



Proactive by Design



SUPPLEMENTAL STORMWATER INVESTIGATION

**PROPOSED QUICK CHEK FOOD STORE AND
RESTAURANT
ER/UDC WEST WINDSOR, LLC
WEST WINDSOR, MERCER COUNTY, NEW JERSEY**

July 12, 2022

File No. 26.0092434.02

PREPARED FOR:

ER/UDC West Windsor, LLC

P. O. Box 391

Williston, Vermont

GZA GeoEnvironmental Inc.

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July 12, 2022
File No. 26.0092434.02

ER/UDC West Windsor, LLC
P. O. Box 391
Williston, Vermont 05493

Attention: Mr. Len Kuhn

Report
Supplemental Stormwater Investigation
Proposed Quick Chek Food Store and Restaurant
West Windsor, Mercer County, New Jersey
ER/UDC West Windsor, LLC

Introduction

This report presents the results of a supplemental stormwater investigation completed by GZA GeoEnvironmental, Inc. (GZA) at the site of a proposed Quick Chek food store and a proposed restaurant which may be constructed in West Windsor, Mercer County, New Jersey. The site is located adjacent to and west of Southfield Road between Princeton-Hightstown Road and McGetrick Lane, as shown on the attached Site Location Map, Plate 1. Our work was performed in general conformance with our proposal dated May 13, 2022.

Proposed Construction

Plans provided to us indicate that the development would consist of two facilities and associated site improvements. The eastern half of the property would be developed by a Quick Chek food store approximately 5,869 square feet in plan area. A canopy with eight fuel dispensers would be located to the north of the food store area and four underground storage tanks would be located north of the canopy. On-site paved parking and roadway areas would be constructed to service the proposed facility.



Adjacent to and west of the Quick Chek development, a restaurant with drive-thru approximately 4,541 square feet in plan area would be constructed. The building would be located on the eastern side of this portion of the parcel with a drive-thru lane south and east of the building. On-site paved parking and roadway areas would be constructed north and west of the proposed restaurant.

On-site stormwater facilities are planned for the development consisting of above ground basins and porous asphalt and concrete areas.

It is our understanding that a portion of McGetrick Lane will be realigned through the development and enter Southfield Road about 100 feet north of its current position. As a result of this realignment, additional stormwater testing consisting of 4 test pits was requested by Bohler in unexplored areas being considered for stormwater facilities.

Purpose and Scope of Work

The purpose of our services was to:

- 1) explore the subsurface soil and groundwater conditions via test pits in four accessible locations adjacent to McGetrick Lane and within the proposed development;
- 2) collect tube samples of the soil layers encountered from all proposed test pit locations for laboratory tube permeameter permeability testing; and
- 3) prepare a brief summary report of our findings for use by Bohler in their evaluation of the stormwater improvements.

To accomplish these purposes, a subsurface exploration program consisting of 4 supervised test pit excavations was performed at the site along the McGetrick Lane roadway realignment per Bohler's request. The test pits were advanced using a track-mounted excavator (CAT 308) and extended to depths of approximately 12 feet



below existing surface grades. The approximate locations of the test pits performed for this investigation are shown in relation to proposed site features on the Plot Plan, Plate 2.

All field work was performed under the direct technical supervision of a geologist from GZA. Our representative located the explorations in the field, maintained continuous logs of the explorations as the work proceeded, obtained bulk samples of the materials encountered in the test pits suitable for identification purposes, and obtained relatively undisturbed tube samples from the test pits for laboratory tube permeameter permeability testing.

Detailed descriptions of the encountered subsurface conditions are presented on the Test Pit Logs, Plates 3A through 3D. The soils observed during the test pit excavations were visually classified in general accordance with the procedures of the United States Department of Agriculture Soil Classification System (USDA) described on Plate 4.

The following discussion of our findings are subject to the Limitations attached as an Appendix to this report.

Findings

Topsoil was encountered at the surface in the test pits ranging from about 12 to 14 inches in thickness. In Test Pit 3, the topsoil was underlain by clay loam fill which extended to a depth of approximately 3 feet below grade. The remaining test pits encountered native soils below the topsoil. The topsoil and fill materials were underlain by interlayered loamy sand, sandy loam, sandy clay loam, sandy clay, and clay soils. The materials containing more clay were observed closer to the intersection of McGetrick Lane and Southfield Road.

