EARTHQUAKE READY BURNSIDE BRIDGE

Multnomah County is creating an earthquake-ready downtown river crossing.

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November 18, 2020

Urban Design and Aesthetics Working Group (UDAWG) – Meeting #5 Notes

Project:	Earthquake Ready Burnside Bridge (EQRB)
Subject:	Urban Design and Aesthetics Working Group
Date:	Wednesday, November 18, 2020
Time:	1:00 PM – 3:00 PM
Location:	WebEx (see email for link)

WORKING GROUP MEMBERS

Randy Gragg, Executive Director, Portland Parks Foundation
Bill Will, Public Works Artist
Paddy Tillett, ZGF
Chris Herring, Artistic Director, Portland Winter Lights Festival
Megan Crosby, Urban Development + Partners
~~Ian Williams, Deadstock Coffee~~
Priscilla Macy, Oregon Outdoor Coalition
Izzy Armenta, Oregon Walks
Dave Todd, Portland Rose Festival
Brian Kimura, Japanese American Museum of Oregon

AGENCY GROUP MEMBERS

Patrick Sweeney, PBOT
Teresa Boyle, PBOT
Lora Lillard, BPS
Rachel Hoy, BPS
Hillary Adam, BDS
Tate White, PPR
~~Justin Douglas, Prosper Portland~~
Bob Hastings, TriMet
Magnus Bernhardt, ODOT

PROJECT TEAM MEMBERS

Megan Neill, Multnomah County
Mike Pullen, Multnomah County
JD Deschamps, Multnomah County
Emily Miletich, Multnomah County
Jon Henrichsen, Multnomah County
~~Suzanne Carey, DEA~~
Heather Catron, HDR
Steve Drahota, HDR
Cassie Davis, HDR
Michael Fitzpatrick, HDR
Katy Segura, HDR
Jeff Heilman, Parametrix
Allison Brown, JLA
Carol Mayer-Reed, Mayer/Reed
Jeramie Shane, Mayer/Reed
Josh Carlson, Mayer/Reed
Anne Monnier, KPFF
Joel Newman, Fat Pencil

COMMUNITY TASK FORCE OBSERVERS

Bill Burgel, Peter Finley Fry, Ed Wortman, Fred Cooper, Susan Lindsay

Purpose:

The purpose of the UDAWG is to serve as a technical resource body to the CTF for urban design and aesthetics by:

- *Providing informed insights and opinions on the visual features for each type selection option*
- *Recommending measures to enhance aesthetic opportunities or mitigate potential visual impacts*
- *Representing urban design and aesthetic interests*
- *Reflecting the character of Portland by suggesting place-making opportunities*

Outcomes:

The outcomes for the UDAWG group are to:

- *Inform a set of feasible bridge type options for the CTF's consideration*
- *Inform a project-specific Visual Performance Standard for use during the Type Selection and Final Design phases*
- *Recommend visual and aesthetic evaluation criteria for consideration by the CTF*

Notes:

WELCOME, INTROS, PRE-MEETING INFO, AND GENERAL COMMENTS

- Introductions
- Pre-meeting information
- Purpose and Outcomes
- Meeting Objectives
- Project Update

GENERAL COMMENTS

- None

WEST APPROACH FOCUS

- Bridge Type Assessment (cont'd)
    - Westside Study: Existing; Vertical Clearance: 23 feet
    - Westside Study: Truss Option; Vertical Clearance: 25 feet
    - Westside Study: Cable Stayed Option; Vertical Clearance: 25 feet
    - Westside Study: Girder Option (columns at Naito Parkway); Vertical Clearance: 15 feet
    - Westside Study: Girder Option (columns within Waterfront Park); Vertical Clearance: 17 feet
    - Westside Study: Tied Arch Option; Vertical Clearance: 25 feet
- Adjusted Waterfront Park Tower Placement
- Street Scape
    - Existing

- Example: Toronto
- Example: Mumbai
- Example: I-395 in Miami
- Example: Seville & Los Angeles
- Example: Chicano Park, San Diego
- Example: Holland
- Example: Concrete Texture

