DRAFT REPORT
TEST PITTING
PROPOSED DEVELOPMENT AT THE BASEMENT OF THE MULOCK HOUSE
33 MULOCK DRIVE
NEWMARKET, ONTARIO

Prepared for:

THE CORPORATION OF THE TOWN OF NEWMARKET

Prepared By:

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1. INTRODUCTION

Sirati & Partners Consultants Limited (SIRATI) was retained by the Corporation of The Town of Newmarket (the "Client") to undertake a geotechnical investigation at the basement of the Mulock House situated at central area of Mulock Property located at 33 Mulock Drive in Newmarket, Ontario (the "Site").

The purpose of this geotechnical investigation was to observe the eleven (11) test pits excavated at the basement of the Mulcok House and determine depth and configuration of the existing foundation. Geotechnical engineering recommendations pertaining to potential underpinning is then provided.

This report has been prepared for the Client and its designers. Third party use of this report without Sirati & Partners Consultants Limited (SIRATI) consent is prohibited. The limitation conditions presented in **Appendix B** form an integral part of the report and they must be considered in conjunction with this report.

2. FIELD WORK

Client arranged to excavate eleven (11) test pits (TP1 to TP11, see Drawing 1 for location plan) using hand digging technique by an excavation sub-contractor under the direction and supervision of the Client. The test pits (TP1 to TP11) were excavated to depth ranging between 0.21 m and 0.78 m, below existing concrete floor slab.

All the excavated test pits were visually inspected by SIRATI personnel and photographs were taken along with measurement of depth of exposed foundation elements. Four (4) grab samples (from test pits TP1, TP3, TP6, and TP11) were taken from the bearing stratums of the excavated test pits. As well as visual examination in the laboratory, all the soil samples were tested for moisture content. Selected three (3) soil samples (from test pits TP3, TP6, and TP11) were subjected to hydrometer analyses and Atterberg Limits testing and the results will be provided in our final report.

3. FOUNDATION DEPTH AND CONFIGIRATION

The exposed foundation elements at the location of the excavated test pits, were visually inspected along with measurement of the foundation depth. The visual inspection was carried out to gather information on foundation current condition as well as examining the foundation soil condition. Findings from this study is presented in Table 2 along with a photo log that is presented in Appendix A of this factual report.

4. BEARING STRATA SOIL CONDITION

The bearing stratums under the foundation elements at the excavated test pits were visually inspected and examined by SIRATI senior geotechnical engineer using pocket penetrometer readings. The findings from the visual inspection and pocket penetrometer measurements are provided in Table 1. It should be noted that due to limitation of the current investigation (e.g. limited depth and configuration of test pits, disturbance of bearing stratum, etc.) the following findings are preliminary and should be confirmed by further investigation.

Table 1. Bearing Strata Soil Condition Summary

Test Pit ID	Bearing Strata Soil Condition	Estimated Bearing Capacity at SLS (kPa)	Estimated Factored Geotechnical Resistance at ULS (kPa)
TP1 to TP5	Clayey Silt possible Fill, trace sand and gravel, brown, stiff, moist	100	150
TP6 and TP7	Clayey Silt possible Fill, trace sand and gravel, brown, firm, moist	75	100
TP8 to TP11	Clayey Silt possible Fill, trace sand and gravel, brown, stiff, moist	100	150

No groundwater seepage was observed during the test pit inspection; however, it should be noted that the groundwater levels can vary and are subject to seasonal fluctuations in response to major weather events. The groundwater level should be confirmed through a hydrogeological study on site.

SIRATI recommend performing a confirmatory geotechnical investigation on site.

5. FROST PROTECTION

All footings exposed to seasonal freezing conditions must have at least 1.2 m of soil cover for frost protection.

There is no official rule governing the required founding depth for footings below unheated basement floors. Certainly, it will not be greater than the 1.2 m required in Southern Ontario for exterior footings. Un-monitored experience indicates that a shallower depth ranging from 0.82 to 0.9 m for interior column footings and 0.4 m for wall footings has been successful where 2 or more basement

levels apply. The 0.82 m depth is believed to be close to the minimum structural requirement for interior column footings. Adjacent to air shafts and entrance and exit doors, a footing depth of 1.2 m below floor level is required or, alternatively, insulation protection must be provided.

It is also emphasized that underfloor drainage and/or an adequate free draining gravel base is required to minimize the risk of floor dampness. Floor dampness could lead to temporary icing and the risk of accidents.

6. EARTHQUAKE CONSIDERATIONS

According to Table 4.1.8.4.A of OBC 2012, the site earthquake classification can only be determined by drilling geotechnical boreholes and using average properties in top 30 m.

Based on the test pit information the subject site can be classified as "Class E". This has to be confirmed by additional geotechnical borehole investigation.

7. GENERAL RECOMMENDATION ON POTENTIAL UNDERPINNING

Upon geotechnical review of the site condition the followings are recommended:

- The excavated area under the existing foundation should be backfilled with concrete to immediately under the existing foundation, in order to connect to the existing foundation.

- The base of existing foundation should be cleaned of any soil residues to provide a complete and smooth connection between the existing foundation and newly placed concrete.

