

STORMWATER MANAGEMENT FACILITY OPERATIONS & MAINTENANCE MANUAL

Prepared for

ER/UDC WEST WINDSOR LLC

Block 47; Lots 2-6

Township of West Windsor
Mercer County, New Jersey

Prepared by

BOHLER //

NJ Certification of Authorization No. 24GA28161700

30 Independence Boulevard, Suite 200
Warren, NJ 07059
908-668-8300

Tung-To Lam, P.E.
New Jersey Professional Engineer
License No. 47863

November 2021
Revised: December 2022
Revised: March 2022
Revised: September 2023
Revised: November 2023

BENJ #: J190844

Stormwater Management Measures Maintenance Plan & Field Manuals

Development Name: ER/UDC West Windsor, LLC

Address: 332-340 Hightstown Road & 125 Southfield Road

Block(s) / Lot(s): 46 / 2-6

Township, County: Township of West Windsor, Mercer County

Party Responsible for Maintenance:

ER/UDC West Windsor

Address: 250 Miron Drive, Southlake, Texas 76092

Contact Person(s): Jeff Berg Phone: (817) 912-1731

Prepared by: Bohler Engineering NJ, LLC Date: September 18, 2023

This plan is recorded in

Deed Book # _____ Page # _____ with _____ County Clerk on Date

Last Revised on ____/____/____

Table of Contents

Part I- Maintenance

List of Stormwater Management Measures 1

Location Map..... 3

Description of Stormwater Management Measures 4

Preventative and Corrective Maintenance Action Plan..... 6

Inspection and Logs of All Preventative and Corrective Maintenance 14

Maintenance Personnel, Equipment, Tools, and Supplies..... 15

Disposal Plan 16

Cost Estimate..... 17

Safety Measures and Procedures 18

Training Plan and Records 19

Annual Evaluation of the Effectiveness of the Plan 21

Documents 22

Part II- Field Manuals and Maintenance Records

- Field Manual for Snout Hood by Best Management Products, Inc.
- Field Manual for First Defense Unit by Hydro International
- Maintenance Logs and Inspection Records

Part I- Maintenance Plan

List of Stormwater Management Measures

The stormwater management measures incorporated into this development are listed below. The corresponding Field Manuals for the stormwater management measures are located in Part II of the Maintenance Plan.

Type of Stormwater Management Measure	BMP No.	Location Description	State Plane Coordinates
Bioretention Basin #1	Basin #1	Southern portion of proposed Lot 2	530,668 Northing 468,721 Easting
Bioretention Basin #2	Basin #2	Western property line of Proposed Lot 1	530,750 Northing 468,830 Easting
Porous Paver Area #1	PPA #1	Parking field on Western side of Proposed Lot 2	530,816 Northing 468,615 Easting
Porous Paver Area #2	PPA #2	Parking field on Northern area of Proposed Lot 2	530,847 Northing 468,749 Easting
Porous Paver Area #3	PPA #3	Parking field and patio area center of Proposed Lot 2	530,775 Northing 468,684 Easting
Porous Paver Area #4	PPA #4	Parking field on Western area of Proposed Lot 1	530,691 Northing 468,826 Easting
Porous Paver Area #5	PPA #5	Parking field on Southeast corner of Proposed Lot 1	530,508 Northing 468,980 Easting
Porous Paver Area #6	PPA #6	Parking field surrounding QuickChek building	530,602 Northing 468,945 Easting
Porous Pavement Area #7	PPA #7	Northeast portion of McGetrick Lane expansion	530,670 Northing 468,607 Easting
Outlet Structure #130	OS #1	Within Basin #1	530,688 Northing 468,664 Easting
Outlet Structure #430	OS #2	Within Basin #2	530,773 Northing 468,820 Easting
Outlet Structure #700	OS #3	Within PPA #1	530,822 Northing 468,627 Easting
Outlet Structure #640	OS #4	Within PPA #2	530,849 Northing 468,682 Easting

Outlet Structure #620	OS #5	Within PPA #3	530,815 Northing 468,660 Easting
Outlet Structure #420	OS #6	Within PPA #4	530,699 Northing 468,812 Easting
Outlet Structure #330	OS #7	Within PPA #5	530,528 Northing 468,886 Easting
Outlet Structure #331	OS #8	Within PPA #6	530,544 Northing 468,902 Easting
Outlet Structure #110	OS #9	Within PPA #7	530,746 Northing 468,509 Easting
Snout Hood #1	SH #1	Within 'B' inlet # 430	530,726 Northing 468,841 Easting
Discharge Point #1	Discharge #1	Existing 'B' inlet within Princeton-Hightstown Road	530,909 Northing 468,757 Easting
Discharge Point #2	Discharge #2	Existing storm manhole within McGetrick Lane	530,853 Northing 468,370 Easting
First Defense Unit #1	FD#1	Within Outlet Structure W/ 'B' Inlet #430	530,726 Northing 468,841 Easting
First Defense Unit #2	FD#2	Within 'B' Inlet #370	530,610 Northing 469,022 Easting

Location Map



PRINCETON - HIGHTSTOWN ROAD

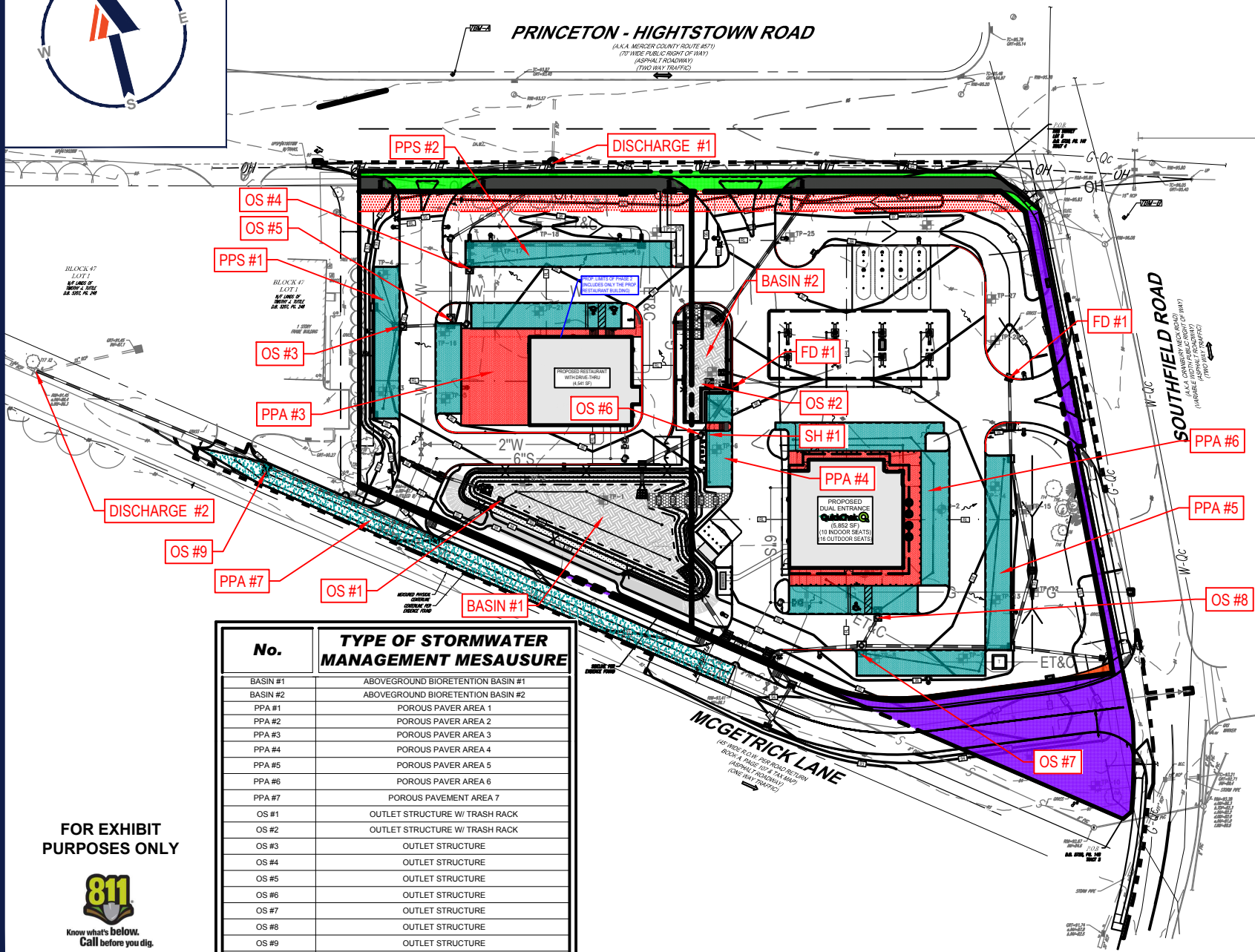
(A.K.A. MERCER COUNTY ROUTE 267)
(70' WIDE PUBLIC RIGHT OF WAY)
(ASPHALT ROADWAY)
(TWO-WAY TRAFFIC)

