

# Bayfront Tower

JRMT PMIT

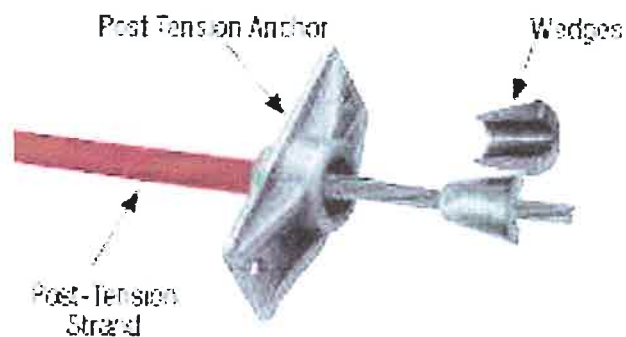
## Background on Bayfront Tower's Structural Findings by Slider Engineering

On March 15<sup>th</sup> the Board will be meeting with Slider Engineering Group, our structural engineer, to discuss the findings associated with their structural survey. The survey began in early 2022 with inspection of various building elements and continued throughout the year with subsequent evaluation and testing of building components. Although the inspection covered many different elements, the main areas of concern can be categorized into four (4) different areas:

- Post Tension Cables
- Building Envelope
- Garage Repairs
- Roofing

### Post Tension Cables

Concrete is a very common construction material that is very strong in compression and notably less strong in tension. It is because of these good properties while in compression that modern building design utilizes Post Tension (PT) cable systems. PT cables are a system of cables that run through our concrete slabs in the building. These cables pass through the concrete slab and are tensioned to more than 30,000 lbs. This use of a highly tensioned cable system allows builders to construct buildings with much thinner slabs than older systems. This in turn allows buildings to be constructed at a lower cost, less weight, and in a more efficient time frame.



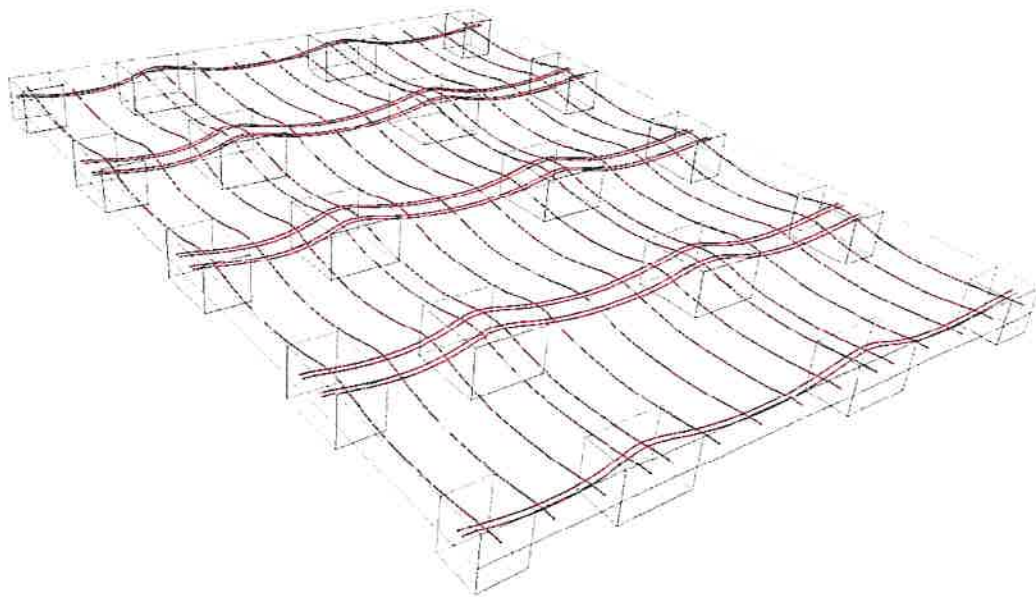
The basic component of a PT system consists of a long seven strand cable passing through the slab in both North/South, and East/West orientations. These long cables are covered with a plastic wrap and are anchored on the outside edges of the slab using an anchor plate with a cone shaped receptical and anchor wedges that grip tighter and tighter on the cable as the cable is tensioned.

The PT cables can bring even more strength to the concrete slab if they are "Draped" up and down at critical locations in the slab. The diagram below depicts the cables being "Draped" at strategic locations

to give the slab even greater load bearing capacity. Our PT cables use this “draped” application, which also means the cables pass close to the top of the slab at some points and close to the bottom of the slab at other points.

The design is engineered specifically for the building and each cable is responsible for creating enough tension at key locations for the slab to be able to do its job. These PT cables are spaced throughout the slab so the loss of a single cable can reduce the load carrying capacity of the slab at the location of the failed cable.

According to the original drawings our building is built with a safety factor (or additional capacity) of approximately 40% .