Groundwater seepage was observed in the test pits at depths ranging from approximately 10 to 11.5 feet below grade, corresponding to Elevations of +82.5 feet and +83.5 feet. Mottling, indicative of seasonally saturated conditions, was observed in the test pits at depths ranging from 36 to 72 inches below grade.



Laboratory tube permeameter permeability tests were performed on relatively undisturbed tube samples of the subsoils collected in each test pit. The permeability tests indicate that the sandy subsoils (loamy sand and sandy loam) generally exhibited permeabilities of 1 inch per hour to greater than 19.1 inches per hour, while the silty and clayey soils (sandy clay loam, loam, clay loam, and clay) exhibited permeability of less than 1 inch per hour. The laboratory tube permeameter tests are shown on the individual test pit logs.

Please contact us if you have any questions regarding this information.

The following Plates and Appendix are attached and complete this report:

- Plate 1 – Site Location Map
- Plate 2 – Plot Plan
- Plates 3A through 3D– Test Pit Logs
- Plate 4 – USDA Soil Textural Triangle
- Appendix – Limitations

Respectfully submitted,

GZA GeoEnvironmental, Inc.

Handwritten signature of Cory S. Karinja in blue ink.

Cory S. Karinja, P.E.
Project Manager

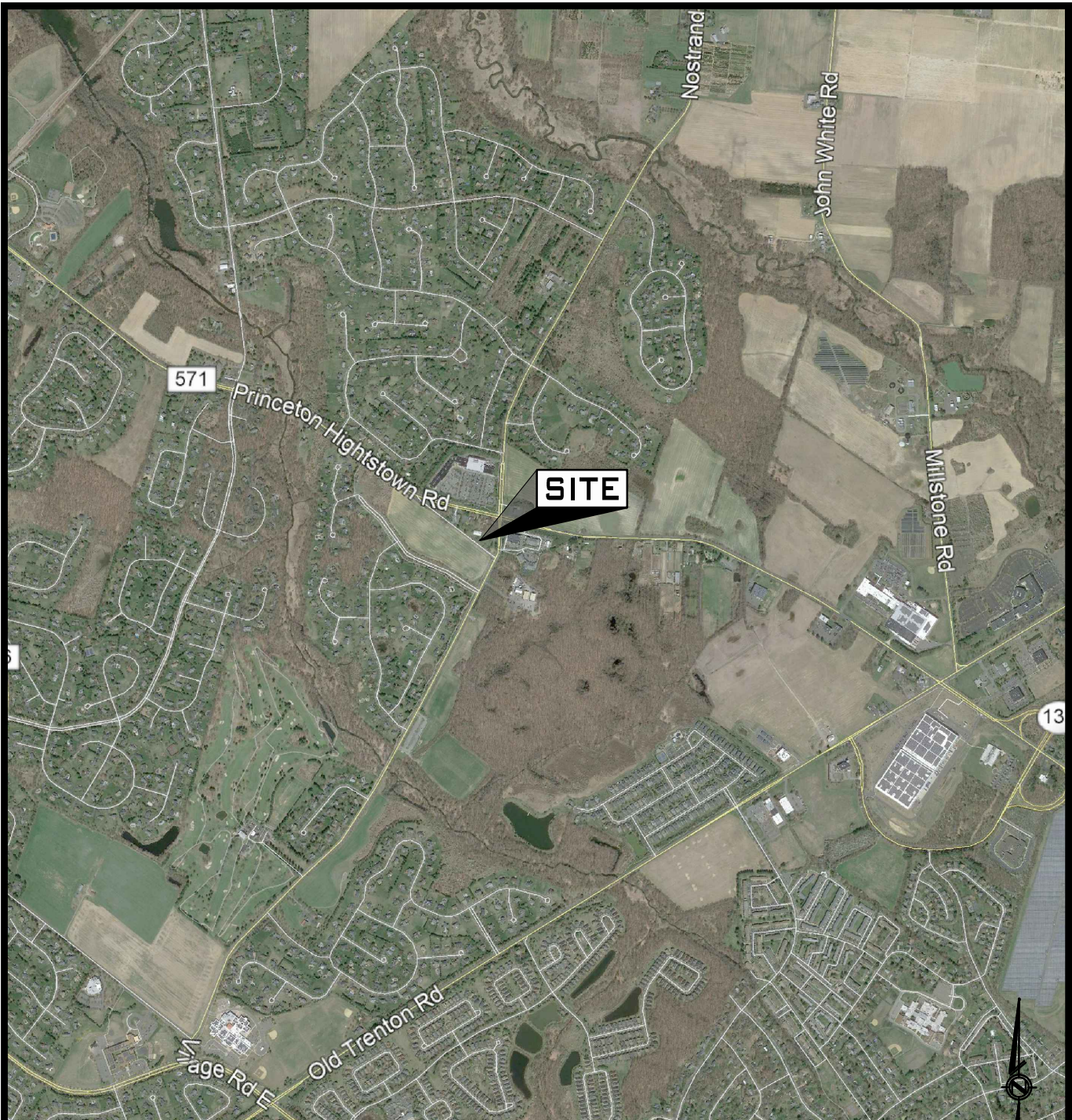
Handwritten signature of Mark R. Denno in blue ink.

