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A Civil Engineering Assessment of the Decision To Reject A Tunnel As An Option To Replace The I-5 Bridge Over the Columbia River

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Robert Wallis, PE

215 West 4th 'Street, Suite 102

Vancouver, Washington 98660

360-977-8007

1. Introduction

The States of Oregon and Washington recently released a draft EIS for the proposed $7.5 billion project to replace the I-5 bridge across the Columbia River. That project, called the IBR project (Interstate Bridge Replacement project) is being implemented by a group of Oregon and Washington DOT staff and their consultants called the IBR team.

An initial step in the EIS process was the evaluation of technical options to identify a preferred option for further refinement and environmental evaluation. A fixed bridge option was identified as the preferred option and the others were rejected, including the immersed tube tunnel (ITT) option.

Project critics have alleged that the IBR team deceived the public and elected officials when they provided false information regarding the deficiencies of the ITT design option which led to the rejection of that option. This report evaluates the validity of those allegations and their implications.

2. Conclusions

In evaluating the public record and discussing the matter with various agency staff, including those on the IBR team, it is concluded that:

1. During the process of screening design options to replace the existing I-5 bridge over the Columbia River, the public and their elected officials were deceived by the IBR team.

2. That deception was the result of false and exaggerated claims regarding the deficiencies of the ITT option during the process of screening design options. The most damaging of those false claims – that the ITT option was unable to make critical street connections - was a fatal flaw for the ITT design option which led directly to it's rejection. That false claim appears to have been fabricated for the sole purpose of having the ITT design option rejected. The fact that this false claim was contradicted by the engineering report which the IBR team commissioned to evaluate the feasibility of the tunnel, suggests that it was fabricated for the sole purpose of deceit.

3. That deception completely undermined the credibility of the process of screening design options, which in turn undermined the credibility of the recently released draft EIS. The process of screening alternatives should be repeated prior to finalizing the EIS.

4. The IBR team were negligent in their actions regarding the process of screening design options. Those responsible should be held accountable. If the screening process for the technical options is repeated, which it should be, that effort should be completed by an independent party.

3. Background

The process of selecting a replacement of the IBR bridge began in the mid-1990's - with internal efforts by the ODOT staff to explore options for implementing the project. ODOT staff assumed that the replacement bridge would be a fized bridge similar to the I-205 bridge except that it would include light rail.

Officially, that process began in 2005 when the DOT's were authorized to proceed with what became known as the Columbia River Crossing (CRC) project. Through that CRC process a fixed bridge design option was selected and advanced through prelimary design and environmental assessment, leading to a final EIS prepared to meet the requirements of the National Environmental Policy Act. The CRC project was officially terminated 2014.

The DOT's of both states continued efforts to implement a bridge replacement project. That effort, now named the Interstate Bridge Replacement (IBR) began in earnest in 2019. That project, has moved forward through five basic decision making steps – all as mandated the National Environmental Policy Act (NEPA) due to the fact that the project was federally funded.
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Step 1 – Establish the Project Team

In I-5 bridge is owned by Oregon and Washington, which means the state legislatures are responsible for making key decisions regarding what gets built and how it is funded. A Bi-state Legislative Committee from both states was established to guide the process and provide oversight. A wide variety of advisory groups including those from local, state, and federal agencies were established to provide input and recommendations. These are collectively referred to as "the public".

Step 2 – Identify Project Goal.

The Bi-state Legislative Committee of the state legislatures had to first agree to a project goal. In this case - the replacement of the existing bridge.

Step 3 – Identify Options that Meet that Goal.

State DOT staff and their consultants (the IBR project team), provided the public with technical options that met the project goal of replacing the bridge. Initially, they did not present the public with the option of an ITT tunnel. That option was added as a direct result of public input into the Step 3 procet\ss.

Step 4 – Evaluate Options and Select A Preferred Option.

IBR leadership gathered technical information help inform the decision making process. Most of that information came from previous studies completed as part of the CRC. Because the ITT design option was not evaluated in the CRC process, an engineering evaluation of the ITT design option was completed, and summarized in an engineering

report made available to the public. That report was entitled "Tunnel Concept Evaluation."

Project advisory groups, using a consistent set of parameters to apply to each technical option, compared each option to the others through a screening process to select a locally preferred alternative (LPA). That LPA became a foundational decision to serve as a basis for Step 5 efforts.

That process of evaluating and comparing the technical options was summarized in a memorandum called the River Crossing Option Summary. That memorandum reflected what the IBR team told the public and their elected officials during the public meetings and workshops where the technical options were discussed.

Step 5 –Advance design efforts and evaluation impacts.

The evaluation of project impacts for the LPA was completed and summarized in a draft EIS which met the requirements of the Natioanal Environmental Policy Act.

