



## CASE STUDY

<b>Project:</b> Fortin Residence. White Rock, B.C.	<b>Structural Engineer:</b> Somerset Engineering. Burnaby, B.C.	<b>Geotechnical Engineer:</b> Geopacific Consultants. Burnaby, B.C.	<b>Contractor:</b> Vickars Construction. Burnaby, B.C.
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### Project Description:

A 35 year old home on an in filled lot site near the ocean by marine drive in this initially small summer community. The house had undergone a period of rapid differential settlement due to rotting and resultant failure of foundation support, of untreated wooden pilings. At the time of repair the rear portions of the buildings had settled more than 12 inches ( 300 mm). The home, despite the large amount of differential settlement, was in very good condition as it was protected from damaging bending and twisting of its wood frame by a very stiff foundation assembly over the failing piling.



### Soils:

Geotechnical investigation including boreholes on this and the sister property to the east revealed 2-3 feet of sandy fills followed by 20 feet of logs, stumps sand , construction debris with broken siding and sawdust mixed with sands and silts. By 26-30 feet natural deposits of sand appear transitioning into dense sands and gravels by 32-34 feet overall depth .



### Repair:

It was elected to repair the home by replacing the degraded wood pilings with portably placed high capacity pilings due to access difficulties associated with the proximate surrounding homes. Since the foundations were reinforced adequately to allow a pile supported structure it was relatively easy using the patented PULLDOWN™ Piling to modify all the attachments to allow re-leveling.

Helical Pulldown™ Micropiles were selected

due to the height and access restrictions on the site including pile placements in the basement floor of the existing structure. As well piles were required to be installed into the dense underlying gravelly soils with portable hand held equipment yet capable of placing piles with ultimate capacities approaching 80 Kips (360kN). Additionally the selected piling structure allows creation of reinforced concrete attachments that in turn can be used to re-level the building that when locked off holds the structure permanently in place.

#### **Production Piling and Installation:**

The Helical Pulldown™ Micropile size and configuration used was ss5 6-8-10 inch helical triple lead section employing a 6" grout column placed through a PVC 6" pipe which is placed with the first pile section and extends 5'-10' of depth. The pile was turned into target soils between 28-34 feet below grade with final torques exceeding 5500 ft/lbs.

The grout mix used was a proprietary silica fume grout, manufactured by Baselite Concrete Industries of Vancouver, B.C., for Vickars Developments. It is known as Pulldown Pile grout Type A. The grout is mixed on site and reinforced with polyfibers and added to the pvc sleeve as the pile is being formed during installation. The PVC sleeve also has the added benefit of reducing negative skin friction or down-drag forces exerted on the grout shaft by settling upper layers of debris.

As is usual for all repair works done by Vickars a fully transferable 20 year warranty was made on the repaired foundations of the home. This then replacing any value lost in the building, due to the major structural problems with its piled foundations.

