
**ADDENDUM GEOTECHNICAL INVESTIGATION FOR THE EVALUATION OF
FOUNDING CONDITIONS & EXCAVATIBILITY FOR PROPOSED FUEL STATION,
ACORN CITY**

8 March 2022

Attention: Mr D. Malabie

REPORT DVH-21-108a: ADDENDUM TO GEOTECHNICAL REPORT FOR THE PROPOSED ACORN CITY DEVELOPMENT: SPECIFIC GEOTECHNICAL INVESTIGATION ON THE PROPOSED FUEL STATION SITE

At the request of D. Malabie we have carried out an evaluation of founding conditions and excavability for the proposed new fuel station at the Acorn City development. Exact earthworks details are unknown at this stage.

1. Fieldwork

The fieldwork operation for the township establishment of the Acorn City development was carried out in June 2020 (see report DVH-20-28). Based on the location of the proposed new fuel station development, test pits TP6, TP7 and TP14 are relevant owing to their general proximity to the site. Test pit TP7 is located in immediate proximity to the site.

Further to the above, it is noted that the current letter report should be read in conjunction with the original geotechnical report "DVH-20-28 Acorn City Urban Mixed Use Development".

2. Regional And Site-Specific Geology

According to the available geological maps (1:250 000, 2430 Pilgrims Rest) the area of investigation is underlain by **medium to coarse grained quartz-feldspar-biotite gneiss** of the Swazian Erathem. This was confirmed during the fieldwork operation. Owing to weathering of the gneiss bedrock residual gneiss soils occur across the area of investigation. The upper soil layer comprises a layer of transported hillwash.

Based on the recorded soil profiles the fuel station site falls within geotechnical soils zone, Zone C2 .

Geotechnical Soil Zone	General Soil Profile Description
Zone C2	Transported Hillwash overlying localised Transported Pebble Marker overlying thick potentially collapsible Reworked Residual Gneiss overlying Residual Gneiss.

This geotechnical soil zones are based on the classification systems as provided by the NHBRC Home Builders Manual (2015) and SANS 10400-H Foundations (2012). The approximate areal extent of each soil zone is shown on the site plan enclosed in Appendix A. The recorded soil profile within the vicinity of the fuel station as based o the most relevant test pits (see test pits TP6, TP7 and TP14) is described in below.

The upper soil layer in the vicinity of the fuel station comprises medium dense and locally firm intact slightly clayey silty sand / slightly silty clayey sand of **transported hillwash** origin. The hillwash extends to depths of the order of 0,2m to 1,1m (average depth 0,65m).

The hillwash is underlain by loose to medium dense / medium dense intact micaceous slightly silty clayey sand / **reworked residual gneiss**. The reworked residual gneiss extends to depths varying between 1,6m and 2,3m. The reworked residual gneiss is underlain by loose / loose to medium dense jointed micaceous slightly clayey silty sand / silty sand **residual gneiss** to depths in excess of 3,0m, the excavation limit of the backactor, in those test pits where it occurs across Zone C2.

No perched water table or zones of seepage were noted in any of the test pits excavated across the site

3. Evaluation of Founding Conditions & Foundation Recommendations

The portions of the site upon which the proposed fuel station will be located are noted as occurring within the previously identified soil Zone C2. Across Zone C2, owing to the potentially highly compressible and/or collapsible nature of the upper in situ soils, special foundation procedures would be required. Considering the nature of the proposed structure within the fuel station it is recommended that suitably designed **reinforced concrete rafts** be regarded as the optimal foundation solution. The rafts could be placed at shallow depth within the upper in situ soils. A Modulus of Subgrade Reaction (k) value of 40kPa/mm could be applied to the in-situ soils to facilitate the design of the raft foundations.

4. Excavation Procedures

Based on the findings of the near-surface geotechnical investigation of June 2020, specifically the findings of the aforementioned test pits, those portions of the site in the vicinity of the proposed fuel station would classify as **soft excavation** material to depths in excess of 3,0m. This according to the classification system as provided in SANS 1200D, DA and DB.

It is anticipated that the excavation depth for the fuel tank portions of the development would be in excess of 3,0m, the depth limit of the abovementioned test pits, June 2020. In this regard, should additional information regarding excavatibility of the underlying soils below 3,0m depth be required, further geotechnical work in the form of Dynamic Probe Super Heavy (DPSH) testing would be necessary.

5. Soil Corrosivity

Based on the findings of the soil chemistry tests carried out during the geotechnical investigation of 2020, it is noted that the in-situ soils across the site classify as non-corrosive towards buried concrete and steel.

6. Conclusion

The geotechnical conditions of the proposed fuel station site are considered suitable for the construction of underground tanks and pipework and for above-ground building structures.

We trust the above meets with your current requirements. Please do not hesitate to contact us should you require any additional information.