- The base of the excavation must be thoroughly cleaned of all loosened, disturbed, wet, and/or softened soil, and/or water.

- The time lag between excavation and concrete placement should be minimized to limit softening and sloughing of the soil.

- The concrete should be placed without segregation, and carefully vibrated.

- Consultation should be made with the Structural Engineer to fill the potential gap between the existing foundation and the newly placed concrete. Pressure grouting may be an option to be considered.

8. GENERAL COMMENTS ON REPORT

Sirati & Partners Consultants Limited should be retained for a general review of the final design and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, Sirati & Partners will assume no responsibility for interpretation of the recommendations in the report.

The comments given in this report are intended only for the guidance of design engineers. The number of boreholes or test pits required to determine the localized underground conditions between boreholes/test pits affecting construction costs, techniques, sequencing, equipment, scheduling, etc., would be much greater than has been carried out for design purposes. Contractors bidding on or undertaking the works should, in this light, decide on their own investigations, as well as their own interpretations of the factual borehole/test pits results, so that they may draw their own conclusions as to how the subsurface conditions may affect them.

The limitation conditions presented in Appendix B form an integral part of the report and they must be considered in conjunction with this report.

We trust that the information contained in this report is satisfactory. Should you have any questions, please do not hesitate to contact this office.

Yours truly,

SIRATI & PARTNERS CONSULTANTS LIMITED

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Table 2. Test Pit Observation Summary

Test Pit ID	Excavation Depth (m)	Excavation Method	Buried Foundation Wall below the Grade (m)	Foundation Thickness (m)	Footing Projection from the Face of Foundation Wall (m)	Bearing Strata Soil Condition	Photo ID in Appendix A	Notes
TP1	0.78	Hand Digging	N/A	0.09	0.12	Clayey Silt possible Fill, trace sand and gravel, brown, moist	Photo 1 and 2	Concrete floor slab thickness is 0.11 m, foundation was observed on the two corners (wall sides), which consists of stone blocks (Cobbles)
TP2	0.42	Hand Digging	N/A	0.12	0.12	Clayey Silt possible Fill, trace sand and gravel, brown, moist	Photo 3 and 4	Concrete floor slab thickness is 0.11 m, foundation was observed on the two corners (wall sides), which consists of stone blocks (Cobbles)
TP3	0.24	Hand Digging	0.11	0.11	0.09 to 0.10	Clayey Silt possible Fill, trace sand and gravel, brown, moist	Photo 5 and 6	Concrete floor slab thickness is 0.11 m, foundation was observed on the two corners (wall sides), which consists of stone blocks (Cobbles)
TP4	0.33	Hand Digging	N/A	N/A	N/A	Clayey Silt possible Fill, trace sand and gravel, brown, moist	Photo 7 and 8	Concrete floor slab thickness is 0.12 m to 0.15 m, foundation was not observed.
TP5	0.35	Hand Digging	N/A	N/A	N/A	Clayey Silt possible Fill, trace sand and gravel, brown, moist	Photo 9 and 10	Concrete floor slab thickness is 0.14 m to 0.15 m, foundation was not observed, column at this location was observed to be constructed on brick units (two rows), thickness of the bricks was 0.12 m with projection of 0.04 m from the outer face of the column
TP6	0.25	Hand Digging	N/A	N/A	N/A	Clayey Silt possible Fill, trace sand and gravel, brown, moist	Photo 11 and 12	Concrete floor slab thickness is 0.1 m, foundation was not observed, column at this location was observed to be constructed on brick units (two rows), thickness of the bricks was 0.14 m with projection of 0.18 m from the outer face of the column
TP7	0.21	Hand Digging	N/A	0.08 to 0.10	0.05 to 0.12	Clayey Silt possible Fill, trace sand and gravel, brown, moist	Photo 13 and 14	Concrete floor slab thickness is 0.07 m to 0.10 m, foundation was observed on the two corners (wall sides), which consists of stone blocks (Cobbles)
TP8	0.25	Hand Digging	N/A	0.10 to 0.12	0.10 to 0.15	Clayey Silt possible Fill, trace sand and gravel, brown, moist	Photo 15 and 16	Concrete floor slab thickness is 0.10 m, foundation was observed on the two corners (wall sides), which consists of stone blocks (Cobbles)
TP9	0.27	Hand Digging	N/A	0.09	0.05 to 0.12	Clayey Silt possible Fill, trace sand and gravel, brown, moist	Photo 17 and 18	Concrete floor slab thickness is 0.12 m, foundation was observed on the two corners (wall sides), which consists of stone blocks (Cobbles)
TP10	0.35	Hand Digging	N/A	N/A	N/A	Clayey Silt possible Fill, trace sand and gravel, brown, moist	Photo 19 and 20	Concrete floor slab thickness is 0.10 m to 0.12 m, foundation was not observed, column at this location was observed to be constructed on brick units (five rows), thickness of the bricks was 0.35 m with projection of 0.15 m from the outer face of the column
TP11	0.35	Hand Digging	N/A	0.10 to 0.12	0.00 to 0.07	Clayey Silt possible Fill, trace sand and gravel, brown, moist	Photo 21 and 22	Concrete floor slab thickness is 0.10 m, foundation was observed on the two corners (wall sides), which consists of stone blocks (Cobbles)

