

Proposed Northbank Development

Submission by
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My Interest

As a Design Engineer in the Co-Ordinator General's Department in the 1960's, I had a major role in the design of the Victoria Bridge. My responsibilities included analysis and design of the piled foundations for the piers and the southern abutment. I am concerned that the proposed Northbank Development will impact on the safety of the Victoria Bridge in the event of a major flood in the Brisbane River.

My Credentials

- ◆ I have practiced as a Civil Engineer specialising in structural Engineering for the past 47 years. My experience includes design responsibility for numerous bridges, wharves and buildings Queensland, other states and Papua New Guinea.
- ◆ I was a founding Director of the Concrete Institute of Australia and the inaugural Queensland Branch President from 1969 to 1972.
- ◆ I have served on SAA Code committees for Piling, Prestressed Concrete and Wind Loads on Buildings.
- ◆ I was Chairman of the Queensland Chapter of the Association of Consulting Engineers, Australia from 1982 to 1984. I also served terms as a Federal Councillor and Vice President, Secretary and Convenor of the Structural Engineering Group of the Queensland Chapter.
- ◆ I have served a number of terms as a Member of the Board of Professional Engineers, Queensland, from 1990 to 1992 as a co-opted member and from 1992 to 1998 as an elected member.

My Concerns

At the time of designing the Victoria Bridge, the Chief Structural Engineer made the decision that, for the purpose of calculation of stream flow forces on the sub-structure, no allowance for debris or impact from floating objects should be provided. Consequently, the piers were designed for water flow at the design flood level. Each pier is supported on driven pre-tensioned prestressed concrete piles, as I recall, 48 piles under the southern pier and 51 piles under the northern pier. The piles were analysed for combinations of dead load plus stream flow forces, with minimal live load as the southern approaches to the bridge would be under water in the design flood. A factor of safety of 2 was applied in the design of the piling.

My concern is that the proposed development, extending 50 m into the waterway, will potentially increase the flood flow velocities significantly, particularly if debris bridges between supporting structures. Even though the increase in flood level may

be marginal, the increase in velocity will be in proportion to the reduction in width of the waterway. A 50 m obstruction equates to a 16% loss of cross-section and a corresponding 16% increase in velocity. As the stream flow forces are proportional to the square of the velocity, the increase in the stream flow forces on the piers would be 34%. This will certainly impact on the factor of safety of the piles but, without access to the original calculations, I cannot say how much the factor of safety is reduced.

In the circumstances, I strongly advise that the proposed development should not proceed without a thorough investigation of the potential risk to the safety of the Victoria Bridge