



memorandum

(416) 235-3731

To: Karen Smith
Assistant Maintenance Engineer
Central Region
1st Floor, Atrium Tower

From: Pavement and Foundation Design Section
Room 315, Central Building
Downsview, Ontario

Re: Pisa Stone Retaining Wall
Hwy 7A, Near Regional Road 2 in Port Perry
W.O. 94-11013
District 6, Toronto

1994 11 01

At your request, we visited the above mentioned site to investigate the cause of distress to a retaining wall. It is understood that the retaining wall was constructed in 1983. Recently some movement took place in the wall which caused a gap between the wall and the retained soil.

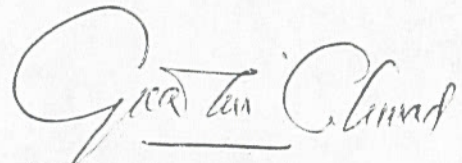
The site is located in the southwest corner of Hwy 7A and Regional Road 2 in Port Perry. A 30.5m long and 1m high 'Pisa stone' retaining wall is constructed on the south side of Hwy 7A oriented in the east-west direction. The wall retains the front yard of a house to provide room for a sidewalk on the immediately north side of the wall. The house is situated on the south side of the wall at a distance of about 12m from the wall on a higher ground. The wall is 0.96m high and is constructed with 12 layers of block, each 75mm thick and 600mm long.

The wall appeared to be almost vertical. However, according to the contract drawings (Cont. No 83-84, WP No 138-75-03) the wall was supposed to be constructed at 1H:8V. If the wall was constructed as per drawing, then it means the top of the wall had moved up to 12 cm. According to the drawing, weeping holes were to be provided every 3m (i.e. at least 10 weeping holes in the entire length of the wall), but there were no weeping holes in the retaining wall. We observed two longitudinal cracks in the ground, one adjacent to the wall and the other at a distance of 760mm from the wall. The cracks were 50mm to 75mm wide and of similar depth in a conical shape. The cracks were covered with grass. There were few vertical cracks in the wall as well.

Assuming the Pisa Stone retaining wall was designed to withstand the earth pressures imposed by the geometry, in our opinion, the distress in the wall is due to lack of provision to allow drainage of water behind the retaining wall, e.g. no weeping holes as shown in the drawing and/or inadequate free draining material behind the retaining wall.

Provided that you have no concern for the safety of the residents with respect to the cracks behind the wall, in our opinion, there is no immediate danger to the integrity of the wall. The movement in the wall has been taking place for a long period of time. However, we suggest that if any further movement in the wall is observed, then the wall should be repaired. In order to provide free draining material behind the wall, perhaps the entire wall will have to be replaced. Alternatively, the wall could be replaced with reinforced earth type wall.

If you have any questions please call our office.



K.S.Q. Ahmad, P. Eng.
Foundation Engineer

For

D. Dundas, P. Eng.
Senior Foundation Engineer