Drawings

LEGEND

APPROXIMATE LOCATION OF CEILING REMOVAL. OPENING TYPICALLY 12" x 48" TO OBSERVE SPACING, ORIENTATION, AND SIZE OF JOISTS AND BEAMS, AS WELL AS CONDITION OF JOISTS AT END-BEARING LOCATIONS AT EXTERIOR WALLS. DECORATIVE PLASTER ELEMENTS SUCH AS CORNICES ARE TO BE PROTECTED AND REMAIN IN PLACE. ALLOW FOR REMOVAL AND REINSTATEMENT OF BRICKS ADJACENT TO END-BEARING LOCATIONS (ONE LOCATION PER OPENING AT EXTERIOR WALLS, WHERE POSSIBLE). DOCUMENT CONDITIONS AND PROVIDE REPORT CONFIRMING OBSERVATIONS INCLUDING SPACING, ORIENTATION, AND SIZE OF JOISTS AND BEAMS AND CONDITION OF JOISTS. IDENTIFY EXTENT OF DRY ROT OBSERVED (IF ANY).

APPROXIMATE LOCATION OF FLOOR REMOVAL AND EXCAVATION FOR TEST PITS. OPENING TYPICALLY 24" x 24" AND EXCAVATED TO THE UNDERSIDE OF THE FOOTINGS (NOT LOWER THAN THE UNDERSIDE OF THE FOOTINGS). DOCUMENT CONDITIONS AND PROVIDE REPORT CONFIRMING OBSERVATIONS INCLUDING THE SIZE, POSITION, DEPTH, CONSTRUCTION MATERIALS AND CONDITION OF FOOTINGS.

CARPET REMOVAL AND DISPOSAL

AREA RUG REMOVAL. AREA RUGS TO BE ROLLED AND STORED ON SITE IN THE ROOM WHERE THEY CURRENTLY RESIDE

+VG ARCHITECTS
THE VENTIN GROUP LTD

APPENDIX A

TEST PIT PHOTO LOGS

Photo 1: Test Pit TP1

Photo 2: Test Pit TP1

Photo 3: Test Pit TP2

Photo 4: Test Pit TP2

Photo 5: Test Pit TP3

Photo 6: Test Pit TP3

Photo 7: Test Pit TP4

Photo 8: Test Pit TP4

Photo 9: Test Pit TP5

Photo 10: Test Pit TP5

Photo 11: Test Pit TP6

Photo 12: Test Pit TP6

Photo 13: Test Pit TP7

Photo 14: Test Pit TP7

Photo 15: Test Pit TP8

Photo 16: Test Pit TP8

Photo 17: Test Pit TP9

Photo 18: Test Pit TP9

Photo 19: Test Pit TP10

Photo 20: Test Pit TP10

Photo 21: Test Pit TP11

Photo 22: Test Pit TP11

Appendix B: Limitation and Use of the Report

This report is intended solely for the Client named. The material in it reflects our best judgment in light of the information available to Sirati & Partners Consultants Limited (SIRATI) at the time of preparation. Unless otherwise agreed in writing by SIRATI, it shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. No portion of this report may be used as a separate entity, it is written to be read in its entirety.

The conclusions and recommendations given in this report are based on information determined at the borehole locations. The information contained herein in no way reflects on the environment aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the boreholes may differ from those encountered at the borehole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation. The benchmark and elevations used in this report are primarily to establish relative elevation differences between the borehole locations and should not be used for other purposes, such as grading, excavating, planning, development, etc. Professional judgement was exercised in gathering and analyzing data and formulation of recommendations using current industry guidelines and standards. Similar to all professional persons rendering advice, SIRATI cannot act as absolute insurer of the conclusion we have reached. No additional warranty or representation, expressed or implied, is included or intended in this report other than stated herein the report.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of boreholes may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the subsurface conditions may affect their work. This work has been undertaken in accordance with normally accepted geotechnical engineering practices.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SIRATI accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time. Any user of this report specifically denies any right to claims against the Consultant, Sub-Consultants, their officers, agents and employees in excess of the fee paid for professional services.

SIRATI engagement hereunder is subject to and condition upon, that SIRATI not being required by the Client, or any other third party to provide evidence or testimony in any legal proceedings pertaining to this finding of this report or providing litigations support services which may arise to be required in respect of the work produced herein by SIRATI. It is prohibited to publish, release or disclose to any third party the report produced by SIRATI pursuant to this engagement and such report is produced solely for the Client own internal purposes and which shall remain the confidential proprietary property of SIRATI for use by the Client, within the context of the work agreement. The Client will and does hereby remise and forever absolutely release SIRATI, its directors, officers, agents and shareholders of and from any and all claims, obligations, liabilities, expenses, costs, charges or other demands or requirements of any nature pertaining to the report produced by SIRATI hereunder. The

Client will not commence any claims against any Person who may make a claim against SIRATI in respect of work produced under this engagement.