Mark R. Denno, P.E.
Principal

Handwritten signature of Christopher P. Tansey in blue ink.

Christopher P. Tansey, P.E.
Consultant/Reviewer

CSK:MRD/ck
(1 copy submitted via e-mail)



Aerial Photo courtesy of Google Earth Pro



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SITE LOCATION MAP

PROPOSED QUICK CHEK FOOD STORE
WEST WINDSOR, NEW JERSEY
ER/UDC WEST WINDSOR, LLC

JOB NO.

26.0092434.02

FILE NO.

-

DR. BY

VJD

CHK. BY

CSK

DATE

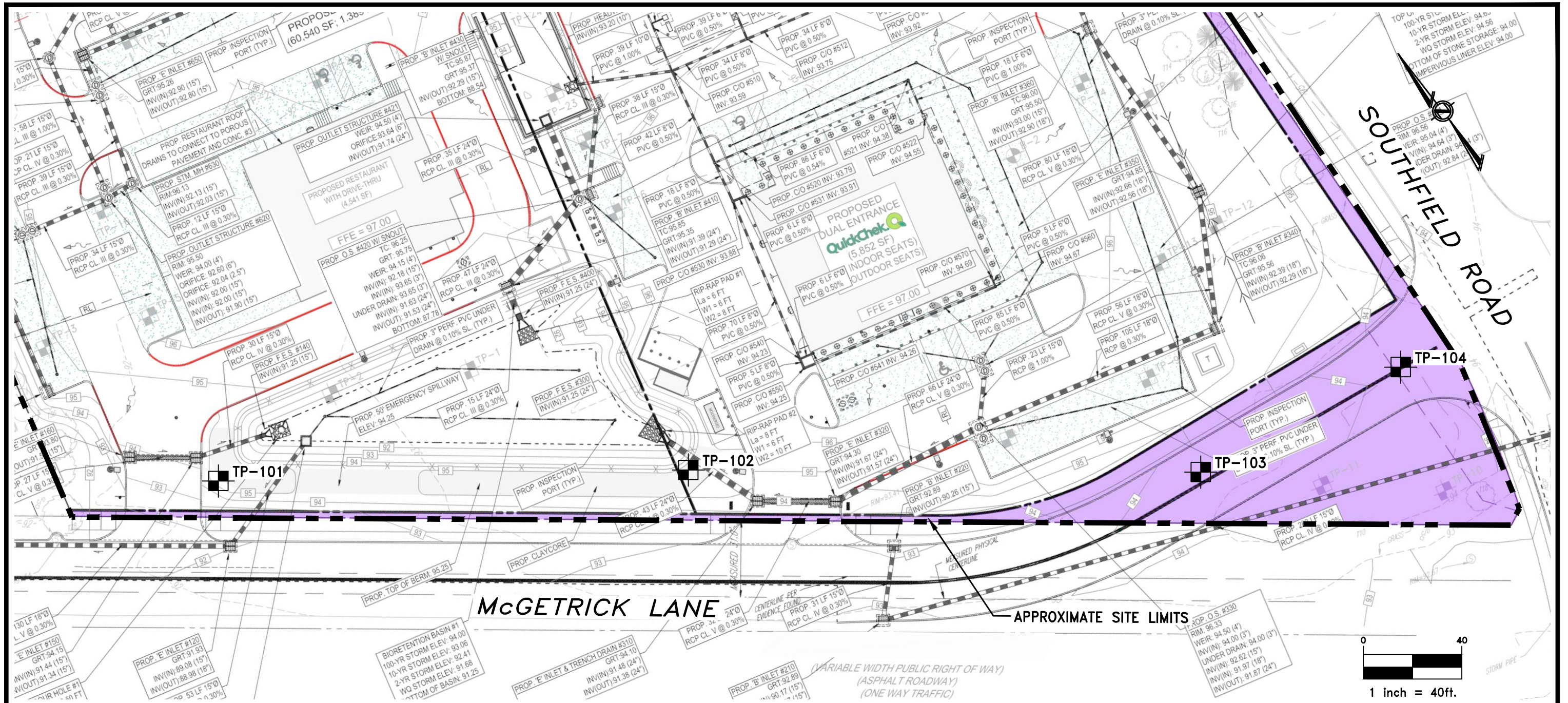
6/22/22

SCALE

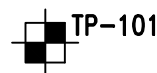
1"=2,000'

PLATE

1



KEY:



TP-101 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

NOTES:

1. This drawing is part of GZA GeoEnvironmental, Inc. Report No. 26.0092434.02 and should be read together with the report for complete evaluation.
2. General layout was obtained from a drawing prepared by Bohler Eng., entitled "Drainage Plan" dated 11/4/21 (revised 3/9/22), scale 1" = 30'.

PLOT PLAN

**PROPOSED QUICK CHEK FOOD STORE
WEST WINDSOR, NEW JERSEY
ER/UDC WEST WINDSOR, LLC**



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JOB NO. 26.0092434.02		FILE NO. -		
DR. BY VJD	CHK. BY CSK	DATE 6/22/22	SCALE 1" = 40'	PLATE 2

TEST PIT LOG



GZA GeoEnvironmental, Inc.
Engineers and Scientists

ER/UDC West Windsor, LLC
Prop. Quick Chek and Restaurant
West Windsor

EXPLORATION NO.: TP-101
SHEET: 1 of 1
PROJECT NO: 26.0092434.02
REVIEWED BY: Cory Karinja

Logged By: Jeremy Weremeichik
Contractor: Heritage Excavating
Operator: Travis

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12.3

Ground Surface Elev. (ft.): 92.5

Date Start - Finish: 6/15/2022 - 6/15/2022

Type of Excavator: Rubber-tire Backhoe

Groundwater Depth (ft.)

Excavator Model: John Deere 410G

Date	Time	Water Depth	Stab.Time