SOUTHFIELD ROAD

(A.K.A. CONVENT ROAD)
(60' WIDE PUBLIC RIGHT OF WAY)
(ASPHALT ROADWAY)
(TWO-WAY TRAFFIC)

MCGETTRICK LANE

(45' WIDE ROW FOR BIOTRETENTION BASIN)
(60' WIDE ROW FOR TRAIL)
(ASPHALT ROADWAY)
(ONE-WAY TRAFFIC)



No.	TYPE OF STORMWATER MANAGEMENT MESAASURE
BASIN #1	ABOVEGROUND BIOTRETENTION BASIN #1
BASIN #2	ABOVEGROUND BIOTRETENTION BASIN #2
PPA #1	POROUS PAVER AREA 1
PPA #2	POROUS PAVER AREA 2
PPA #3	POROUS PAVER AREA 3
PPA #4	POROUS PAVER AREA 4
PPA #5	POROUS PAVER AREA 5
PPA #6	POROUS PAVER AREA 6
PPA #7	POROUS PAVER AREA 7
OS #1	OUTLET STRUCTURE W/ TRASH RACK
OS #2	OUTLET STRUCTURE W/ TRASH RACK
OS #3	OUTLET STRUCTURE
OS #4	OUTLET STRUCTURE
OS #5	OUTLET STRUCTURE
OS #6	OUTLET STRUCTURE
OS #7	OUTLET STRUCTURE
OS #8	OUTLET STRUCTURE
OS #9	OUTLET STRUCTURE
SH #1	SNOUT HOOD
DISCHARGE #1	DISCHARGE POINT VIA 15" RCP PIPE
DISCHARGE #2	DISCHARGE POINT VIA 15" RCP PIPE
FD #1	FIRST DEFENSE UNIT
FD #2	FIRST DEFENSE UNIT

FOR EXHIBIT PURPOSES ONLY



Know what's below.
Call before you dig.

NEW JERSEY
YOU MUST CALL 811 BEFORE ANY EXCAVATION
WHETHER IT'S ON PRIVATE OR PUBLIC LAND.
1-800-272-1000
www.nj1-call.org

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REGISTERED PROFESSIONAL ENGINEER
NEW JERSEY LICENSE NO. 47883
NEW YORK LICENSE NO. 082924
CONNECTICUT LICENSE NO. 2024
PENNSYLVANIA LICENSE NO. 76746

REVISIONS

REV	DATE	COMMENT	DRAWN BY	CHECKED BY
2	12/05/2022	REV. PER TOWNSHIP COMMENTS	CPR	TXL
3	09/18/2023	REV. PER COUNTY ROW IMPROVEMENTS	MA/WTW	TXL
4	11/07/2023	REV. PER TOWNSHIP COMMENTS	MAI	TXL

PROJECT No.: J190844
DRAWN BY: CPR
CHECKED BY: TXL
DATE: 11/04/2021
CAD I.D.: J190844-LOCE-4A

PROJECT:
O&M MANUAL
FOR
UR/EDC WEST WINDSOR LLC
MAP: 23.03 | BLK: 47 | LOTS: 2-6
N.J.S.H ROUTE 38
TOWNSHIP OF WEST WINDSOR
MERCER COUNTY, NEW JERSEY

BOHLER
BOHLER ENGINEERING NJ, LLC
30 INDEPENDENCE BLVD., SUITE 200
WARREN, NJ 07059
Phone: (908) 668-8300
Fax: (908) 754-4401
www.BohlerEngineering.com
NJ CERT. OF AUTHORIZATION NO. 24GA28161700 & MH4000122

T. LAM
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE NO. 47883
NEW YORK LICENSE NO. 082924
CONNECTICUT LICENSE NO. 2024
PENNSYLVANIA LICENSE NO. 76746

SHEET TITLE:
LOCATION MAP
SHEET NUMBER:
1

C:\02318\190844\CD\DRAWINGS\EXHIBITS\LOCATION EXHIBIT\190844-LOCE-4A-1-LAYOUT-C-01-LOCATION.MXD

Description of Stormwater Management Measures

Bioretention Basin #1

Design storm:

- Design Purposes:
 - Water quality & water quantity
 - NJDEP water quality storm (1.25 inches in 2 hours)
 - 2-year storm (3.31 inches);
 - 10-year storm (5.01 inches);
 - 100-year storm (8.33 inches)
- Dimensions: 170' length x 50' width x 4' depth

Bioretention Basin #2

Design storm:

- Design Purposes:
 - Water quality, water quantity & recharge
 - NJDEP water quality storm (1.25 inches in 2 hours)
 - 2-year storm (3.31 inches);
 - 10-year storm (5.01 inches);
 - 100-year storm (8.33 inches)
- Dimensions: 52' length x 27' width x 3' depth

Porous Paver Area #1

Design storm:

- Design Purposes:
 - Water quality & water quantity
 - NJDEP water quality storm (1.25 inches in 2 hours)
 - 2-year storm (3.31 inches);
 - 10-year storm (5.01 inches);
 - 100-year storm (8.33 inches)
- Dimensions: 106' length x 18' width x 2' depth

Porous Paver Area #2

Design storm:

- Design Purposes:
 - Water quality & water quantity
 - NJDEP water quality storm (1.25 inches in 2 hours)
 - 2-year storm (3.31 inches);
 - 10-year storm (5.01 inches);
 - 100-year storm (8.33 inches)
- Dimensions: 144' length x 18' width x 2' depth

