FOUNDATION SYSTEMS ENGINEERING, P.C.

June 16, 1992

EXHIBIT 146 Frank Castleberry

Mrs. Alberta Clyce
907 Woodland Avenue
Johnson City, Tennessee 37601

RE: SINKHOLE
UNIT 18, LIMITED ADDITION CONDOMINIUMS
JOHNSON CITY, TENNESSEE
FSE JOB NO. 92099

Dear Mrs. Clyce:

This letter is written to confirm my verbal opinions made during our inspection of the sinkhole that has developed between your unit, No. 18, and the adjacent unit on the west side of your condominium. The sinkhole was formed approximately 3 months ago, as you described to me and at the present time is a large hole covering the area between each of the condominiums.

The sinkhole is a direct result of surface water saturating the area between the condominiums due to a very poor drainage feature that was placed within this area by the contractor. Water saturated these soils and allowed a solution cavity to develop in the limestone formation underlying the project site and eroding of the soils occurred.

The limestone strikes in a northeast to southwest direction with a sharp dip to the south/southeast of some 50 to 75 degrees within this location. This limestone formation is very soluble. When water has an opportunity to saturate the soils overlying the limestone creating an excessive pressure, the weak zones in the limestone will erode creating the sinkholes as can be seen between the two condominiums.

The solutioning has created a situation where an extremely large opening now exists between the condominiums that has undermined both foundations. The attached drawing indicates the approximate extent of the sinkhole in plan and profile view. The foundations for the adjacent condominium to your condominium has been severely undermined because the soils have collapsed beneath the entire foundation from the rear of the building toward the front. Condominium No. 18 is at the present time bridging the sinkhole

EXHIBIT 3

because the end right rear corner of the building is still bearing on residual soil with the sinkhole approximately 5 feet from the end of the building. The sinkhole is approximately 6 to 8 feet in width and this is the span that the foundation is covering at this time. Beneath both condominiums, the erosion has allowed surface soils to collapse and flow into the sinkhole. Condominium 18 has a very large erosion area directly underneath the crawl space and is of larger size that the visible sinkhole between the condominiums. The adjacent condominium on the west side also has erosion underneath the crawl space that is again as large as the visible outside sink.

The only proper way to prepare and prevent further damage is to underpin both units by placing a structural beam that is bearing on residual soil to the south side of each of the units spanning and catching the existing wall and carrying at least 20 feet to the north side or the front portion of the house. It is mandatory that a grade beam be utilized and not allow the foundation to bear within the soil matrix in these locations. Cross beams should be placed along the rear walls to insure that support of the rear walls is achieved to prevent failure of the rear corners of both condominiums.

After this is performed, the sinkhole should be excavated down to bedrock material, cleaned thoroughly, and a filter fabric such as Typar 3601 or equal should be placed within the excavation. The area directly beneath the foundations should have reinforced concrete placed directly underneath the grade beam from front to rear so as to prevent any water from penetrating underneath both condominiums.

After this work has been performed and placement of the filter fabric, a No. 57, open graded stone should be placed back into the excavation up to within one foot of subgrade level. At this depth the filter fabric should be draped on top of the stone mass and topsoil placed to allow grass to be placed. At this depth a solid pipe with a catch basin at the rear of the building should be placed to intercept water flowing along the rear of the condominiums in this location. This water should be captured and taken in a solid pipe to the front and dumped on the street and access to natural drainage way in this location.

We understand that there are serious drainage problems within the condominium complex itself. We recommend that the condominium association hire an architect to review the drainage situation within the condominium project and provide recommendations as best method of removing surface water.

SUMMARY

Based upon our visit, we assign a very high risk that both condominiums on each side of the developed sinkhole is in eminent danger of collapsing of the rear portion of the buildings. Repairs should be made as described above so as to prevent further damage from occurring to allow the building units to be utilized as purchased.

If you have any questions, do not hesitate to call on us at your convenience.

Very truly yours,

M. Frank Castleberry, P.E.
Soils/Foundation Consultant
Tennessee No. 12035

MFC/sdh

cc: Mr. Charles Rich
Homeowners Association