6/15/22		10	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	1.5	0-12	Topsoil - Brown (10YR, 4/3) clay loam, 20% gravel, weak fine crumb, slightly moist, friable, clear smooth boundary, many fine roots	1		
2			12-20		2		
3	S2, T2	3	20-54	Yellowish brown (10YR, 5/4) sandy clay loam, 20% gravel, weak medium crumb, moist, friable, abrupt smooth boundary, few fine roots Strong brown (7.5YR, 5/8) gravelly sandy loam, 30% gravel, moderate medium granular, moist, firm, abrupt smooth boundary	3		
4					4		
5	S3, T3	5	54-84	Light yellowish brown (10YR, 6/4) sandy loam, 20% gravel, moderate medium subangular blocky, moist, firm, gradual smooth boundary, common medium distinct gray (10YR, 6/1) mottles encountered from 72 inches to 84 inches	5		
6					6		
7					7		
8	S4, T4	10	84-148	Brownish yellow (10YR, 6/6) loamy sand, 20% gravel, 5% cobbles, moderate medium granular, moist, firm, common medium distinct gray (10YR, 6/1) and reddish brown (2.5YR, 4/4) mottles encountered throughout layer	8		
9					9		
10					10		
11					11		
12					12		
13				End of exploration at 12.3 feet. Moderate groundwater seepage encountered @ 10' Estimated seasonal high groundwater observed @ 72"			
14							
15				Tube Permeability Test Results: 19.1 in/hr @ 3' 1.6 in/hr @ 5' 14.2 in/hr @ 10'			
16							
17							
18							
19							
20							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3A

TEST PIT LOG



GZA GeoEnvironmental, Inc.
Engineers and Scientists

ER/UDC West Windsor, LLC
Prop. Quick Chek and Restaurant
West Windsor

EXPLORATION NO.: TP-102
SHEET: 1 of 1
PROJECT NO: 26.0092434.02
REVIEWED BY: Cory Karinja

Logged By: Jeremy Weremeichik
Contractor: Heritage Excavating
Operator: Travis

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12

Ground Surface Elev. (ft.): 93.5

Date Start - Finish: 6/15/2022 - 6/15/2022

Type of Excavator: Rubber-tire Backhoe

Groundwater Depth (ft.)