The cable and the anchoring components are made of steel and can corrode. Corrosion on any part of the system can cause the system to fail over time. PT cables began being used in construction in the 1960s and became a standard practice in the late 1960s and 1970s for high-rise structures. The early application of the technology did not typically provide protection for the anchors and wedges from moisture as they do today. Today's construction standards fully encase the PT cables in a protective coating. Without the protective coating, the PT cable ends are only protected by the outside building envelope.

Unfortunately, the inspections performed by our engineers show that there is corrosion on both the anchors and the cables themselves. There are thousands of PT cables and associated anchors in our building embedded in concrete, so the costs associated with repairs can climb rapidly.



The structural engineers needed to determine the extent of the corrosion in their testing so the correct plan of action could take place. A number of sample anchors were removed from the building and sent to a lab to determine the level of corrosion inside the anchor, since it was not possible to tell from the outside. The lab provided our engineers with the data from their microscopic evaluation. Based on these and other findings the engineers believe that each anchor must be exposed around the building and a test performed to see if the cable is still under tension.

This process of testing will reveal if: 1) the whole cable and anchor must be replaced; or 2) only the anchor requires replacement; or 3) the existing components can be just cleaned, coated with rust retardant materials and left in service. Each outcome has a specific cost associated with it, and in some cases the repairs required could necessitate cutting into the slab to access the cable to be repaired correctly.



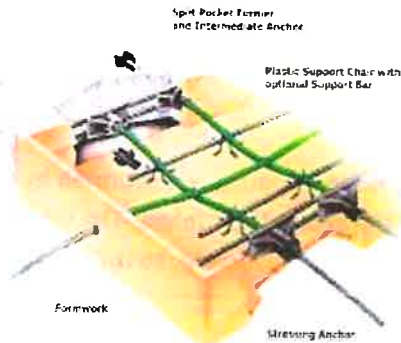
Sticking Jack



Tension Tool



Reusable Pocket Former with 2 piece wedges



The photo shows how the contractor cuts into the slab on a balcony so that the cable can be accessed. This must be done if the anchor is to be replaced but the cable remains. Depending on the location,

cables may need to be accessed and repaired inside the units. In some cases this can be accomplished from the ceiling of the unit below the concrete slab.

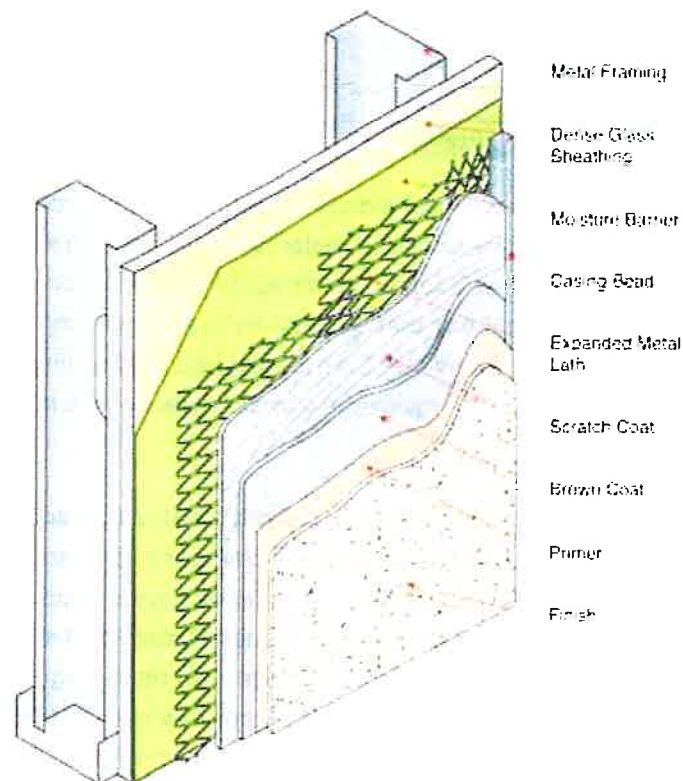
The second image above depicts the framework that may be needed to repair the concrete and the rebar reinforcement necessary around the PT anchor.

Each anchor and cable assembly must be evaluated and the correct protocol for repair determined from the findings. This is dangerous work as the cables are under extreme tension and an unexpected release could cause severe injury or damage. It is also necessary to support the slab being worked on in case there have been other undiscovered failures. Support of the slab with shoring in units above and below the repair must be maintained at all times in order to be certain that there will be no failure of the slab from lack of tension from the PT cables. It is likely that owners will not be able to occupy their units during phases of the project.

### Building Envelope

Building envelope is a term used to describe the outside of the building responsible for keeping the weather and outside conditions from getting to the living spaces. This too can be thought of as a system.

In our case we have stucco applied over either CMU (concrete block) or metal framing. The cementitious block and the metal framing provide the support and the stucco provides a tough exterior finish.