Porous Paver Area #3

Design storm:

- Design Purposes:

- Water quality, water quantity & recharge
- NJDEP water quality storm (1.25 inches in 2 hours)
- 2-year storm (3.31 inches);
- 10-year storm (5.01 inches);
- 100-year storm (8.33 inches)
- Dimensions: 86' length x 67' width x 2.5' depth

Porous Paver Area #4

Design storm:

- Design Purposes:
 - Water quality & water quantity
 - NJDEP water quality storm (1.25 inches in 2 hours)
 - 2-year storm (3.31 inches);
 - 10-year storm (5.01 inches);
 - 100-year storm (8.33 inches)
- Dimensions: 65' length x 18' width x 1' depth

Porous Paver Area #5

Design storm:

- Design Purposes:
 - Water quality & water quantity
 - NJDEP water quality storm (1.25 inches in 2 hours)
 - 2-year storm (3.31 inches);
 - 10-year storm (5.01 inches);
 - 100-year storm (8.33 inches)
- Dimensions: 136' length x 18' width x 1' depth

Porous Paver Area #6

Design storm:

- Design Purposes:
 - Water quality & water quantity
 - NJDEP water quality storm (1.25 inches in 2 hours)
 - 2-year storm (3.31 inches);
 - 10-year storm (5.01 inches);
 - 100-year storm (8.33 inches)
- Dimensions: 134' length x 32' width x 1' depth

Porous Pavement Area #7

Design storm:

- Design Purposes:
 - Water quality & water quantity
 - NJDEP water quality storm (1.25 inches in 2 hours)
 - 2-year storm (3.31 inches);
 - 10-year storm (5.01 inches);
 - 100-year storm (8.33 inches)
- Dimensions: 400' length x 15' width x 1' depth

Preventative and Corrective Maintenance Action Plan

As per N.J.A.C. 7:8-5.8(b) & (e), preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including, but not limited to, repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of non-vegetated linings.

As per NJDEP BMP Manual Ch. 8 (Feb. 2004), maintenance plans should include specific preventative and corrective maintenance tasks such as removal of sediment, trash, and debris; mowing, pruning, and restoration of vegetation; restoration of eroded areas; elimination of mosquito breeding habitats; control of aquatic vegetation; and repair or replacement of damaged or deteriorated components.

As per NJDEP BMP Manual Ch. 8 (Feb. 2004), maintenance plans should include recommended corrective responses to various emergency conditions that may be encountered at the stormwater management measure. It should be noted that if the stormwater management measure includes a Class I or II dam as defined in the NJDEP Dam Safety Standards at N.J.A.C. 7:20, an emergency action plan for the dam is also required. See N.J.A.C. 7:20-1.7(f) for more information.

As per NJDEP BMP Manual Ch. 8 (Feb. 2004), the maintenance plan should address the maintenance of access points to the stormwater management measures in accordance with the following:

- all components of the stormwater management measures must be readily accessible for inspection and maintenance;
- trees, shrubs, and underbrush must be pruned or trimmed as necessary to maintain access to the stormwater management measure via roadways, paths, and ramps, including paths through perimeter vegetation to permanent pools, aquatic benches, and safety ledges to allow for the inspection and control of mosquito breeding; and
- the exact limits of inspection and maintenance easements and rights-of-way should be specified on stormwater management measure plans and included in the maintenance plan.

Routine Inspection and Maintenance of the Stormwater Management Facilities:

All stormwater management basins have been designed to control degradation of water quality. Without proper routine inspection and maintenance, the basins may lose some or all of their capability to function to their full capacity. Lack of adequate maintenance at these facilities could lead to system failures.

Regularly scheduled maintenance inspections of the stormwater facilities should be performed at least four (4) times each year. The primary purpose of these inspections is to ascertain the operational condition and safety of the facilities, particularly the condition of embankments, outlet structures, sedimentation and other safety-related aspects. Inspections will also provide information on the effectiveness of regularly scheduled Preventative and Aesthetic Maintenance Procedures, and will help to identify where changes in the extent and scheduling of the procedures are warranted. Finally, the facility inspections should also be used to determine the need for and timing of Corrective Maintenance procedures.

Routine maintenance of these facilities should be separated into two (2) basic types: Functional Maintenance and Aesthetic Maintenance. Functional Maintenance is further broken down into two (2) categories: Preventative and Corrective. Aesthetic Maintenance, which is necessary to maintain the visual appeal and aesthetic quality of these facilities, should be incorporated on the same schedule as the preventative maintenance efforts. Listed below are the Preventative, Corrective and Aesthetic Maintenance Procedures to be performed on a routine basis:

Preventative Maintenance Procedures:

The purpose of Preventative Maintenance is to maximize the effectiveness of the stormwater management aspects of the basins so that they remain operational and safe and to minimize the need for potential emergency or extensive corrective maintenance. These procedures are as follows:

- a) **Maintenance of Adjacent Areas** – Grass areas, trees, and shrubs throughout the site require periodic routine maintenance to include fertilizing, de-thatching and soil conditioning in order to maintain healthy growth and to provide soil stabilization. The application of fertilizers should follow manufacturer's instructions to reduce run-off of these compounds into the basins. Additionally, provisions should be made to re-seed and re-establish grass cover in areas damaged by sediment accumulation, stormwater flow, or other causes. These tasks should be performed, or at least evaluated, on a quarterly basis. Lawn areas should be mowed at least once a month during the growing season. Vegetated areas must be inspected at least annually for erosion and

scour as well as unwanted growth, which should be removed with minimum disruption to the remaining vegetation.

The highlighted maintenance access path as shown on the Location Map is to be maintained for access and maintenance from the developed portion of the site to discharge points 1, 2, and 3. Grass areas, trees, and shrubs following along the highlighted path require the same periodic routine maintenance as stated above to allow for access.

Note: All use of fertilizers, mechanical treatments, pesticides and other means to ensure optimum vegetation health must not compromise the intended purpose of the stormwater management facility. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible and if necessary, the minimum amount practical.

- b) **Removal and Disposal of Trash/Debris and Sediment** – All stormwater management components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least four times annually as well as after every storm exceeding one inch of rainfall in 24 hours. Such components should include the catch basins, outlet structures, trash racks and discharge points.

Removal of trash and debris will prevent possible damage and minimize potential mosquito breeding habitats. Debris and trash must be properly hauled off the site and transferred to an approved disposal site.

- c) **Elimination of Potential Mosquito Breeding Habitats** – The most effective mosquito control program is one that eliminates potential breeding habitats. Almost any stagnant pool of water can be attractive to mosquitoes, and may become the source of a large mosquito population. A maintenance program dedicated to eliminating potential breeding areas is preferable to chemical means of controlling mosquitoes. The most important maintenance functions is removal of all obstructions to natural flow patterns before stagnant water conditions can develop.

- d) **Parking lot Maintenance** – This management measure involves employing pavement cleaning practices, such as parking lot sweeping on a regular basis, to minimize pollutant export to the stormwater conveyance system/ detention basins and eventually the receiving waters. These cleaning practices are designed to remove sediment, debris, and other pollutants from access drive and parking lot surfaces that are a potential source of pollution impacting urban waterways. Mechanical machines that use vacuum assisted dry sweeping to remove particulate matter shall be utilized as these have the ability to remove finer sediment particles. Parking lots and access drives shall be swept/ vacuumed at least semi-annually or more often as conditions warrant. The disposal of the swept material must be properly hauled off the site and transferred to an approved disposal site. Other parking lot maintenance features include the use of on-site trash receptacle. These receptacles should be located in strategic areas where the majority of the pedestrian traffic occurs. These receptacles should be emptied weekly. The disposal of the solid waste must be properly hauled off the site and transferred to an approved disposal site.