Excavator Model: John Deere 410G

Date	Time	Water Depth	Stab.Time
6/15/22		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2	0-14	Topsoil - Brown (10YR, 4/3) clay loam, 10% gravel, weak fine crumb, moist, friable, abrupt smooth boundary, many fine roots	1		
2			14-36	Light olive brown (2.5Y, 5/3) sandy clay loam, 5% gravel, moderate medium subangular blocky, moist, firm, gradual smooth boundary, few medium roots	2		
3	S2, T2	4	36-84	Strong brown (7.5YR, 5/8) sandy loam, 30% gravel, moderate medium granular, moist, firm, clear smooth boundary, common medium distinct gray (10YR, 6/1) mottles encountered from 60 inches to 84 inches	3		
4					4		
5					5		
6	S3, T3	7.5	84-96	Light yellowish brown (10YR, 6/4) sandy loam, 20% gravel, moderate medium subangular blocky, moist, friable, clear smooth boundary, common medium distinct gray (10YR, 6/1) and strong brown (7.5YR, 5/8) mottles encountered throughout layer	6		
7					7		
8					8		
9					9		
10			96-144	Brownish yellow (10YR, 6/6) loamy sand, 5% gravel, moderate medium granular, moist, firm, common medium faint strong brown (7.5YR, 4/6) and reddish brown (2.5YR, 4/4) mottles encountered throughout layer	10		
11					11		
12				End of exploration at 12 feet.	12		
13				Slight groundwater encountered @ 11'			
14				Estimated seasonal high groundwater observed @ 60"			
15				Note: Sidewall collapsing below 11'			
16				Tube Permeability Test Results:			
17				0.52 in/hr @ 2'			
18				1.8 in/hr @ 4'			
19				7.5 in/hr @ 7.5'			
20							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3B

TEST PIT LOG



GZA GeoEnvironmental, Inc.
Engineers and Scientists

ER/UDC West Windsor, LLC
Prop. Quick Chek and Restaurant
West Windsor

EXPLORATION NO.: TP-103
SHEET: 1 of 1
PROJECT NO: 26.0092434.02
REVIEWED BY: Cory Karinja

Logged By: Jeremy Weremeichik
Contractor: Heritage Excavating
Operator: Travis

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94

Final Test Pit Depth (ft.): 12
Date Start - Finish: 6/15/2022 - 6/15/2022

Type of Excavator: Rubber-tire Backhoe
Excavator Model: John Deere 410G

Groundwater Depth (ft.)			
Date	Time	Water Depth	Stab.Time
6/15/22		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2.5	0-14	Topsoil - Dark brown (10YR, 3/3) clay, 10% gravel, moderate medium subangular blocky, moist, firm, abrupt wavy boundary, many fine roots	1		
2			14-42	Brown (10YR, 4/3) clay, 20% gravel, moderate medium subangular blocky, moist, friable, abrupt smooth boundary	2		
3	S2, T2	5	42-84	Strong brown (7.5YR, 8/8) sandy clay loam, 30% gravel, moderate medium subangular blocky, moist, firm, gradual smooth boundary, common coarse distinct gray (10YR, 6/1) mottles encountered throughout layer	3		
4					4		
5					5		
6	S3, T3	8	84-144	Light olive brown (2.5Y, 5/3) sandy loam, 30% gravel, moderate medium granular, friable, common medium distinct gray (10YR, 6/1) mottles encountered throughout layer	6		
7					7		
8					8		
9					9		
10					10		
11					11		
12					12		
13				End of exploration at 12 feet.			
14				Slight groundwater seepage encountered @ 11'			
15				Estimated seasonal high groundwater observed @ 42"			
16				Tube Permeability Test Results:			
17				0.48 in/hr @ 2.5'			
18				0.52 in/hr @ 5'			
19				3.3 in/hr @ 8'			
20							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3C

TEST PIT LOG



GZA GeoEnvironmental, Inc.
Engineers and Scientists

ER/UDC West Windsor, LLC
Prop. Quick Chek and Restaurant
West Windsor

EXPLORATION NO.: TP-104
SHEET: 1 of 1
PROJECT NO: 26.0092434.02
REVIEWED BY: Cory Karinja

Logged By: Jeremy Weremeichik
Contractor: Heritage Excavating
Operator: Travis

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12

Ground Surface Elev. (ft.): 95

Date Start - Finish: 6/15/2022 - 6/15/2022

Type of Excavator: Rubber-tire Backhoe

Groundwater Depth (ft.)

