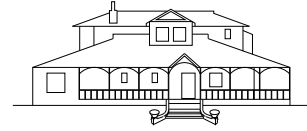


# DRENNAN, MAUD & PARTNERS

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OUR REF.: 18498

YOUR REF.:

16<sup>th</sup> April 2007

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**Attention : Gavin Thomas**

Dear Sir,

**STORM DAMAGE : BALLITO : 19 AND 20 MARCH 2007  
BERMUDA, SUNTRAP AND BOULDER BAY**

Our report dated 5 April 2007 regarding the storm damage to various complexes at Ballito refers. Subsequent to the preparation of this report we have undertaken further inspections and set down below are our additional comments regarding the above complexes.

**1. BERMUDA**

**1.1** Extensive alterations and additions to this complex has recently been completed by a developer. Insurance cover of the complex has reverted back to the Body Corporate. Following the recent storms the beach at the front of the units has been extensively undermined. The damage is more severe along the northern parts of the sea facing boundary. The erosion of the beach has damaged the steel palisade boundary fence as well as a dry



stack retaining wall constructed behind the boundary fence. The extent of the erosion beyond the northern parts of the seaward boundary has also undermined the foundations to the patios of the units. The normal strip foundation below the curved patio of the northernmost ground floor unit has been exposed and undermined by at least 1m. The damage becomes progressively less towards the south.

- 1.2** Prior to our inspection we investigated the background to the complex and establish from both the builders and the engineer who had been involved with the recent development that the original section of the flats as well as the additions have all been founded on piled foundations. The piled foundations extended to the recent ground floor units constructed along the eastern boundary. Following these investigations we met with the contractor who loaned us drawings from their archives that were used during the construction of the latest development. These drawings confirm that the main structures have been founded on piles. Amendments had been made on site and the as-built situation of the deck/patios of the ground floor additional units constructed near the eastern boundary had been built with the shallow strip footings around the outer edge of the patio with a dry stack retaining wall in front of it and behind the steel palisade fence.

## **2. SUNTRAP**

- 2.1** We were concerned at our initial inspection of the Suntrap complex that it may have been founded on strip footings. We were subsequently informed telephonically that it had been constructed on piled foundations and we have been able to locate representative drawings from the engineers who had been involved with the original complex indicating that the main structure is founded on piles. There are however retaining walls between units and around the pool that did not have piled foundations.
- 2.2** At our recent inspection we note that damaged stormwater pipes from individual units continue to discharge water onto the eroded area causing further erosion of the beach sand. There are at least two instances where the pipes near the balconies are causing ongoing damage whenever rain is experienced.
- 2.3** The Local Authority is in the process of reinstating the sewer line and manholes that had been destroyed along the front of the complex and had an excavator on the beach clearing rubble in anticipation to relay the sewer line. This excavator had removed most of the debris from the retaining wall

around the pool as well as the pool in order to clear a line for the reinstatement of the effluent pipe. With the debris of the pool and its associated retaining wall removed the oversteep eroded banks are more exposed along the northern ground floor units.

### **3. BOULDER BAY**

**3.1** In our previous report we referred to Unit Numbers 7, 8 and 9. We understand that we have used the incorrect numbers of the units but confirm that our comments are based on the sea facing southernmost units and when next we visit the complex would confirm the correct numbers of the units so that there are no misunderstandings.

### **4. CONCLUSIONS**

**4.1** It is fortunate that the main units of the Bermuda complex have been founded on piled foundations but there is cause for concern regarding the undermined strip foundations to the extra patios at the front. We recommend that the foundations to the deck/patios of the three northernmost units be underpinned using 250 mm diameter auger piles at regular intervals underneath the existing strip foundations. Jack piles can also be considered if it is deemed feasible that the jacking forces can be mobilised having regard to the relatively low mass of the balcony structures themselves. We recommend that each balcony have five piles installed under the strip foundations. The damaged dry stack retaining wall and steel palisade fence can only be repaired once the long-term plans with regard to the reinstatement and/or upgrading of the eroded beach are known. As mentioned in the previous report long-term plans are subject to environmental reports that would have to be approved by the Department of Agriculture. As the sea facing ground floor units of the main structures are piled these units can be occupied if necessary. We recommend however that the balconies of the three northernmost units should not be used and should be securely locked. It is anticipated that further damage can occur due to continued erosion at the front and the situation should be monitored. There are screen walls dividing the unit's which protrude slightly outwards from the main structures that are also founded on piles whereas the balance of the walls are on strip foundations. We could not gain access to individual units but from the front did not note movement joints within the structure where the foundations changed from piles to spread footing. If this was the case there is the possibility that cracks could develop in the screen wall as the front section settle where they are founded on strip footings. We enclose herewith copies of the drawings of the complex that we have been able to obtain for your information.

4.2 We recommend that temporary connections to the damaged stormwater pipes from individual units at the Suntrap complex be made so that water discharging from these pipes continues in a controlled manner down the eroded scar on to the beach in pipes. This will restrict further erosion. In our previous report we recommended that certain units at Suntrap should not be occupied. This was based on the assumption that the main structure may not have been founded on piles. As we have established that the main structures have been founded on piles there is no reason to insist that the units be vacated. We are however of the opinion that none of the ground floor patios that had been damaged be used and that the ground floor doors of each unit remain locked with the patios out of bounds. We enclosed herewith copies of the drawings that we have since obtained indicating the piled foundations and the retaining walls and pool structures that have been damaged for your information.

We trust that this additional information is of assistance. The drawings supplied would be essential in quantifying the damage. Should you have any queries please do not hesitate to contact us.

Yours faithfully

**DRENNAN, MAUD & PARTNERS**

**R.D. COLLYER Pr.Eng.**

*Encls. Drawings for Bermuda and Suntrap  
Photographs*

*cc. Ballito Estates Attention : Barbara Shingler*

/cr