The first four of these steps are taken for every complex public infrastructure project regardless of whether it be implemented by federal, state, or local government. The intent of this process is to assure that agency staff deliver a project which meets public needs as opposed to their own institutional needs, or the needs of a special interest group having influence over them. The process enables the public to determine what "public" project their government builds.

4. How the Public Was Deceived

The public was deceived by false and misleading technical information regarding the deficiencies of the ITT design option. That information was represented to the public as being the professional opinion of engineers, when it was not.

During the Step 3 process of reviewing and assessing the technical options, there was considerable interest by the public in the ITT design option and strong advocacy for that option by some. That interest largely disappeared when the IBR team falsely claimed that the ITT design option had deficiencies that did not exist.

Most notably, the IBR team alleged that the ITT option would not enable connections to streets in Downtown Vancouver and Hayden Island or SR-14 without significant out-of-direction travel. That claim, which was essentially a fatal flaw, was totally untrue, and in fact was contradicted by the engineering report that summarized the engineering evaluation of the ITT design option – the Tunnel Concept Assessment.

In addition to making the false claim regarding connections, the IBR team appears to have exaggerated other ITT tunnel deficiencies.

The IBR team's false and exaggerated claims regarding ITT option deficiencies were made in numerous public meetings and workshops. They were discussed in the report which summarized the screening process – River Crossing Option Comparison. Those deficiencies were listed in a "fact sheet" that was distributed to the public and made available on their website. That fact sheet - "Why Not A Tunnel" is quoted as follows:

"The tunnel design concepts have already been analyzed as river crossing options. Tunnel options do not best address the transportation issues identified in the I-5 bridge corridor, and would result in multiple challenges in the program area. Because of these challenges, tunnel options were removed from consideration.

Analysis of the tunnel options identified the following challenges:

- *Significant out-of-direction travel for drivers, freight, emergency response vehicles, transit users, bicyclists and pedestrians*
- *The inability to tie into existing connections such as SR 14, Vancouver City Center and Hayden Island*
- *Potential safety concerns for bicyclists and pedestrians*
- *The potential for significant archaeological, cultural and environmental impacts*
- *Cost estimates for a tunnel are estimated to be approximately two times higher than cost estimates for a replacement bridge and approaches. This estimate does not include other highway, interchange or high-capacity transit improvements* that would be necessary."

The first two of these deficiencies are one and the same (the inability to connect means significant out-of-direction travel). If true, which was not the case, the ITT design option would not be practical.

<u>The Alleged Deficiencies Regarding Out-of-Direction Travel and Inability to Make Critical Street Connections.</u>

The first two claims regarding ITT deficiencies were that the ITT option would

1. Present "*Significant out-of-direction travel for drivers, freight, emergency response vehicles, transit users, bicyclists and pedestrians?*
2. Results in "*The inability to tie into existing connections such as SR 14, Vancouver City Center and Hayden Island"?*

Again, they are one and the same. The essential assumption that supports the claim that connections to critical streets cannot be made is that the ITT design option could not include interchange ramps. The IBR design team deceived the public when they told them told that those ramps were impractical. Please note what the IBR team stated in the "River Comparison Crossing Comparison" document that the ITT design option:

”Requires **unconventional and complex** below-grade construction to accommodate interchange connections consisting of cut and cover tunnels with large temporary excavations. This would make **construction impractical”.**

The bold sentences are from the IBR report.

Compare that comment with the only mention of that issue in the engineering report – Tunnel Concept Assessment and it will become clear that the IBR team;s intent was deceit. :

> “The ITT would be connected to the above-ground roadway network via cut-and-cover and retained cut connections at either end. Excavation support for these end connections could differ between Vancouver and Hayden Island, as excavations in Vancouver are anticipated to be primarily in gravel alluvium, whereas excavations on Hayden Island are anticipated to be primarily in silt/sand alluvium. The deepest excavations could require ground support systems consisting of braced or restrained secant pile or slurry walls, while shallower excavations may require less robust ground support systems. Ground improvement measures could be incorporated to decrease the potential for seepage through the base of the excavation and to provide long-term support for the constructed cut-and- cover and retained cut sections. “

The comment “would be connected to the above grade roadway network” is a total contradiction to what the IBR told the public during the alternative screening process as quoted previously. In the engineering report prepared by IBR constultands, there <u>is</u> no mention whatsoever of those connections being “impractical”.

The Tunnel Concept Assessment clearly contradicted the claim about connections. Connections are in fact practical and with those connections, there are no out-of-direction travel deficiencies.