DISCUSSION/QUESTIONS

- Patrick Sweeney (via chat): Could asymmetric on the east be an option?
    - Steve Drahota: The east Long-span could be made slightly more asymmetric. We have the tower placed midway between 2nd Avenue and the railroad; the more you shift it to the east, the taller the tower goes. It can be shifted closer to 2nd, but it would come at a financial cost and would mean a taller tower.
- Bob Hastings (via chat): In the girder option it shows the clearance as a full, flat surface. But aren't there separate girders...a more serrated look?
    - Steve Drahota: Yes, but we wanted to focus the graphic on the vertical clearances and an outside surface seems best for this purpose. In truth, there would be gaps between the girder lines or boxes.
- Bob Hastings (via chat): Views on pages 26 - 31 would be the view from the light rail or pedestrians on the Steel Bridge's top deck.
- Mike Pullen (via chat): What is the ballpark cost increase for asymmetrical cable stay on west?
    - Steve Drahota: I don't have that answer right now. Because you're trying to balance the load on top of the tower, you end up filling that back span with more weight because you have to balance that weight. Additionally, tie-downs would likely be required. It is definitely a cost premium, but we just haven't gotten to that answer yet.
- Magnus Bernhardt (via chat): For Waterfront Park, could the cables be just on the east side of the pylon and girder on the west?
    - Steve Drahota: Yes, but that would introduce significant loads to the tower that the tower doesn't generally cannot handle with being made extremely large. Any time you have cables pulling on one side of a tower, the loads are unbalanced and require large capacities to resist it. If you don't have balance, then the tower needs to resist all of that load. Michael, have you had that before?

- Michael Fitzgerald: We could bypass the back span, but it's a much more expensive thing. One Calatrava project did this and it required an additional $60-$70 million to accommodate that detail.

- Dave Todd (via chat): At some point, burden of balancing asymmetries would seem to run risk of compromising earthquake resistance.
- Fred Cooper (via chat): Can the below deck space be an enclosed use, like a year-round market. Maybe with the girder option?
    - Mike Pullen (via chat): Fred, the county's policy is to not have buildings under our bridges, for safety and access to maintain and repair the bridge. But temporary things like Saturday Market are OK.
- Patrick Sweeney (via chat): It would be helpful to hear from Tate about thoughts on column placement, organization of Saturday Market, etc.
    - Tate White: Thank you so much for the vertical clearance and street scape graphics. I think that vertical clearance will be more important than vertical space above the bridge, but I would like to talk to my colleagues more before providing more information. I appreciate the precedence. I want to be very thoughtful of the particular context we have here.
    - Steve Drahota: You believe vertical clearance will become the priority over vertical space above the bridge?
    - Tate White: Yes, that is my initial feedback, but I would really like to talk to my colleagues about this more before providing any official feedback. We're still working to determine the impacts of that vertical clearance. Creating a cavernous space with columns, when we have a large houseless population, makes me nervous, and uses with the Saturday Market would benefit from a single large opening space.
    - Bill Will: I agree that vertical clearance is more important than having columns in that area. More important than NOT having columns. These slides were really helpful. I feel like the columns in that area are not offensive to me; I find them interesting in some ways. From the beginning, I have not been very opposed to having columns in that area.
    - Dave Todd (via chat): Concur with Bill's support of Tate's characterization.
    - Chris Herring: With the Portland Light Festival, what I've looked for under bridges are hang points (for sound, lighting, aerialists) as well as power to plug into. I like the open spaces, like for concerts. And who knows what future uses will be desired. I think it's important to not just build for now, but to allow for things that come up in the future that we cannot predict.
    - Bob Hastings: I feel like we're all trying to describe different parts of the elephant from different vantage points. When we're talking about the area underneath the bridge, we're actually talking about the bridge architecture. It's helpful to consider the whole part of it; not a zero-sum game, but a collective of different impressions.

- Fred Cooper (via chat): Columns in the park space provides an opportunity to incorporate their vertical surfaces in the architectural design.
- Paddy Tillett: The columns along Naito Parkway really separate Naito Parkway from Waterfront Park, protects the space underneath the bridge, and leaves the prospect across the river open. That is a quality we don't have anywhere else and could utilize the Waterfront Park space.
- Dave Todd: Paddy put into words what I was trying to articulate. Especially when you are planning for future unforeseen uses.
- Magnus Bernhardt (via chat): The open sightline with the tied arch is appealing, makes the connectivity between north and south more seamless.
- Lora Lillard (via chat): I agree that the vertical clearance is more important than the open space above the deck. We can always work with columns in the park; these don't appear to be unduly obtrusive. However, we'll never be able to replicate the light and air from a taller deck once the bridge is built.