Corrective Maintenance Procedures:

- a) **Removal of Debris and Sediment** – Sediment, debris and trash which threaten the discharge capacity of the basins should be removed immediately and properly disposed of. As noted previously, it is recommended that all water be evacuated from the basins before any significant amount of sediment, settled debris or trash is removed from the basins.
- b) **Structural Repairs** – Structural damage to outlet and inlet structures, trash racks, access hatches, roadways, and as a result of vandalism, flood events, settlement or other causes must be repaired promptly. The urgency of the repairs will depend upon the nature of the damage and its effects on the safety and operation of the facility. The analysis of

structural damage if it occurs and the design and performance of structural repairs should only be undertaken by a Professional Engineer.

- c) **Extermination of Mosquitoes** – If neglected, basins can become a potential mosquito breeding area. The extermination of mosquitoes will usually require the services of the County Mosquito Commission. If mosquito control in the facility becomes necessary, the preventative maintenance program should be re-evaluated, and more emphasis should be placed on control of mosquito breeding habitats.

- d) **Erosion Repair** – Vegetative cover or other protective measures are necessary to prevent the loss of soil due to the forces of wind and water. Where a re-seeding program has not been effective in maintaining a non-erosive vegetative cover, or other factors have exposed soils to erosion, corrective steps should be initiated to prevent further loss of soil that may result in danger to the stability of the facility. Soil loss can be controlled by a variety of materials and methods, including rip-rap, gabion lining, geotextile fabrics, sod, seeding, concrete lining and re-grading.

- e) **Elimination of Trees, Brush, Roots and Animal Burrows** – The stability of embankments can be impaired by large roots and animal burrows. Additionally, burrows can present a safety hazard for maintenance personnel. Trees and brush with extensive, woody root systems should be completely removed to prevent destabilization and the creation of seepage routes. Regular mowing will prevent vegetation that can cause root problems. Roots should also be completely removed to prevent decomposition within the embankment. Root voids and burrows should be filled with material similar to the existing material, and capped just below grade with stone, concrete or other material. If the filling of the burrows does not discourage the animals from returning, further measures should be taken to either move the animal population or to make critical areas of the facility unattractive to them.

- f) **Snow and Ice Removal** – Accumulations of snow and ice can threaten the functioning of the inlets, outlets and emergency spillways. Provision of the equipment, material and personnel to monitor and remove snow and ice from critical areas will assure the function of the facility during the winter months.

Aesthetic Maintenance Procedures:

- a) **Graffiti Removal** - The timely removal of graffiti will restore the aesthetic quality of the basins. Removal can be accomplished by paint or other cover, or removal with scrapers, solvents or cleansers. Timely removal is important to discourage further graffiti and other acts of vandalism.

- b) **Grass Trimming/Landscape Maintenance** – The lawn areas around the site shall be mowed on a regular basis as necessary to maintain the lawn at a height of 2 to 3-inches. These areas shall also be fertilized twice a year, once in the spring and once in the fall. Fertilizer for lawn areas shall be 10-20-10 applied at a rate of 11 lbs. per 1,000 sf. or as determined by a soil test. Any bare, dead or damaged lawn areas shall be re-seeded in accordance with the original procedures as outlined in the Soil Erosion and Sediment Control Plans using the same mix and seeding rates. Stabilization of bare or damaged areas shall be done in a timely fashion so as to avoid exposing the soil to erosion.

If season prevents the re-establishment of turf cover, exposed areas should be stabilized with straw or salt hay mulch as described in the Soil Erosion and Sediment Control Plans until permanent seeding can be done. Seeding can be done between March 15th and June 15th and between September 15th and December 1st, only if adequate water is provided.

The shrubs around the basins should also be maintained in order to promote a neat appearance and healthy, vigorous growth. All shrubs should be allowed to grow together in masses as shown on the plans and not pruned into individual plants. The planting beds should be mulched with hardwood mulch every two (2) years in order to provide a suitable growing medium for the shrubbery and to retain moisture around the root zones.

Pruning of shrubs should also be done on a regular basis to maintain the shape and appearance of the shrub masses. The height of the shrubs may vary according to the plants natural growth habits, but should not exceed 6-feet. Pruning should be done as necessary throughout the year to remove dead branches and to control new growth. Any pruning, other than the removal of dead branches, should be done

in either late winter/early spring or after the shrub has flowered in the spring.

In the event that a shrub should experience more than 2/3 die back, it should be replaced in kind as soon as possible in either the spring or fall planting season. The replacement shrub should be the same species as the original and installed at the size and condition as specified on the original landscape plans. If, for any reason, a substitution of species or size must be made, it shall be subject to the approval of the project Landscape Architect.

The trees surrounding the basin areas shall be maintained regularly to ensure good health and exhibit an attractive appearance. Their maintenance should include fertilization twice annually, with one application in the spring and another in early fall. The trees shall be pruned in the late winter or early spring. However, dead branches should be removed as soon as they are noticed. Care should be taken to avoid cutting off the central leader of a tree if one is present.

If a tree is severely damaged or experiences more than 2/3 die back, it should be replaced in either the spring or fall planting season, whichever comes first. The only exception to this is if the replacement tree has a fall transplanting hazard. Replacement trees should be planted at the same size and condition as specified on the landscape plans. Any tree or shrub maintenance, tree pruning or plant material substitution of species or size shall be subject to the approval of the project Landscape Architect.

- c) **Control of Weeds** – Although a regular grass maintenance program will minimize weed intrusion, some weeds will appear. Periodic weeding, either chemically or mechanically, will help to maintain a healthy turf, and keep grassed areas looking attractive. Application of chemicals should be minimized and monitored closely so as not to affect the ecosystems within the detention basin. Excessive growth of weeds within the basin can be controlled mechanically as discussed in the previous section.

The recording of all maintenance work and inspections provide valuable data on the facility's condition. Review of this information will also help

to establish more efficient and beneficial maintenance procedures and practices. As the owner is ultimately responsible for site maintenance, all recorded information should be directed to the owners of the basins for review and subsequent follow-up on recommendations. Data obtained from informal inspections should be retained; however, under current regulations, this data does not have to be submitted to NJDEP.

Preventative Maintenance Actions

Frequency	Preventative Maintenance Actions	Stormwater Measures/ No.
Monthly	Vegetation mowing and removal in growing season	-
Quarterly	Quarterly inspection (Sediment removal, depending on the type of measure)	e.g., Discharge Point #1 & 2, Outlet Structure #1-9, onsite inlets
Semiannual	Clean, sediment removal, depending on the type of measure Inspection of water quality units	e.g., Basin #1 & #2, PPA #1-7, First Defense Units
Annual	Basin Structural Inspection	e.g., Basins #1 & 2, PPA #1-7, Outlet Structure #1-9
Unscheduled	Quick inspection after every 1" rain	All Stormwater Management Measures

Corrective Maintenance Actions

Potential Corrective Maintenance Actions	Stormwater Management Measures/No.
Repair/replacement of eroded or damaged riprap scour hole	e.g., Basins #1 & 2
Repair/Replacement of outlet pipes or orifices	e.g., Basins #1 & 2
Repair/Replacement of Stormwater Manufactured Treatment Devices	First Defense Units

Inspection and Logs of All Preventative and Corrective Maintenance

As per N.J.A.C. 7:8-5.8(f), the person responsible for maintenance shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.