In public meetings and workshops, the IBR team leadership told the public repeatedly that, because there could be no connections from the tunnel to surface streets, frontage roads would be required from the ends of the tunnel where it daylighted at each end over 1,000 feet from the river banks. To get to any point near the river (streets in downtown Vancouver, SR-14, and Hayden Island, would require exiting the tunnel where it surfaced, and back-tracking to the streets through those frontage roads, thus the “out-of-direction travel”. Here is a quote from the Option Comparison document:

> “As shown, an ITT would likely daylight on the southern end of Hayden Island in Portland and near Evergreen Boulevard in Vancouver. This would eliminate connections to I-5 at SR 14 and Hayden”

Those frontage roads would have had drastic impacts upon Downtown Vancouver and Hayden Island. Those business and property owners who had shown initial interest in the ITT design due to the fact that it avoided what they perceived to be “bridge blight” completely lost interest upon being deceived into believing that their properties and businesses would have been devastated by frontage roads.

<u>The Alleged Deficiency Regarding Potential safety concerns for bicyclists and pedestrians</u>

Although there are no meaningful safety concerns for a well-designed tunnel, the fact is that if not designed well or policed, there could be a safety concern. The exact holds true for the fixed bridge options massive above-ground vehicle an pedestrian ramps as well, however that potential deficiency was not identified for the fixed bridge option. Nor was it noted that the fixed bridge option could "potentially" present additional safety concerns related to the fact that, unlike the ITT design option, pedestrians and bicyclists will be exposed to weather conditions that would result in in slippery surfaces and that associated fall hazards would be increased by high winds.

The Alleged Defiency Regading archaeological, cultural and environmental impacts

The fact that more ground would be excavated with the ITT design option than with the fixed bridge option does mean that there is potentially more archeological impacts. There is no mention of the fact that just downriver from the proposed tunnel, Vancouver's Waterfront Development was constructed with significantly more excavation and site disturbance than would occur with the ITT design option construction. That vast amount of excavation did not have any archeological impacts or cultural impacts.

Nor does the IBR team mention the opportunities that the ITT option would provide for enhancement of cultural resource in the vast amount of open space created above the tunnel.

The IBR team members have emphasized the environmental impacts of dredging, without mentioning the fact that those impacts can be easily managed. The dredging required to install the ITT design option is in fact a small percentage of the dredging that occurs every year to maintain the Columbia River shipping channel.

The Alleged Deficiences Regarding Cost Estimates

The IBR team stated that the ITT design option would cost twice as much as the fixed bridge option. That statement is very questionable.

The fact that when the IBR team initially provided a cost estimate, it was the result of two engineering errors that impacted costs. One was the assumption that the existing navigation channel would not be relocated for the ITT option. The other was an error in the estimated excavation quantities which significantly increased the cost estimate for the ITT design option. Both errors were brough to the attention of the IBR team. They failed to acknowledge the first error. They corrected the second but continued to claim that the ITT option was "twice the cost".

The error that the IBR team failed to connect was that of over-estimating tunnel depth by failing to assume that the main navigation channel would be relocated. The "Tunnel Concept Evaluation" report included a vertical alignment that was significantly deeper than need be as the result of the failure to assume the main navigation channel would be relocated from its existing location near the north bank of the Columbia to the center of the river. To make that assumption suggests negligence. To understand this please note:

1. As shown on the attached Figure 3 from the Tunnel Concept Evaluation (available for review on the IBR project website under "Technical Documents", there are currently three navigation channels crossing the potential alignments of the tunnel, with the Primary Channel being located within close proximity to the north bank of the Columbia River under the lift-span of the bridge. In addition, there are two barge channels located under the two highest spans of the existing bridge to the south.
2. As shown on the attached Figure 4 from the Tunnel Concept Evaluation, the low point of the tunnel was assumed to be below the Primary Channel near the north bank of the Columbia. With the assumption that the Primary Channel will not be relocated, the low point of the tunnel is at approximate 100 feet below the north bank of the river.
3. If a tunnel were to be constructed, regardless of its depth, it is logical to assume that the three channels would be combined into a single channel in the middle of the river. That navigation channel is currently maintained through the entire length of the Columbia from its mouth to Vancouver, except at bridges, where several smaller channels are needed to avoid bridge piers.
4. A credible conceptual tunnel conceptual design would have assumed that the channel would be relocated to the center of the river. Doing so, would have put the low-point of the tunnel near the center of the river instead of near the north bank. By sloping the tunnel up from the center of the river to the river banks, the tunnel would be much higher in elevation at its bank and inland. Instead of the tunnel being 90 feet deep at the bank as was assumed in the flawed DOT conceptual design, it would be about 45-feet deep.

In short, by failing to assume the Primary Channel would be relocated to the center of the river, which would be a logical assumption, the tunnel was conceptually designed to be much deeper than necessary where it touches upon land on both sides of the river.