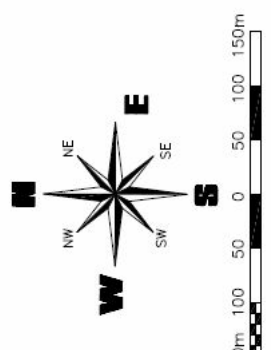
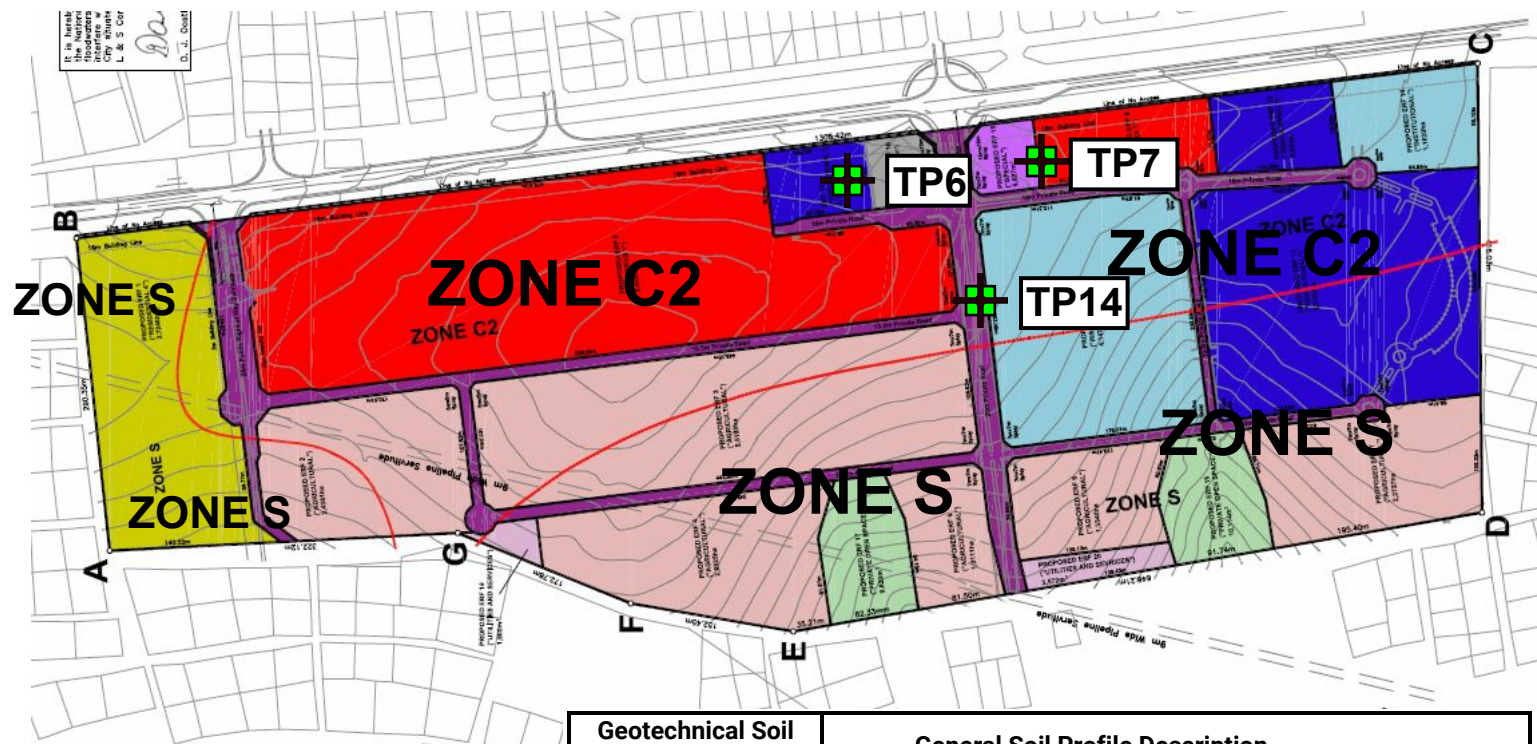
Best regards,

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Geotechnical Soil Zone	General Soil Profile Description
Zone S	Transported Hillwash overlying localised Transported Pebble Marker overlying reworked residual gneiss overlying competent residual gneiss.
Zone C2	Transported Hillwash overlying localised Transported Pebble Marker overlying thick potentially collapsible reworked residual gneiss overlying residual gneiss.

KEY:
 Test Pit Position
 TP

PROJECT: DVH-21-108a
ADDENDUM TO GEOTECHNICAL REPORT FOR ACORN CITY: SPECIFIC GEOTECHNICAL INVESTIGATION FOR FUEL STATION
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UPDATED SITE DEVELOPMENT PLAN INDICATING LOCATIONS OF TEST PIT EXCAVATIONS

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