As per NJDEP BMP Manual Ch. 8 (Feb, 2004), a maintenance plan shall include a schedule of regular inspections and tasks, and detailed logs of all preventative and corrective maintenance performed on the stormwater management measure, including all maintenance-related work orders. The person with maintenance responsibility must retain and, upon request, make available the maintenance plan and associated logs and other records for review by a public entity with administrative, health, environmental, or safety authority over the site.

Inspection Checklists in the Field Manual for the stormwater management measures on this site include:

- “Maintenance Work Order and Checklist” – a comprehensive form outlining both required and completed maintenance work.
- “Maintenance Log” – a summary table for recording of all maintenance work at the site.
- “Inspection Log” – a summary table for recording the results of all inspections of the basins.

The logs of all inspections, and both preventative and corrective maintenance performed should be attached in the “**Maintenance Logs and Inspection Records**” section. See Part II of the Maintenance Plan

Maintenance Personnel, Equipment, Tools, and Supplies

As per NJDEP BMP Manual Ch. 8 (Feb. 2004), maintenance plans should include equipment, tools, and supplies necessary to perform the various preventative and corrective maintenance tasks specified in the plan. Sources of specialized, proprietary, and nonstandard equipment, tools, and supplies should also be provided.

This section applies to both maintenance tasks that are performed by in-house personnel or are outsourced. The design engineer has to list the required amount of maintenance personnel, equipment, tools, and supplies necessary to perform the various preventative and corrective maintenance tasks specified in the plan. In addition, the sources of specialized, proprietary, and nonstandard equipment, tools and supplies for specific measures, such as manufactured treatment devices should also be listed.

Maintenance Personnel/Equipment/Tools/Supplies

Personnel/Equipment/Tools Name	Quantity
General Maintenance Crew	4
General Landscape Equipment	1
Vacuum Truck	1
Power Washer	1

Specialized, proprietary or nonstandard equipment, tools and supplies, if applicable

Name of the specialized, proprietary or nonstandard equipment, tools and supplies	Source

Disposal Plan

As per NJDEP BMP Manual Ch. 8 (Feb. 2004), the maintenance plan should include approved disposal and recycling sites and procedures for sediment, trash, debris and other material removed from stormwater management measures during maintenance operations.

Disposal Field – Onsite

Location of the Onsite Disposal Field:

A trash enclosure and maintenance shed is located to the west of the QuickChek building on proposed lot 1 and a trash enclosure is to located

Disposal Field – Offsite

Description of the Offsite Disposal:

Private hauler handles disposal, unloading and covering offsite

Cost Estimate

As per N.J.A.C.7:8-5.8(b), cost estimates of maintenance tasks, including, but not limited to, sediment, trash and debris removal must be included in the maintenance plan. Below is an illustration of a cost breakdown and estimation for maintenance of stormwater management measures. The design engineer should estimate the cost based on the expected maintenance required for each stormwater management measure. The actual costs may vary with factors such as local requirements, equipment, personnel, weather, and maintenance methods.

COST ESTIMATES

Opinion of Probable Annual Stormwater Management Maintenance Costs

Item	Description	Rate	Unit	Total Units	Frequency Per Year	Item Total
1	Mowing	\$100.00	Acre	1.38	35	\$4,830.00
2	Landscape Maintenance	\$400.00	Acre	1.38	2	\$1,104.00
3	Landscape Maintenance Materials	\$1,200.00	Acre	1.38	2	\$3,312.00
4	General Maintenance	\$500.00	L/S	1	2	\$1,000.00
5	Preventative Maintenance	\$2,000.00	L/S	1	1	\$2,000.00
6	Corrective Maintenance (every 5 years)	\$10,000.00	L/S	1	0.2	\$2,000.00
7	Engineering Inspection	\$500.00	L/S	1	6	\$3,000.00
8	Parking Lot Sweeping	\$50.00	Acre	2.18	12	\$1,308.00
9	Trash Collection	\$50.00	Day	1	365	\$18,250.00
10	First Defense Units	\$5,000.00	L/S	2	1	\$10,000.00
Estimated Annual SWM Maintenance Cost						\$46,804.00
Estimated Annual Insurance Cost						\$ 500.00
Total Estimated Annual SWM Maintenance Costs						\$47,304.00

The responsible party shall review and updated this “Opinion of Probable Annual Stormwater Management Maintenance Costs” table at least once annually. The update shall reflect the task items and quantity to be performed, the cost for each task item, and the frequency.

Safety Measures and Procedures

All maintenance activities must comply with all local, state and federal regulations regarding occupational safety. These include but are not limited to the following:

1. N.J.A.C. 7:26G-1 – Hazardous Waste Regulations
2. N.J.A.C. 7:8 – Stormwater Management
3. O.S.H.A. Permit-Required Confined Spaces and all other OSHA regulations applicable to any work that is conducted on site

The stormwater inspection/maintenance company is required to follow the above referenced requirements. At this time the owner is anticipating using the following stormwater maintenance company:

Hiland Construction Services, Inc.
Hillsborough, New Jersey
(908) 281-5570

Training Plan and Records

As per NJDEP BMP Manual Ch. 8 (February 2004), maintenance training begins with a basic description of the purpose and function of the overall stormwater management measure and its major components. Such understanding will enable maintenance personnel to provide more effective component maintenance and more readily detect maintenance-related problems. Depending on the size, character, location, and components of each stormwater management measure, maintenance personnel may also require training in specialized inspection and maintenance tasks and/or the operation and care of specialized maintenance equipment. Training should also be provided in the need for and use of all required safety equipment and procedures.

I. Training Plan

Types of Training

- Mandatory Stormwater Management Basic Training and Field Manual Usage Training for new maintenance crews
- Occupational Safety Training
- Subcontractor training, if applicable
- OSHA Confined Space Entry Certification

Content of Training

- **Stormwater Management Basic Training**
 - Purposes and Functions of BMPs
 - Training Material
 - NJDEP Stormwater BMP Manual, Chapter Nine: Structural Stormwater Management Measures
 - Chapter 9.6 Manufactured Treatment Devices
 - Vegetation Care
 - Training Material
 - NJDEP Stormwater BMP Manual, Chapter Seven: Landscaping
(provides information on vegetation and landscaping for stormwater management measures)
 - Field Manual Usage Training
 - Training Material
 - Field Manuals attached to this Maintenance Plan
 - Equipment and Tools Operation Training
 - Training Material
 - Equipment or tool manufacturer's Operation & Maintenance Manual
 - Occupational Safety Training
 - Training Material
 - OSHA Confined Space Entry Certification
 - Equipment or tool manufacturer's Operation & Maintenance Manual

- More training information is available at NJ Stormwater.org (<http://www.nj.gov/dep/stormwater/training.htm>)

II. Training Records

Training attendance sheets should be attached by the responsible party after each training.

