



## Pattullo Bridge Replacement Project

# Bridge Foundations

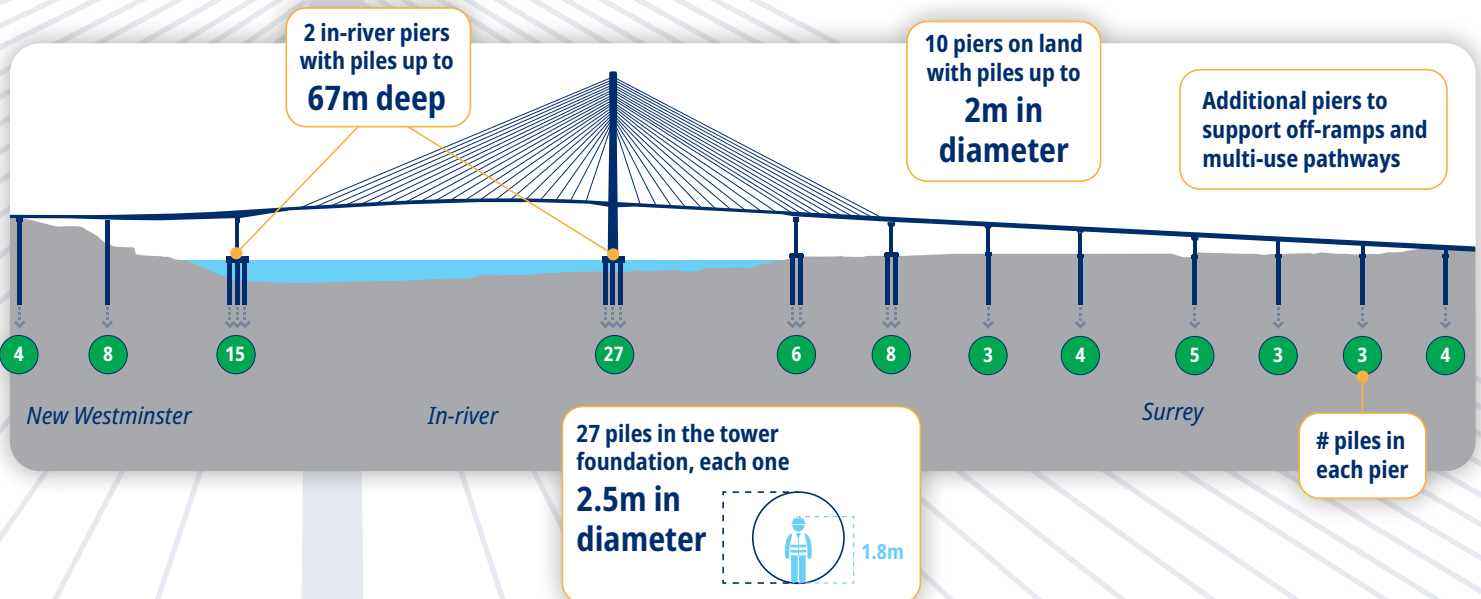
The main tower of the new bridge is 167m high – the tallest bridge tower in B.C. The weight of all that concrete and steel, (and soon, people and cars!) needs to sit on a solid foundation that will last for many years to come.

The first step for building the bridge foundations, or piers, is pile driving. Piling involves either drilling or hammering strong structural pieces made of steel or concrete ('piles') into the ground.

For the in-river and Surrey piers, specialized hammering equipment pounded steel pipes through the soft layers of the ground until they reached a firm layer like bedrock.

In New Westminster piles were installed by drilling shafts and inserting the piles after, to reduce noise for nearby residents.

In total, 12 separate piers comprised of 90 piles will support the bridge.



### Safety

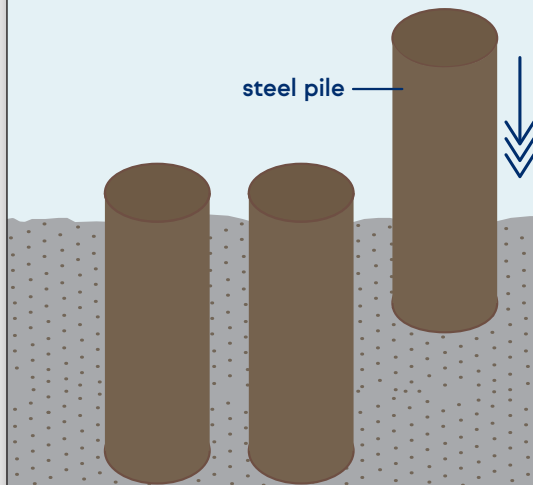
Safety is a top priority for the project. For in-river works, a rescue boat was present on the water at all times during pile driving. Crews are trained to follow emergency rescue plans, and everyone working over water is required to wear a personal floatation device.