Excavator Model: John Deere 410G

Date	Time	Water Depth	Stab. Time
6/15/22		11.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2	0-14	Topsoil/Fill - Very dark brown (10YR, 2/2) silty clay, 40% gravel, 5% cobbles, moderate medium subangular blocky, slightly moist, firm, abrupt smooth boundary, many medium roots	1		
2			14-36	Fill - Brown (10YR, 4/3) clay loam, 10% gravel, moderate medium subangular blocky, slightly moist, firm, gradual irregular boundary, few medium roots	2		
3	S2, T2	4	36-72	Dark yellowish brown (10YR, 4/6) sandy loam, 15% gravel, moderate medium crumb, moist, friable, clear smooth boundary, common fine faint gray (10YR, 6/1) and strong brown (7.5YR, 4/6) mottles encountered throughout layer	3		
4					4		
5	S3, T3	8	72-108	Dark yellowish brown (10YR, 4/4) sandy clay, 50% gravel, 5% cobbles, moderate medium subangular blocky, moist, friable, abrupt smooth boundary, few fine distinct strong brown (7.5YR, 4/6) mottles encountered throughout layer	5		
6					6		
7					7		
8			108-144	Pale brown (2.5Y, 8/3) loamy sand, 10% gravel, moderate medium granular, moist, firm, common fine distinct strong brown (7.5YR, 4/6) mottles encountered throughout layer	8		
9					9		
10					10		
11					11		
12				End of exploration at 12 feet.	12		
13				Slight groundwater seepage encountered @ 11.5'			
14				Estimated seasonal high groundwater observed @ 36"			
15				Tube Permeability Test Results:			
16				0.48 in/hr @ 2'			
17				1.0 in/hr @ 4'			
18				0.59 in/hr @ 8'			
19							
20							

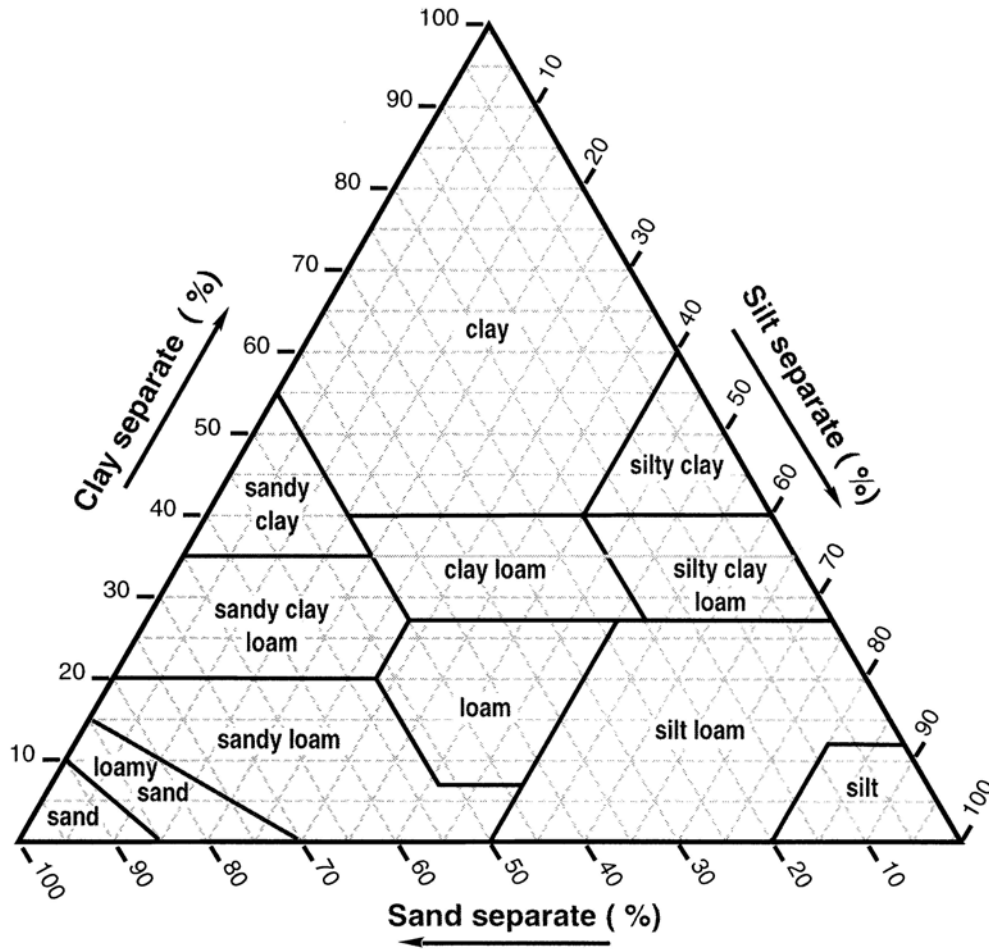
REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3D