Annual Evaluation of the Effectiveness of the Plan

As per N.J.A.C. 7:8-5.8(g), the person responsible for maintenance shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.

The responsible party should evaluate the effectiveness of the maintenance plan by comparing the maintenance plan with the actual performance of the maintenance. The items to evaluate may include, but not limited to,

- Whether the inspections have been performed as scheduled;
- Whether the preventive maintenance has been performed as scheduled;
- Whether the frequency of preventative maintenance needs to increase or decrease;
- Whether the planned resources were enough to perform the maintenance;
- Whether the repairs were completed on time;
- Whether the actual cost was consistent with the estimated cost;
- Whether the inspection, maintenance, and repair records have been kept.

If actual performance of those items has been deviated from the maintenance plan, the responsible party should find the causes and implement solutions in a revised maintenance plan.

Annual Evaluation Records

Evaluator(s)	Date of Evaluation	Decision
		<input type="checkbox"/> Maintain current version OR <input type="checkbox"/> Revise current version Revision date _____ (also update the last revision date on the cover page) <input type="checkbox"/> Requires a new deed recording (also update the last recording information on the cover page)
		<input type="checkbox"/> Maintain current version OR <input type="checkbox"/> Revise current version Revision date _____ (also update the last revision date on the cover page) <input type="checkbox"/> Requires a new deed recording (also update the last recording information on the cover page)
		<input type="checkbox"/> Maintain current version OR <input type="checkbox"/> Revise current version Revision date _____ (also update the last revision date on the cover page) <input type="checkbox"/> Requires a new deed recording (also update the last recording information on the cover page)

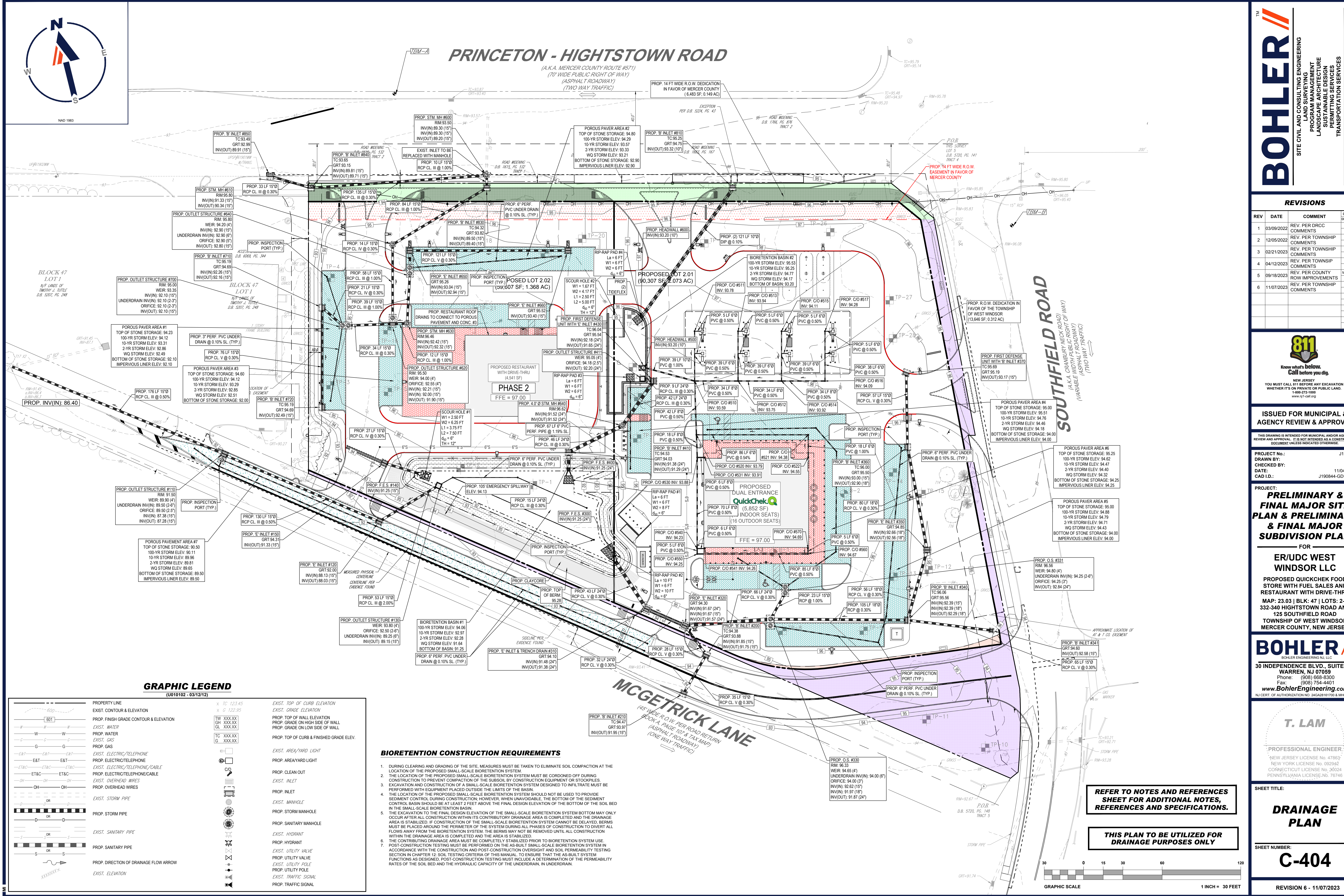
Documents

- Drainage Plan, prepared by Bohler Engineering, dated November 04, 2022, last revised November 07, 2023
- Stormwater Investigation, prepared by Melick-Tully & Associates, dated August 30, 2021
- Supplemental Stormwater Investigation, prepared by GZA, dated July 12, 2022