# 3 Steps to Build Bridge Foundations

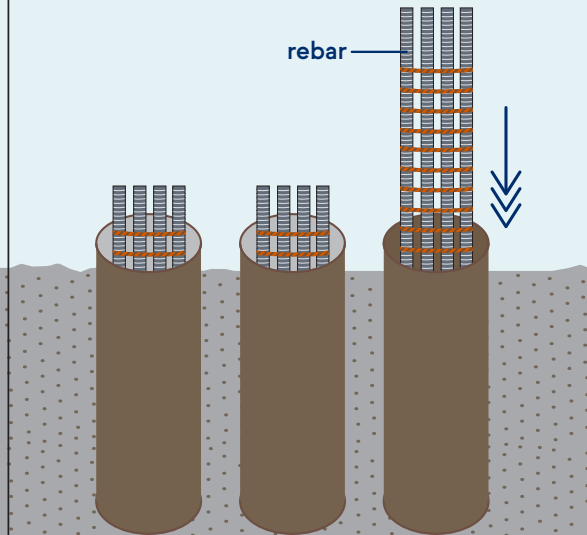
## STEP 1

To build a bridge foundation, a steel pile is driven or drilled into the ground.



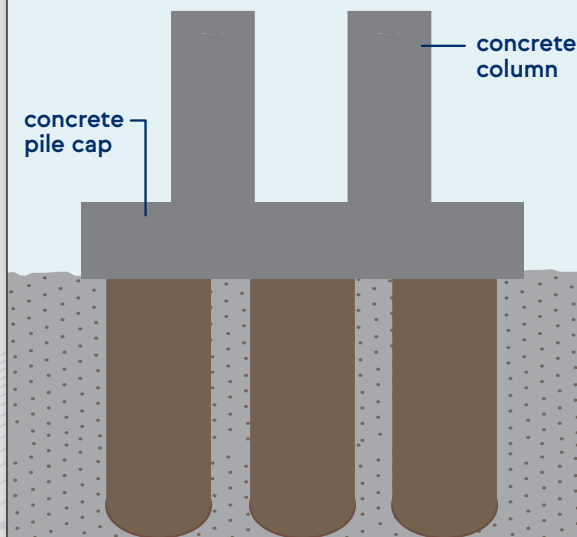
## STEP 2

The pile is a fabricated steel shell which is then filled with rebar, followed by concrete to fill and “plug” the pile.



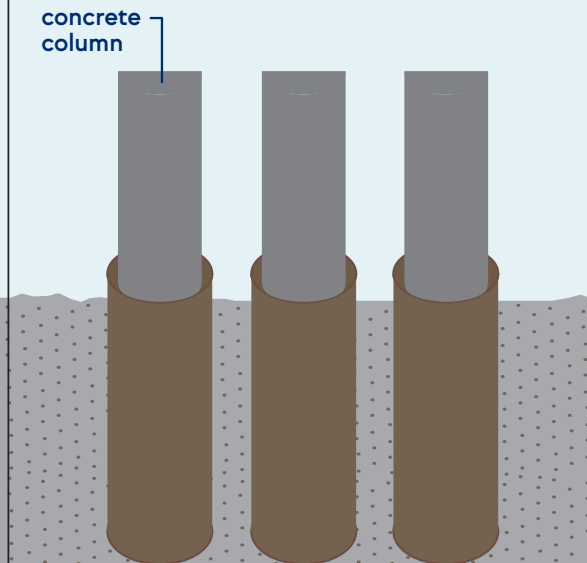
## STEP 3 (Main bridge piers)

Another layer of concrete is poured to cap the pile, and then concrete columns filled with rebar support the bridge deck.



## STEP 3 (Secondary piers)

Concrete columns, filled with rebar, are poured directly on top of the piles to support the bridge deck.





*A hydraulic hammering machine driving steel piles as part of foundation construction in Surrey.*



*Piles being filled with concrete for the in-river foundation near the New Westminster shoreline.*



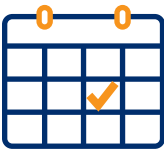
*Overhead view of rebar being installed at the in-river foundation near the New Westminster shoreline.*





A fleet of concrete trucks completing a large concrete pour for the pier near the New Westminster shoreline.

### Considerations



**Scheduling** – piling was scheduled so it did not disrupt train movements on the nearby rail bridge. A tugboat was available at all times to guide other boats through the area during piling.



**Geotechnical environment** – the south side of the Fraser River has many layers of soft peat, silt and sands, requiring deep foundations that extend down to reach a firm layer like bedrock.



**Earthquake preparation** – in the event of an earthquake, soft or loose soil can become unstable. To prevent this, soil densification is being completed near the bridge foundations on the south side.

