each side of the river.

Unsworth handed the conversation to Steinwandel, who said Unsworth did a wonderful job explaining what drivers said.

Steinwandel noted that Ross Island Sand & Gravel no longer dredges and has not dredged in years.

Sean Batty said that he did not expect this to be the last conversation with river users.

Mayor Katz expressed concern about going back to the user groups again. She did not want to see a tentative decision made when there were many problems to address.

Unsworth responded that river users were promised future engagement in order to show how their concerns were addressed and how the project was progressing.

Mayor Katz asked that they bring an independent entity outside of the community to confirm RISGs assessment of the navigational issues.

Pat LaCrosse (OMSI) added that he wanted to know how the bridge would enter the east side because it would dramatically affect development over the next 10-15 years.

Brandman asked Unsworth to elaborate on the implications of having a 600-foot span and what that will do to bridge types and costs.

Unsworth said that the engineers would talk about that.

Brandman asked for further clarification about how the 600-foot span length become the operating requirement and Unsworth again pointed out how the ship would run through the spans.

Mayor Katz reiterated the need for an independent party to reinforce the case for a 600-foot clear main span.

Neil McFarlane asked what the dashed lines on slide 6 were.

Steinwandel said that they represent the centerline of vessel traffic going either up or down the river.

McFarlane Asked if it would be appropriate to think of these lines as the center of two barge “roads”. If this were appropriate, he asked how wide the two “roadways” needed to be.

Steinwandel explained that such a barge “roadway” has to be corrected by the current and wind sets. 200-250 feet is generally considered reasonable. Taking into account safety factors and other ships, a roadway could have to be as wide as 1000 feet.

McFarlane brought up the possibility of expanding roadways and looking into a 3-pier solution.

Batty said that he showed a three-pier option to the river pilots that would put one pier on each side of a roadway.

Steinwandel said he was concerned because with a span length of less than 680 feet, the inadvertency margin for certain error is extremely critical. A barge might run up to a shoal and punch a hole in the vessel. In the history of the bridge they felt that a bridge pier placed anywhere within that triangle shape created by the two routes would almost mean a certain collision with a bridge at a certain point.

Sue Keil (Portland Office of Transportation) asked if every bridge required the same width clearance.

Steinwandel explained from memory that the clearance at the Marquam Bridge is about 350 feet, around 500 feet for the Ross Island Bridge, and about 200 feet for the Hawthorne Bridge, which is the most constricted entrance. He noted that more accurate numbers are published to the inch.

Keil inquired if the clearance had to do with the turning radius.

Steinwandel responded affirmatively and 800 feet is needed to transition from the east side of the river to center of the river. He reiterated the dynamic of current coming down the west side pushing on a loaded barge to the east. The prevailing wind is also out of the southwest and pushes to the northeast. There are times when the tugboat captains have to deal with both those nature dynamics. Without the bridge, there is a considerable length of the river to maneuver to that center point. The design of the bridge according to our tugboat skippers is to give them the same ability to make that

alignment to make the narrowing gap. 600 feet clear is to enable safe passage as barges maneuver out to the Willamette River.

Mayor Katz asked if the currents are specifically located as diagramed.

Steinwandel said it did, but the currents are not constant throughout the year. The currents at a river stage 10 are different from river stage 17 and are completely different at a river stage 23. The extremities of those dynamics are influenced by the river stage at any given time.

Art Johnson (KPFF Consulting Engineers) asked how much river traffic actually uses the river channel.

Steinwandel said from his observation that the west channel is primarily used by pleasure craft. The Portland Spirit uses some sections of that channel. The barge traffic that used to exist along the channel has been curtailed. There is occasional commercial traffic that does maintenance work up and down the river.

Semyon Treyger (HNTB) said the majority of the layouts were for four pier options. All four of those options have 420 feet span. Now that we're facing a 600 feet clearance, it means that many bridge types are not efficient at that span length. The primary cost driver for any bridge is the length of the span. The longer, the more expensive it is. What we were asked by TriMet to do is to look at options that are considered efficient at this span length (tied arch, through-arch, and cable stayed). However, we didn't want to eliminate all the other alternatives in that slide.