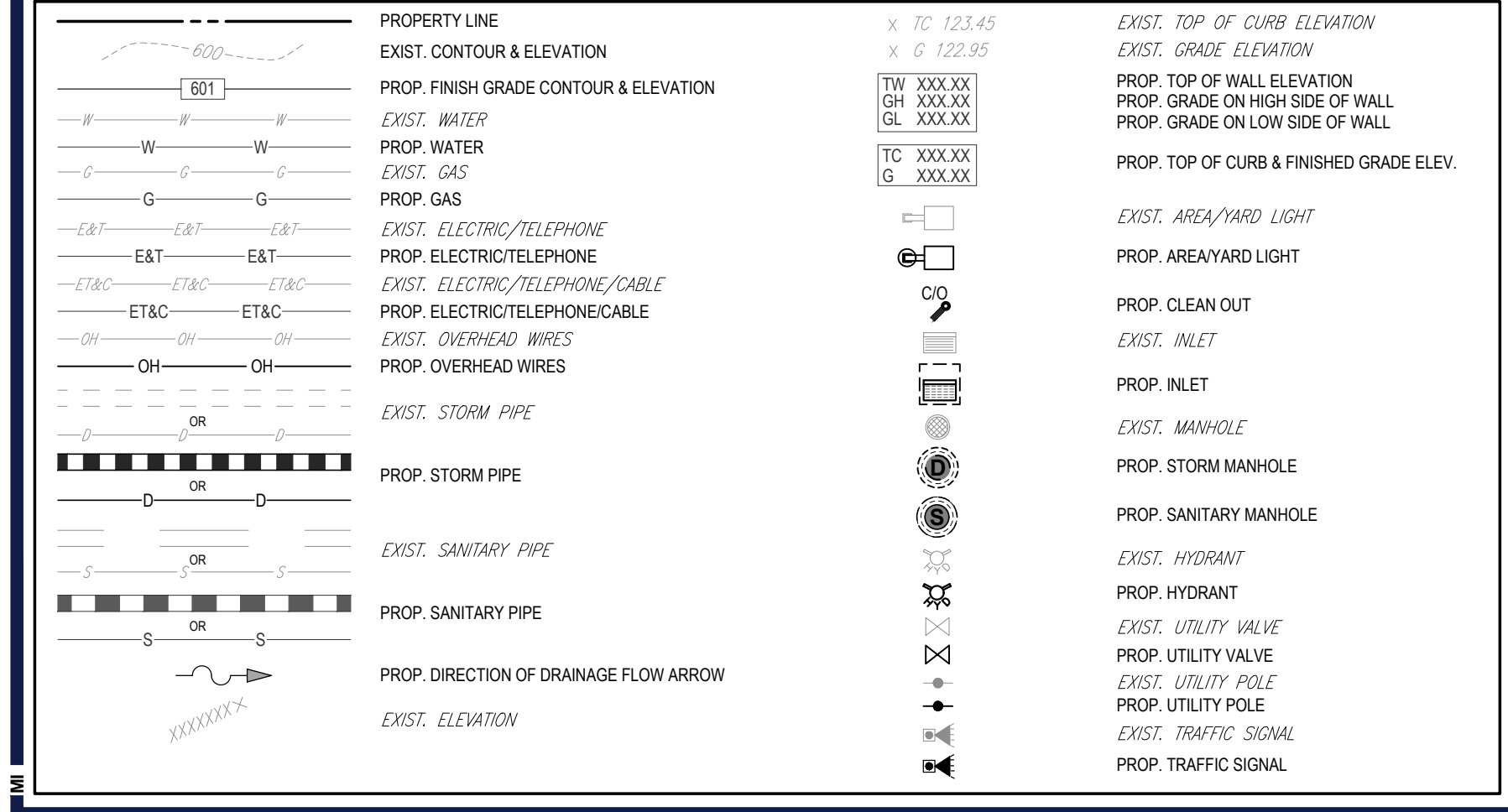
PRINCETON - HIGHTSTOWN ROAD

(A.K.A. MERCER COUNTY ROUTE #571)
(70' WIDE PUBLIC RIGHT OF WAY)
(ASPHALT ROADWAY)
(TWO WAY TRAFFIC)



GRAPHIC LEGEND

(U010102 - 03/12/12)

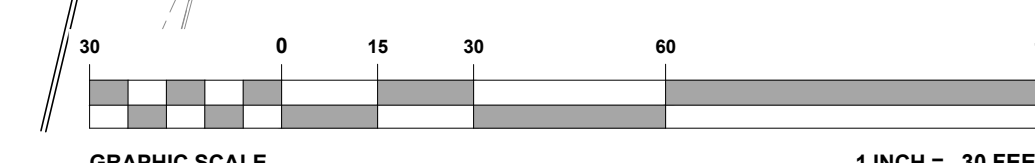


BIORETENTION CONSTRUCTION REQUIREMENTS

- DURING CLEARING AND GRADING OF THE SITE, MEASURES MUST BE TAKEN TO ELIMINATE SOIL COMPACTION AT THE LOCATION OF THE PROPOSED SMALL-SCALE BIORETENTION SYSTEM.
- THE LOCATION OF THE PROPOSED SMALL-SCALE BIORETENTION SYSTEM MUST BE CORDONED OFF DURING CONSTRUCTION TO PREVENT COMPACTION OF THE SUBSOIL BY CONSTRUCTION EQUIPMENT OR STOCKPILES.
- EXCAVATION AND CONSTRUCTION OF A SMALL-SCALE BIORETENTION SYSTEM DESIGNED TO INFILTRATE MUST BE PERFORMED WITH EQUIPMENT PLACED OUTSIDE THE LIMITS OF THE BASIN.
- THE LOCATION OF THE PROPOSED SMALL-SCALE BIORETENTION SYSTEM SHOULD NOT BE USED TO PROVIDE SEDIMENT CONTROL DURING CONSTRUCTION; HOWEVER, WHEN UNAVOIDABLE, THE BOTTOM OF THE SEDIMENT CONTROL BASIN SHOULD BE AT LEAST 2 FEET ABOVE THE FINAL DESIGN ELEVATION OF THE BOTTOM OF THE SOIL BED IN THE SMALL-SCALE BIORETENTION BASIN.
- THE EXCAVATION TO THE FINAL DESIGN ELEVATION OF THE SMALL-SCALE BIORETENTION SYSTEM BOTTOM MAY ONLY OCCUR AFTER ALL CONSTRUCTION WITHIN ITS CONTRIBUTORY DRAINAGE AREA IS COMPLETED AND THE DRAINAGE AREA IS STABILIZED. IF CONSTRUCTION OF THE SMALL-SCALE BIORETENTION SYSTEM CANNOT BE DELAYED, BERMS MUST BE PLACED AROUND THE PERIMETER OF THE SYSTEM DURING ALL PHASES OF CONSTRUCTION TO DIVERT ALL FLOWS AWAY FROM THE BIORETENTION SYSTEM. THE BERMS MAY NOT BE REMOVED UNTIL ALL CONSTRUCTION WITHIN THE DRAINAGE AREA IS COMPLETED AND THE AREA IS STABILIZED.
- THE CONTRIBUTING DRAINAGE AREA MUST BE COMPLETELY STABILIZED PRIOR TO BIORETENTION SYSTEM USE.
- POST-CONSTRUCTION TESTING MUST BE PERFORMED ON THE AS-BUILT SMALL-SCALE BIORETENTION SYSTEM IN ACCORDANCE WITH THE CONSTRUCTION AND POST-CONSTRUCTION OVERSIGHT AND SOIL PERMEABILITY TESTING SECTION IN CHAPTER 12. SOIL TESTING CRITERIA OF THIS MANUAL, TO ENSURE THAT THE AS-BUILT SYSTEM FUNCTIONS AS DESIGNED. POST-CONSTRUCTION TESTING MUST INCLUDE A DETERMINATION OF THE PERMEABILITY RATES OF THE SOIL BED AND THE HYDRAULIC CAPACITY OF THE UNDERDRAIN, IN UNDERDRAIN.

REFER TO NOTES AND REFERENCES SHEET FOR ADDITIONAL NOTES, REFERENCES AND SPECIFICATIONS.