- Hillary Adam: When I think about the cable stay, it's almost like an art piece in the center of the park. I find value in both the tied arch and cable stay options.
- Dave Todd: One thing I like about this tied arch, it's outside of the way of the buildings.
    - Others in the group nodded in agreement.
- Bill Will: For clarification – the question of the below deck height is only in the case that we choose the girder option. If that weren't the case then we wouldn't probably be talking about the ceiling height?
    - Steve Drahota: Correct. The reason we investigated the girder concept was to determine the trade-off for having full open space above the bridge. The importance of having views above deck was expressed, so this was shared in the spirit of trying to balance the open view look and not have anything above the bridge; the tradeoff is the girder depth. Does that answer your question?
    - Bill Will: Yes. And if we come back to the girder option, then we'll have a better understanding of it with this information.
- Magnus Bernhardt (via chat): I like the tied arch for its form, which can be perceived as both contemporary in design and historic in its reference to bridges of the past; the curve is a universally appealing shape and its form and scale flow nicely as they bridge the river.
    - Dave Todd (via chat): Really agree with Magnus on his latest comment.
- Bob Hastings (via chat): I'm concerned that the girder option is being illustrated un-fairly. Why does the girder have to come all the out to the edge of the walkway? Also, why is the girder illustrated as a monolithic 'box'?
    - Magnus Bernhardt (via chat): Agree with Robert.

- Steve Drahota: We wanted to focus the graphic on the vertical clearances and an outside surface seems best for this purpose. In all likelihood, there would be an overhand that creates a shadow that has the appearance of a reduced structure depth (although it is actually the same as what is being shown for the vertical exterior girder face).

MENU OF BRIDGE TYPES

- Input / Feedback Opportunity (Topics to consider during the presentation)
  - Achieving balance: symmetry vs. asymmetry
  - Composition of bridge components
  - Civic scale - east vs. west
  - Elements of human scale
  - Iconic landmark...or not?
  - Lift bridge or bascule opening?
  - Use of different structural systems in a tri-part bridge?
  - Innovation
  - Coherency
- Existing Willamette River Bridges
- Long-span Alternative
- River Hydraulics (Variable Water Surface Elevations)
- Movable Bridge Type – Bascule (Bascule Type for the Burnside Bridge: "Delta Pier")
- Movable Bridge Span (Summary)
  - Technically Feasible Types
    - Lift: 180-foot tall towers (from OHW Elev); individual or strong truss tower; sheave direction options; single or split towers.
    - Bascule: delta pier; twin leaf; rustic or modern style.

Study: Lift Bridge Type

- Lift Scale and Configurations (Lift tower height ~ 180' from OHW Elev)
- Key Attributes of Lift Type for the Burnside Bridge
  - Lift Span: Can be above or below deck
  - Pier Locations: West and east of the existing piers to avoid foundation conflicts
  - Pier Sizing: Needs to accommodate counterweight movements, machine room, and stairs
  - Sheaves Placement: Towards main channel span to raise span
- Lift Span Type – "Girder" type is Technically Feasible
- Technically Feasible Lift Option: Modern Truss Tower Style
- Technically Feasible Lift Option: Individual Tower Style

- Tower Types: Single Tower versus Split Towers
- Vertical Towers - Internal Needs
- Lift Tower Alternatives

Study: Bascule Bridge Type

- Bascule Scale and Configurations
- Key Attributes of Bascule Type for the Burnside Bridge: "Delta Pier"
    - Bascule Span:
        - "Split-leaf" (2 halves) type due to opening length
        - Can be above or below deck
    - Pier Locations: West and east of the existing piers to avoid foundation conflicts
    - Pier Sizing: Needs to accommodate counterweight movements and machine room
    - Trunnion Placement: Towards main channel span to reduce bascule leaf length
    - Vessel Collision Protection: Likely requires a fender or dolphin system for large ships
- Example Bascule Bridge Types
- Delta Pier Alternatives – Shape
- Delta Pier Alternatives – Shape with Tied Arch
- Delta Pier Alternatives – Modern Style
- Delta Pier Alternatives – Modern Style with Tied Arch Approach Spans
- Delta Pier Alternatives – Modern Style with Cable Stayed Approaches
- Delta Pier Alternatives – Modern Style with counterweight above deck

Movable Bridge Design Feature: Operator's House

- Operator House Examples
- Operator's House Concepts

DISCUSSIONS / QUESTIONS

- Bill Will (via chat): A couple of meetings ago, I asked if there was variation of the lift bridge that did not have towers. For example: a hydraulic lift.
    - Steve Drahota: Yes, it's a difference in the mechanics that our team is working on. I'll have an answer for that in our next meeting.
- William Burgel (via chat): What amount of sea-level rise are you considering?
    - Steve Drahota: We are using a 5-7' increase in water surface elevation for climate change.
- Randy Gragg (via chat): Curious: Are lift spans ever "occupyable"? In other words, could it become a sanctioned (and safe) "event" to occasionally let people take a ride?