TriMet asked us to look at the other bridge types and determine how long a span would be available within the current budget. Remember, pushing spans beyond the optimum span comes at a cost premium.

With the current budget, spans were stretched ("span to budget"):

- Steel I-Girder and Steel Box bridges -550 feet
- Wave frame bridges -600 feet
- Sail blade bridge stayed at 420 feet (not considered feasible at longer spans)
- Tied arch bridge - 750 feet
- Through-arch - 680 feet
- Extradosed -600
- Cable-stayed is the same as previously considered (882 feet).

Then we went back and used our evaluation criteria and re ranked all the bridges. We split navigation criteria into two independent criteria because of the river drivers input: width and clearance. We also edited the modal optimization of section, seeing how flexible it is to TriMet needs. A girder bridge with an open deck would be the most flexible. We also looked at transit performance.

What you notice is the initial cost there is a change due to the assumption that each bridge has the maximum span length available within the current budget. The majority of the 9 fixed span you will see the same ranking of 8. This is because the cost is assumed to be the same.

Based on this, we conducted a ranking of the bridges and came up with the 6 bridge types that performed the best based on the engineering criteria.

Mayor Katz: Are you all convinced that the 600-foot clear span is necessary?

Treyger: I cannot answer this question. I can tell you from experience that every bridge is different and some rivers have an established navigation channel. When I start working with it's already there. The Willamette river in this location is different- it doesn't have an established navigation channel, it has multiple navigation routes. The requirement is for the bridge to meet needs of river users. This is a necessary exercise what TriMet and RISG are doing right now. I cannot tell you that the 600 clear is an absolute must. I have to trust Chuck in this respect. I do not have any other numbers.

Johnson: Is there some economics to shorten the (cable-stayed) span?

Treyger: Yes…. We are presenting general bridge types. We can look at variations of the span, we can look at different tower types, shapes, etc.

Zilis: All bridges will meet vertical clearance. This is not a precise cost. This is based on historic data and it's a fairly quick exercise. For some of those bridges a square foot cost is fairly reliable. There were no through-arch bridges in the recent past.

Katz: If you are to agree on the 600 feet clear for navigational clearance what's the additional cost to the 6 bridges?

Treyger: The cost of those bridges went up by probably about $30m, ballpark. All of those bridges cost about the same as a cable-stayed option. Segmental was a base option. Now we stretch several of them to the limit of the budget and the design of the span.

LaCrosse: With $30 million, what can be done at Ross Island at the point of the island to change the configuration thus causing a change of the water?

Steinwandel: There are a lot of unknowns and uncertainties, but you can start straightening the approach to the bridge and the Marquam and Hawthorne bridge by dredging a channel in the Holgate slough, which is more to the westerly direction. Therefore you would not demand such a skewing of the tug and barge as it approaches the bridge. Let me emphasize that there are unknowns that could make a very inexpensive solution become a gigantic financial problem.

LaCrosse: You're always going to have sedimentation.

Steinwandel: With current setting from east to west, they'll fill up. The estimate would require some type of navigational dredging once every four years. It also depends on how strong the freshet in Willamette River is each year.

Johnson: What if you change the routing of the barges?

Steinwandel: On the upstream end we do not have enough channel depth. When you start approaching what is East Island, you shoal up or become extremely shallow. In zero water I believe you can almost walk across that area.

Durgen: if we would have known that information…. How much money would we save so that we would have a 400 feet clearance?

Treyger: it would take us back about $30 million to the base cost.

Brandman: Is it knocking out other bridge types that would be promising for their attributes and costs? Were things being knocked out because they did not hold up the interest of the group?