The above image gives a good representation of a typical metal framed stucco system. Each part of this system has a specific purpose and the one key element that is missing from our building is the moisture barrier. Areas of our building exterior were constructed without a moisture barrier and because stucco

is a porous substance, moisture can permeate through the stucco and corrode the metal framing components designed to hold the stucco in place. This is exactly what has happened around our building and the corrosion had progressed to a point of failure in some locations as early as 2001. This problem was not unique to Bayfront Tower as a number of other buildings were constructed in a similar fashion and suffered the same fate. A common solution at that time was to open up the walls where corroded framing was expected and then “sister” new metal framing components to the deteriorated existing framing. To complete the process a siliconized paint would then be applied to keep the moisture out. Unfortunately, this solution commonly failed and only bought some time before the stucco and metal framing had to be removed and a proper system put in place.



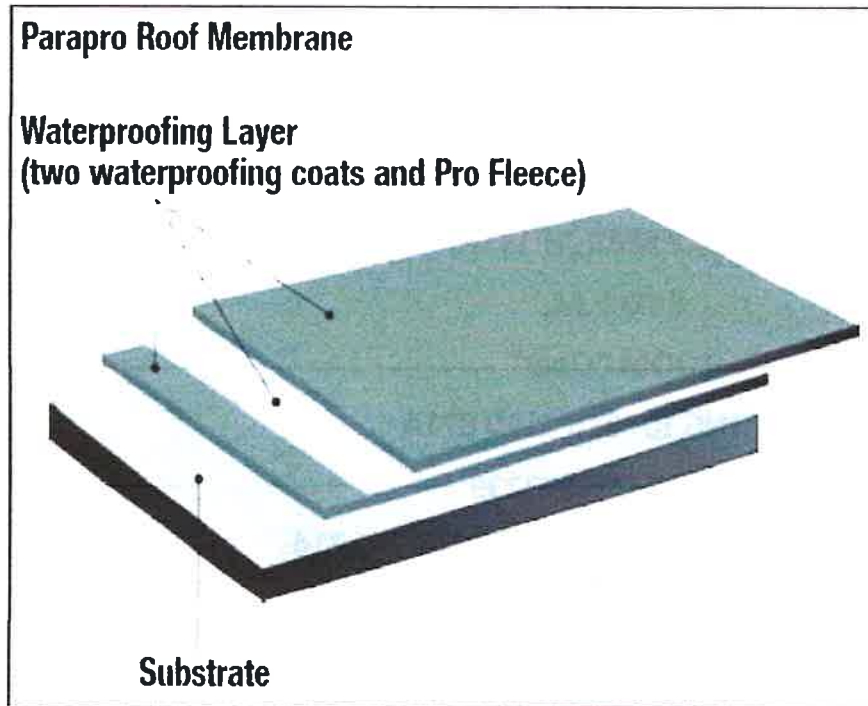
We are now at the point where the stucco system must be replaced. Replacement includes removing the windows and sliding doors in all of the units and replacing the corroded framing components as well as repairing any damaged CMU block that is found before applying a proper stucco system with a true vapor barrier. This is a messy process but one that is necessary to give our windows and doors the proper framing to be secure and to prevent water from leaking into the building. Unfortunately, both old and new windows must be removed to provide the correct protection we need.

### Garage Repairs

There are a number of needed repairs to the garage to restore the structure and prevent further damage. First and foremost is to repair the many structural cracks and spalls found throughout the garage levels. Once those repairs are completed, a proper drainage system and coating needs to be applied to the entire garage floor. Since the removal of the metal facade that enclosed the garage previously, wind driven rain has been able to enter the garage and create a significant amount of damage. For this reason louvers or some other means of keeping the rain out will need to be deployed. After these repairs are completed, new electrical service and lighting will be installed. Repairs to the garage will require areas to be empty while the repairs are taking place.

## Roofing

We currently have a contract with Crowther Roofing for the replacement of our cooling tower area roof. This portion of roofing is to be replaced with a PMMA Parapro Roof Membrane.



PMMA is a technology that has been around for more than 30 years. They are fully reinforced, seamless applications that can be walked on in a matter of hours. This roofing system is the most flexible when it comes to difficult flashing detail which allows the change of piping layout in the cooling tower area without the necessity for a complete reroof.

Our engineers have also noted the rest of our roofing outside of the cooling tower area is compromised. Part of the problem is the numerous penetrations on the parapet walls and the high traffic from contractors on the roof. As one of the final repair stages, the entire roof is expected to be replaced.

## Estimated Project Cost

Our structural engineers have provided a preliminary construction cost estimate of \$30-\$45 million for the repairs depending on the remediation options selected. After the Board meets and discusses the report with Slider Engineering, we plan to request Wiss, Janney, Elstner Associates, our peer engineering firm, to review the report and give us their opinion on the best course of action.