4. Why use *two 2-lane* tubes to add four lanes? From *Jim Wright*, 2017-08-28

Fourth in a series of responses to Victor Wei, P. Eng., Director, Transportation, City of Richmond.

The Garden City Conservation Society (GCCS) has suggested that the Massey Thruway Renewal Project consider adding a 2-lane tube on each side of the Legacy Tube *if it the project opts to add four lane*s. This response —from Jim Wright—fills out the values of that:

1. Having tubes just over half as wide as 4-lane ones would make each segment much smaller, making construction in a shipyard or purpose-built drydock more feasible. (The drydock where the Legacy Tube was fabricated is now the BC Ferries cove in the top-left corner of the graphic—not available.)
2. Each of the two 2-lane tubes could have its path for walking, cycling and rolling (and emergency use) on the outer side of the expanded tunnel, with *user movement in the same direction as traffic movement*. That is ideal for path users, who would have their first entry to the path beyond the last vehicle entrance and their last exit before the first vehicle exit. Southbound, for example, the path entry could be beyond (south of) Rice Mill Road, and the path exits could be before (north of) the vehicle exit for Delta's River Road. This approach says a lot: *it treats vehicle-less users as important*.
3. If there is thought of encouraging buses and/or large trucks to use the four added lanes—with their more generous width and height, that can only be done for both directions if there is a new tube on each side of the expanded tunnel.
4. Having two new lanes on each side of the expanded tunnel enables easy continuity with the existing highway lanes leading into/from the tunnel. (Simple is good, and there is no loss to Deas Island Regional Park or the somewhat natural area on the Richmond side.)
5. All these values add to the basic value of improved safety of the Legacy Tube in an earthquake (subject to an expert study confirming that theory). Furthermore, along with the boost to safety, any damage would be more likely to be repairable, saving money and enabling reliable service.

With all those values, a large financial cost might be reasonable, but it might not even occur. After all, when the existing tunnel was built, the meticulously quoted amount for a tunnel with *two 2-lane tubes* seems to have been far lower than its eventual cost as *a single 4-lane tub*e with far less included. * For instance, the originally planned ceramic tile (reflective and easily cleaned) and raised walkway beside each pair of lanes would, in effect, have added significant safety benefits.)

- According to "British Columbia's Massey Tunnel was a cutting-edge endeavour" in the *Journal of Commerce* (Sep 7, 2009), the 4-lane tube cost $29 million. So much more was included (as listed in the very thorough 1955 report, *Fraser River Highway Crossing at Deas Island,* by Crippen Wright Engineering Ltd.) that it is hard to be precise about the cost difference, but the actual tunnel seems to have increased the cost by at least a third.
- The Crippen Wright report is available on short-term loan from the Garden City Conservation Society.