Rosales: We went to see all the different designs with the criteria and we got similar results as before. The only one that went down in rating was the tied arch. The six ones that we had initially evaluated stayed the same. The main difference now with wave frame is that we used to have four piers, now we have two. Now the wave frames are more pronounced. When you have two of them the main channel is clear. That creates confidence not only in the navigators. When you expand the first three designs (girders) to 550 feet, the bridge becomes very thick.

And when you have a deeper box then the span goes up and you have other implications on the side. New information also revealed that movable bridges were significantly beyond the budget. They stayed at 420 feet because you could not expand it more. The center three were okay. The sail bridge had the consequence of if you increase more than 420 feet it would exceed the budget.

Because of these changes to the main span we quickly adjusted and analyze the consequences of making the main span wider. For the purposes of the aesthetic evaluations. We developed three representative designs. We chose the **girder wave frame** (represents other girder types but may have more potential as it has structure above the deck), **through-arch (**which represents also some of the aspects of the tied arch**), and cable-stayed (**which is similar to extradosed**)**. Didn't have enough time to develop full renderings of all, but these three represent most of the aesthetic issues.

Wave-Frame Design:

- 680 feet span
- No longer need a pier in the river, just one on the bank and 2 piers in the river.

- Brings issues with the greenway because the design of the piers becomes extremely important that are close to the people. Planning to do a study in this area.

Rosales: It fits very well with the other bridges. Very harmonious when you go over the water. Before it was a little bit shorter, now higher. You can see that that the depth (near esplanade) is very thin. We can have the same depth throughout. When you need to make it a little deeper, it's at the pier.

It's a fairly low bridge, it's not above the hills and it's more modest. As a thin structure it's very open, I find it quite harmonious.

Through-Arch:

- Very similar to the Fremont Bridge.
- Need to have another pier in the water because you need support with a girder.
- Stronger, taller arch than wave. Because there's no support over land, the bridge is deeper.
- Marks the navigation channel. The arch is above the horizon. It's more obstructed by Marquam Bridge.

Cable-Stayed

- Doesn't need piers, but towers are very high.
- More aggressive and monumental. You can see it from farther away. You can see it's a completely different scale.

Mark Williams: is there an engineering reason why it has to be pointed at the top?

Rosales: No, it may change. If you want to keep a narrow cross section, you need to keep the towers outside, not inside.

Jim Bernard: Are they the same seismically?

Rosales: They would be designed to the same seismic criteria.

LaCrosse: Couldn't the triangular shape be oval?

Rosales: The cost would increase considerably because it's not a normal situation. They (referring to another bridge in Boston) wanted to have a landmark. In Portland we're much more conservative, we have a budget.

The Aerial Tram tower is very thin and discrete and can disappear. The bridge cannot disappear; it's right in the view corridor. Nothing is obstructing your view except from other bridges. Other buildings can obstruct a tower on the land.

Millius: There's the issue of relative scale. This bridge has the potential to dwarf many tall buildings. The concern with cable stayed is that it's so much bigger than anything around it.

Rosales: I cannot disagree with you. You could not make a cable-stayed half as high. Each of the types have a certain range that you could play with, but it's pretty much fixed.

Mark Williams and Vera Katz asked how the budgets for all six bridges ranked.

Rosales: They're all about the same. One consequence is that if you're higher with a concrete segmental, then you need to have larger ramps and piers.

David Knowles: Does the 600 feet requirement change the development of anything you recommended?

Rosales: I liked the sail bridge. The wave frame was a little bit similar in condition.

Soderstrom: I wonder if you've given up on height and where we are with that height.

Rosales: It's 75 feet. It hasn't changed.

Katz: If we move away from the 75 feet, how do we do that?

Rosales: The main span has a huge impact on the cost. Raising it is not the same impact. If it costs $1.3 million to raise a bridge every foot, and if we need to raise it 5 feet, it would cost $6.5 million.

Katz: What about the aesthetic impacts?

Rosales: It could make it look better from the river. The biggest constraint with a steeper approach is with pedestrians.

Mark Williams: Is TriMet planning to get outside consulting advice to validate the assumption of a 600 feet clearance?