- Steve Drahota: For public safety, I don't think the County would allow the public to do that. I'll let Multnomah County speak to that.
- Mike Pullen: We've taken reporters and elected officials up, with safety gear. The ends that meet up with the roadway are the main risk area, like the edge of a cliff. It's a small number of people that we allow up.

- Magnus Bernhardt (via chat): Is a lift better than bascule for an earthquake or same, thinking roadway alignment after earthquake?
  - Steve Drahota: They are equivalent, but it comes down to cost. The difference is what you have to build into it. We can design each to have the same performance and reliability.
- Magnus Bernhardt (via chat): I like the French bridge lift; "I" street not so much. I don't think the design will hold up over time. Lift with girder only could be the minimalist design (cool); lift becomes the focal point in the middle of the river. If not, seems like lift towers would need to have some continuity with the superstructure materials for tied arch, cable stay etc.
- Bob Hastings (via chat): Good call about the pedestrian and boating activity of the Chicago River bridge.
- Bob Hastings (via chat): Michael's comment about the sculpture of the bridge is taking thinking in the right direction.
- Izzy Armenta (via chat): Could be a chance to reflect the ebbs and flow of the river in the delta pier structure. Making it more connected to the river rather than just a plopped down shape in the river.
- Peter Finley Fry (via chat): The old bridge hiding behind the new bridge is one of my favorite mechanical bridges in the world.
- William Burgel (via chat): Seems like a bridge designed like the New Johnson St Bridge would "handle" a seismic event rather well.
- Paddy Tillett: The diagram you showed with the wheel on rollers; it occurs to me that during a seismic event that is inherently stable at whatever stage of lifting it as at. As opposed to a bascule. Is there a seismic advantage to this design?
  - Steve Drahota: Keith Griesing on our team, with Hardesty and Hanover, was the designer for the New Johnson St Bridge and said this design performed very well in that regard. Where the trade-off comes is in terms of cost. Because of some of the other design complexities and fabrication, they weren't able to see the cost come down. That's a very astute comment. Because the mass is much lower than a lift bridge, its seismic performance is quite good.
  - William burgle (via chat): I agree with Paddy!
- Dave Todd (via chat): Low metacentric height is a big advantage of any design option. Lift bridges scare me in that respect.
- Magnus Bernhardt: The bascule is a place where you take a breath from the architectural components and take in the views. There's a "rest and pause" component there. I love the stuff you all are presenting – its super cool.

- Bill Will (via chat): Agree with Magnus.

- Carol Mayer-Reed: I want to return to program for a second: the sequence of experience; east to west and west to east. Do we want to have a break or have a sculptural element? Do we want to think about it from a programming standpoint? Is it helpful to have that open space in the center of the river? Are we featuring our city and the river more with that?
  - Bob Hastings: I'm not fully convinced, on the west side, that an above deck structure is a presumed addition. I'm still open to the girders. On the east side, I think side there is a greater possibility of that from a functional standpoint. Unpacking what the structural engineering principle is and responding to our urban design challenges. I do agree that the orchestration of how we cross, with all the different modes, unpacking that, as a monolithic one.
  - Randy Gragg: As long as the walkways are not blocked by the structures, I'm not tied to the middle of the bridge being structure-free. I do feel fairly strongly that the three bridge sections have to complement each other in some way. I find the least satisfying to be the girder section on the west side. It feels like more of a freeway on-ramp instead of an intrinsic part of the bridge. You showed some great examples. To me, if there is a single bolt on this thing that isn't needed, I think it's a failure. In my mind, I think about this being a very pure expression of the structure and the elements of the structure are inherent to it and its operation. The touch-points of guardrails create the opportunities of humanness to it. It should demonstrate engineering prowess and design.
  - Paddy Tillett: The experience of being in the middle of the river is something that is very special. This is a very important place. It's on the equator; it's a place to mentally pause, even if the vehicle keeps moving. It's a thing to celebrate. As we're looking at the bascule alternatives, we have the opportunities to minimize the above deck structure. There will be a clear sense that "I am in the middle of the river".
  - Carol Mayer-Reed: It's like a mass and a void; compression and release form, and you are rewarded by what you are seeing all the way around. How do people feel about the lift versus bascule? Any areas of agreement?
  - Magnus Bernhardt: The bridge is a long span and we could provide continuity with some additional architectural features that tie into the functional/operational features of the bridge. Looking for repetition.
  - Mike Pullen: Having attended all of the CTF meetings, they talk about the assembly aspect of the bridge; an event space. The other 99% of the time that it is not being used as an event space, there is the ability to look up and down the river.
  - Patrick Sweeney: The Woodrow Wilson Bridge is really beautiful and the sense of continuity and rhythm and repetition work together as a family and make a really good composition. A trapezoid shape in the middle of the river seems incongruous and a very large thing in the middle of the river, when the river opening isn't that wide. For the lift span and potential for towers – what's appealing to me is how the towers meet the water and having a smaller

footprint in the water. I'm going to be looking at the bridge from the Eastbank Esplanade and Waterfront Park, I'm hardly ever going to be looking at the bridge from the viewpoints of the sketches.