5. The Impact of the Deception Upon the Draft EIS

The draft EIS was prepared assuming the initial screening process was credible which it was not. That EIS addresses only the fixed bridge option. Without a credible alternative screening process, the draft EIS is not credible.

The screening process needs to be repeated without the deception that dominated the process that resulted in the draft EIS. Those on the IBR team involved in that screening process should not be involved in a repeat of that process. They completely lack credibility.

6. Why IBR Leadership Should Be Held Accountable for Negligence

Negligence is the failure to behave with the level of care that a reasonable person would have exercised under the same circumstances.

It is clear that the process of screening design options and selected a locally preferred alternative was not managed by the IBR team to an acceptable standard of care. They were clearly

negligent because they:

1. Claimed ITT deficiencies that did not exist, and exaggerated others.
2. Provided a single engineering evaluation which contained significant errors and not only confused the public, but IBR leadership as well.
3. Violated state professional licensing laws.
4. Skirted those professional licensing laws to avoid accountability for deceiving the public with false engineering information

These acts of negligence are discussed in the following paragraphs.

Exaggeration of Deficiencies

The IBR leadership was negligent in claiming deficiencies when they did not exist, and exaggerating others. That matter is discussed in Section 5 above.

The Deficiencies in the Tunnel Concept Assessment Report

As mentioned above, of the Tunnel Concept Assessment contradicted what the public was told by the IBR team leadership. Apparently, IBR team leadership were unable to understand the Tunnel Assessment Report. That suggests that the report was seriously flawed. Those responsible were negligent in not providing the public with an engineering evaluation and report which substantiated the engineering information that was critical to the success of the public's decision-making process.

As discussed in Section 5, the report contained a significant error in regards to the channel location assumption which significantly exaggerated the depth of the tunnel. If that error had not been made, the tunnel design option would have had considerably less impacts and would have considerably less costs than claimed by IBR staff.

When that error was drawn to the attention of the IBR leadership in a draft engineering report prepared by a licensed civil engineer, it was ignored. This points again to negligence.

The Tunnel Assessment Report violated state licensing laws

The success of the IBR project, like all complex public infrastructure projects depends upon the expertise and ethics of the professional engineers who the public relies upon for advice and opinions on technical matters. State licensing laws exist to provide a mechanism to ensure high professional standards.

A key requirement of engineering licensing laws is that engineering reports be stamped by a professional engineer when released to the public. If that report does has errors that do not reflect an acceptable standard of professional care, the engineer who stamped the report can be held accountable.

Washington State has well-written laws that govern the practice of engineering and the requirements for stamping engineering documents. There are good reasons for those laws, further discussed below. Washington Administrative Code (WAC) WAC 196-23-020 states: Seal/stamp usage.

> *"The use of the seal/stamp must be in accordance with chapter* ***18.43*** *RCW or as otherwise described herein:*
>
> *(1) Final documents are those documents that are prepared and distributed for filing with public officials, use for construction, final agency approvals or use by clients. Any final document must contain the seal/stamp, signature and date of signature of the licensee who prepared or directly supervised the work. For the purpose of this section "document" is defined as plans, specifications, plats, surveys, land descriptions as defined in WAC* ***332-130-020****, reports, and as-built documents prepared by the licensee. (2) Preliminary documents are those documents not considered final as defined herein, but are released or distributed by the licensee. Preliminary documents must be clearly identified as "preliminary" or contain such wording so it may be differentiated from a final document.* The fact is the TCA was "distributed for filing with public officials" for "final agency approvals".

When released to the public, the Tunnel Concept Evaluation did not have a professional stamp. Whether that was for purposes of avoiding accountability, or an oversight,, that action suggests negligence on the part of the IBR team.

Misleading the Public Regarding The Role of Professional Engineers in the Decision Making Process

As mentioned above, professional engineers are held to professional standards that limit their ability to deceive without being held accountable. The IBR team has repeatedly made engineering claims that were unsubstantiated but which were alleged to reflect engineering opinions. In doing so, they skirted the professional licensing laws and voided accountability for failure to comply with an acceptable standard of professional care.

As an example is this statement in single document produced by the IBR which required a professional engineering stamp and thus provided a mechanism for holding an engineer accountable for errors - "River Crossing Option Comparison" stated:

> *"The Tunnel Concept Assessment concluded that an ITT is technically feasible; however, there are numerous challenges, as identified in Table 5. These challenges include significant out-of-direction travel for drivers, freight, transit users, bicyclists and pedestrians; the inability to tie into existing connections, such as SR 14, Vancouver* City Center, and Hayden Island.*"*

That statement was carefully written to imply that the "challenges" reflected the opinion of the engineers who prepared the Tunnel Concept Assessment. As discussed previously, thee was no mention of the "out of direction" issue in the report. If there was, the engineering in responsible

charge of making that statement would have been held accountable because it was not true.