Keil: I trust Chuck, but I think it makes the position stronger.

Katz: There needs to be some validation.

Brandman: With the through arch, does that imply more issues with people that are concerned with fish habitat?

Rosales: When we talked to the environmental people, they much preferred the pier to be on the land.

Brandman: Referring to the dashed lines on the map, is the easterly line pointing towards the center of the Marquam Bridge? What if it were brought to the west at more of an angle so that you have a triangle. Is there a way you shave the clearance?

McFarlane: That's a key question, and that's maybe what another set of eyes could look at.

Brandman: 550 feet is still going to cost you about the same amount of money. If you want to get to a different number you have to get down to 420 feet.

Barnard: We left some that had smaller spans. We left different ranges on the table while we did more analysis. The message is we spent all our time to get there. Is 600 the magic number?

Rosales: It's hard to predict what would happen in between 420 feet and 600 feet of horizontal clearance.

Katz: You would prefer it to be higher? (in reference to vertical clearance) You said yes.

Rosales: If cost were not a consideration, I would say yes.

The group expressed concern about how much an extra $30 million could affect the entire light rail alignment, specifically, how much rail that might reduce. Staff attempted to clarify that the $30 million is not an estimated figure, and that the upper end of the budget for the bridge was included in the LPA estimate, so this is not "extra" in that sense.

Unsworth explained that the capital costs took into account a flexible number for the bridge.

McFarlane: The pushback is that we're in the midst of a process to fund it. We have a lot of local money to raise and it's going to be very hard to get there. Every time the project requires a more costly element, that makes the project that much harder to fund. The federal government is also making it more difficult. Any higher cost element will make it harder to get to a financing plan that works.

Keil: You have a cost and a revenue side. They don't match even at what we put in initially. If you add cost it becomes less of a match.

McFarlane: It should continue to weigh on us on how you can get the best value you can.

Katz: I get a sense that the committee wants to validate the 600 feet span length requirement.

Rosales: Sometimes you have to evaluate the risk of not changing something that might obstruct later. The more time you wait the more the cost will increase. Is it worth it to make the jump now or wait later? That's always a tricky but important question.

Katz: The other question is how many surprises you're going to come back to us with?

Batty: We hired an outside expert to assist with the vertical clearance assumption. Through that and other activities, we've learned that the coast guard has a hard standard to anticipate. In addition, we're also just hitting the tip of the iceberg in terms of environmental permitting side of this bridge and this project.

Unsworth: There are other issues about where to place the pier in regards to future sediment caps, etc. Those are all elements that play. We're doing things six, seven months ahead of a typical preliminary engineering schedule.

Johnson: Is any one bridge more susceptible to damage?

Treyger: It depends on the size of the pier. When it's barge vs. bridge, the bridge always loses.

Keil: Are we saying that any of these are still within the original number that we had plugged into the budget?

Barnard: Yes. We stretched them all until span equaled the budget. There's still rigorous engineering analysis that needs to be done. At the end of the process we'll come to 2-4 that will be available. More cost analysis and geotechnical exploration is still needed. A key message is don't fall in love with ones you see here because when we do more analysis it may not be a viable option based on what we learn.

Knowles: Give us a preview at the next meeting.

Barnard: We're going to come through with recommendations. We're going from "some to few" and we're going to go out to the public around December with the validated "few".

Brandman: With each of these bridges stretched, doesn't it cost $30 million more?

Rosales: No. The additional cost depending on the type of bridge is anywhere is believed to be from $0 to $30 million more than the lowest cost SDEIS option (concrete segmental). We need to do more cost analysis to validate that assumption and to determine more accurate individual cost ranges for recommended bridge types.

Treyger: $30 million was the difference between the segmental and the cable-stayed design in the SDEIS phase.

Katz asked the committee to have concurrence about asking for an independent analysis of whether a 600 feet span was needed. The committee concurred.

David Knowles closed and reiterated that there needed to be more validation about the navigation issues.