  - Bill Will (via chat): What Patrick says: we need to see this from those angles.

- Dave Todd: Aesthetically, all of the bridges were flat girders on each side. Metacentric height is a real thing and I'm concerned that that approach seems to be thumbing our nose at the tectonic forces we are trying to deal with in the first place. When something like that fails, it fails catastrophically.
- Lora Lillard (via chat): None of these examples are showing structure above deck on either side of the lift, so it's difficult to understand how much texture/noise/structure would be seen on a lift with towers in the middle.
- Bill Will (via chat): The bridge is almost always closed. I prefer bascule because of its simplicity and openness. I also like the elegance of the bascule's movement when in operation.
- Tate White (via chat): I agree with both Lora and Bill's comments.
- Randy Gragg (via chat): Remind us: which bridge type is likely more costly?
  - Steve Drahota: At this point, it's too early to tell which movable type (lift or bascule) will have a higher cost due to the bridge's extreme seismic design criteria. The engineering and constructability teams are working hard to develop costs (and cost risks due to design and construction uncertainties) for each option before the end of the year. To this point, the (cost) devil is in the details and each movable type has its own, unique cost premium(s) associated with seismic performance.
- Lora Lillard (via chat): RE: masses and voids question from Carol - this is a necessary balance because of all the "noise" that could be created with so much structure. To avoid the noise, I'd rather the "void" occur in the middle of the river as opposed to the west side, because of the height issues on waterfront park that we've mentioned. Otherwise, I'd ask that the bridge design be as light as possible to avoid heaviness or cage-like structure. Also curious if all of these options allow the pedestrian/bike paths to occur on the outside of the structure.
- Dave Todd (via chat): Agree with Lora
- Peter Finley Fry (via chat): Comment: do the different designs generate significantly different levels and articulation of noise?
  - Steve Drahota: No, they generally do not.

[In the interest of ending the meeting on time, the group moved on.]

TYPE SELECTION EVALUATION CRITERIA

- The Type Selection Evaluation Criteria distributed with today's meeting material is a draft of the compilation of input from this group; i.e., your words put in the form of criteria. The Project Team want to make sure this reflects UDAWG members' comments well. Please note that this was not developed in terms of hierarchy of importance; feel free to reorganize the items. The items in

orange are not differentiators in the bridge type. The Project Team would like to draw comments from everyone.

- Lora Lillard: Is there a way for us to "weigh" the criteria that we're looking at/reviewing? This is everything we've ever talked about, but I think we've realized out loud that not all criteria are created equal.
    - Carol Mayer-Reed: Not officially, but your input on that would be appreciated and conveyed to the CTF for their consideration.

Homework

- Instructions: Please read and provide comments on the draft Urban Design and Visual criteria Part I "Urban Context and Experience" and Part II "Visual and Aesthetics".
- Questions to you
    1. Do the criteria within Parts I and II reflect the UDAWG's key Urban Design and Aesthetic topics needed to recommend a bridge type? If not, how would you modify the criteria to do so?
    2. Would you recommend advancing these criteria to the CTF for their use in recommending a bridge type? If not, how would you change the criteria to do so?
- Suggestions from you
    - Email your responses to Katy Segura (Katy.Segura@hdrinc.com) by 11/29/20.
    - We will compile and bring your input to UDAWG Mtg #6 on 12/2/20.

NEXT STEPS

Proposed Meeting Dates and Durations:

- Mtg #6 (2 hrs) – Wed 12/2/20 (Comprehensive Bridge Composition)
    - Key Topics: Range of Feasible Alternatives; Preliminary Evaluation Criteria Review
- Mtg #7 (2 hrs) – Wed 12/16/20 (Input and Recommendations to CTF)
    - Key Topics: Input on the Range of Feasible Alternatives and Visual Design Guidelines; Recommended Type Selection Evaluation Criteria

---------- Planned Break until March, 2021 ----------

- Mtg #8 (2 hrs) – Wed 3/10/21
- Mtg #9 (2 hrs) – Wed 6/2/21