Texture Triangle:

Fine Earth Texture Classes (———)



USDA SOIL CLASSIFICATION SYSTEM

APPENDIX

APPENDIX

Limitations

A. Subsurface Information

Locations: The locations of the explorations were approximately determined by tape measurement from existing site features. Elevations of the explorations were approximately determined by interpolation between contours shown on topographic plans provided to us. The locations and elevations of the explorations should be considered accurate only to the degree implied by the method used.

Interface of Strata: The stratification lines shown on the individual logs of the subsurface explorations represent the approximate boundaries between soil types, and the transitions may be gradual.

Field Logs/Final Logs: A field log was prepared for each exploration by a member of our staff. The field log contains factual information and interpretation of the soil conditions between samples. Our recommendations are based on the final logs as shown in this report and the information contained therein, and not on the field logs. The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and/or tests of the field samples.

Water Levels: Water level readings have been made in the explorations at times and under conditions stated on the individual logs. These data have been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater will occur due to variations in rainfall, temperature, and other factors.

Pollution/Contamination: Unless specifically indicated to the contrary in this report, the scope of our services was limited only to investigation and evaluation of the geotechnical engineering aspects of the site conditions, and did not include any consideration of potential site pollution or contamination resulting from the presence of chemicals, metals, radioactive elements, etc. This report offers no facts or opinions related to potential pollution/contamination of the site.

Environmental Considerations: Unless specifically indicated to the contrary in this report, this report does not address environmental considerations which may affect the site development, e.g., wetlands determinations, flora and fauna, wildlife, etc. The conclusions and recommendations of this report are not intended to supersede any environmental conditions which should be reflected in the site planning.

B. Applicability of Report

This report has been prepared in accordance with generally accepted soils engineering practices for the exclusive use of ER/UDC West Windsor, LLC for specific application to the design of the proposed Quick Chek and restaurant. No other warranty, expressed or implied, is made.

This report may be referred to in the project specifications for general information purposes only, but should not be used as the technical specifications for the work, as it was prepared for design purposes exclusively.

C. Reinterpretation of Recommendations

Change in Location or Nature of Facilities: In the event that any changes in the nature, design or location of the facilities are planned, the findings and/or recommendations contained in this report shall not be considered valid unless the changes are reviewed and findings of this report modified or verified in writing.

Changed Conditions During Construction: The findings and/or recommendations submitted in this report are based in part upon the data obtained from 4 widely-spaced test pit excavations performed for this study. The nature and extent of variations between the explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

Changes in State-of-the-Art: The findings contained in this report are based upon the applicable standards of our profession at the time this report was prepared.

D. Use of Report by Prospective Bidders

This soil investigation report was prepared for the project by GZA GeoEnvironmental Inc. (GZA) for stormwater design purposes and may not be sufficient to prepare an accurate bid. Contractors utilizing the information in the report should do so with the express understanding that its scope was developed to address stormwater design considerations. Prospective bidders should obtain the owner's permission to perform whatever additional explorations or data gathering they deem necessary to prepare their bid accurately.

E. Construction Observation

We recommend that GZA be retained to provide on-site soils engineering services during the earthwork construction and foundation phases of the work. This is to observe compliance with the design concepts and to allow changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.