THIS PLAN TO BE UTILIZED FOR DRAINAGE PURPOSES ONLY



BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
TRANSPORTATION SERVICES

REVISIONS				
REV	DATE	COMMENT	CHECKED BY	DRAWN BY
1	03/09/2022	REV. PER DRCC COMMENTS	CPR	TXL
2	12/05/2022	REV. PER TOWNSHIP COMMENTS	CPR	TXL
3	02/21/2023	REV. PER TOWNSHIP COMMENTS	CPR	TXL
4	04/12/2023	REV. PER TOWNSHIP COMMENTS	MED	TXL
5	09/18/2023	REV. PER COUNTY ROW IMPROVEMENTS	MAI	TXL
6	11/07/2023	REV. PER TOWNSHIP COMMENTS	MAI	TXL

811
Know what's below. Call before you dig.
NEW JERSEY
YOU MUST CALL 811 BEFORE ANY EXCAVATION WHETHER IT'S ON PRIVATE OR PUBLIC LAND.
1-800-272-1000
www.nj.gov/811

ISSUED FOR MUNICIPAL & AGENCY REVIEW & APPROVAL

THIS DRAWING IS INTENDED FOR MUNICIPAL AND AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.: J190844
DRAWN BY: CPR
DATE: 11/02/2021
CAD ID: J190844-GDUL-6A

PRELIMINARY & FINAL MAJOR SITE PLAN & PRELIMINARY & FINAL MAJOR SUBDIVISION PLAN

FOR
ER/UDC WEST WINDSOR LLC
PROPOSED QUICKCHEK FOOD STORE WITH FUEL SALES AND RESTAURANT WITH DRIVE-THRU
MAP: 23.03 | BLK: 47 | LOTS: 2-6
332-340 HIGHTSTOWN ROAD AND 125 SOUTHFIELD ROAD
TOWNSHIP OF WEST WINDSOR
MERCER COUNTY, NEW JERSEY

BOHLER
BOHLER ENGINEERING NJ, LLC
30 INDEPENDENCE BLVD., SUITE 200
WARREN, NJ 07059
Phone: (908) 685-6300
Fax: (908) 754-4401
www.BohlerEngineering.com
NJ CERT. OF AUTHORIZATION NO. 246A28191700 & M6000122

T. LAM
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE NO. 47862
NEW YORK LICENSE NO. 0292942
CONNECTICUT LICENSE NO. 30024
PENNSYLVANIA LICENSE NO. 76748

SHEET TITLE:
DRAINAGE PLAN
SHEET NUMBER:
C-404
REVISION 6 - 11/07/2023



Melick-Tully
& Associates

A Division of GZA



STORMWATER INVESTIGATION

Proposed Quick Chek Food Store and Restaurant

**West Windsor, Mercer County, New Jersey
ER/UDC West Windsor, LLC**

August 30, 2021

File No. 26.0092434.00

PREPARED FOR:

ER/UDC West Windsor, LLC

P. O. Box 391

Williston, Vermont 05493

Melick-Tully & Associates, A Division of GZA

117 Canal Road

South Bound Brook, NJ 08880

732-356-3400

GZA has 32 Offices Nationwide

www.melick-tully.com www.gza.com

Copyright© 2019 GZA GeoEnvironmental, Inc.



Melick-Tully
& Associates

A Division of GZA

GEOTECHNICAL

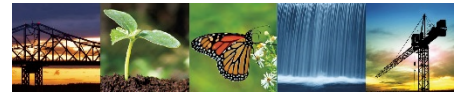
ENVIRONMENTAL

ECOLOGICAL

WATER

CONSTRUCTION
MANAGEMENT

117 Canal Road
South Bound Brook, NJ 08880
T: 732.356.3400
www.melick-tully.com
www.gza.com



August 30, 2021
File No. 26.P000237.22

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

Attention: Mr. Larry Harder

Report
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 stormwater investigation completed by Melick-Tully & Associates, a Division of GZA GeoEnvironmental, Inc. (MTA) 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 June 30, 2021.

Proposed Construction

A site layout plan provided to us indicates 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 with a finish floor elevation of +97.00 feet. 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 approximately 4,541 square feet in plan area with a drive-thru would be constructed with a finish floor elevation of +96.50 feet. The building would be located on the west 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 management facilities are currently planned. These currently include seven above-ground stormwater management basins, seven areas of porous asphalt pavement below proposed car parking areas on both developments, and porous concrete pavements adjacent to the two structures.

Purpose and Scope of Work

The purpose of our services was to:

- 1) explore the subsurface soil and groundwater conditions via test pits and borings in accessible portions of the proposed development;
- 2) collect tube samples of the soil layers encountered from all proposed test pit locations for laboratory tube permeameter permeability testing;
- 3) perform cased borehole permeability testing at selected locations; and
- 4) prepare a brief summary report of our findings for use by the basin designer in their evaluation of the stormwater improvements.

To accomplish these purposes, a subsurface exploration program consisting of 28 supervised test pit excavations and two test borings were performed at the site in the locations of proposed stormwater management facilities shown on Bohler's preliminary site plan dated April 27, 2021. The test pits were advanced using a track-mounted excavator (CAT 308) and extended to depths of 12 to 13 feet below existing



surface grades. The test borings were advanced using a geoprobe with continuous core sampling and extended to depths of 10 feet below grade. A cased borehole permeability test was performed adjacent to each boring following completion at depths of 2 and 8.5 feet below grade. The locations of the explorations 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 geotechnical engineer from MTA. Our representative located the explorations in the field, supervised the soil sampling operations, maintained continuous logs of the explorations as the work proceeded, and obtained samples of the materials encountered in the explorations for identification purposes. We also obtained relatively undisturbed tube samples from the test pits for laboratory tube permeameter permeability testing and performed cased borehole permeability testing adjacent to each boring.

Detailed descriptions of the encountered subsurface conditions are described on the Test Pit Logs, Plates 3-1 through 3-28, and Test Boring Logs, Plates 4-1 and 4-2. The soils were visually classified in general accordance with the procedures of the United States Department of Agriculture Soil Classification System (USDA) described on Plate 5.

All soil samples were brought to our office, and selected samples were subjected to laboratory grain-size and tube permeameter permeability testing. The results of the gradation testing are presented on Plates 6-1 and 6-2, while the permeability test results are presented on Plate 7.

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



Site Conditions

Surface Features: The site contains five separate lots (Lots 2 through 6). Lot 2 consists of a one-story masonry building with a basement and a paved parking lot to the west. Lot 3 consists of a two-story frame building and a detached frame garage. Lot 4 consists of a two-story frame building and a detached one-story garage structure. Lot 5 consists of a one-story frame building with a detached frame garage. And Lot 6 consists of a one-story frame building to the west and previously consisted of a one-story frame building to the southeast, which had already been demolished at the time of our investigation. Grass lawns with trees, bushes, and driveways cover the surface between the buildings. Princeton-Hightstown Road borders the property to the north, Southfield Road to the east, and McGetrick Lane to the south.

Topographic information shown on the plans provided to us indicates that the ground surface elevations slope downward from approximately Elevation +96 feet in the northeast to approximately Elevation +93 in the western and southern portions of the site.

Subsurface Conditions: Approximately 2 inches of asphalt pavement was encountered at the surface in Test Pits 16 and 19. Fill was encountered at the surface in Test Pits 10 and 11. The remaining test pits were performed in grass lawn areas where approximately 3 to 26 inches of topsoil was encountered. Fill was also encountered below the surface materials in Test Pits 16, 17, 21, and 22. Fill thicknesses varied from about 1.3 feet to 5.8 feet and typically consisted of sandy loam, sandy clay loam, and clay soils. The surface and fill materials were underlain by interlayered sand, loamy sand, sandy loam, sandy clay loam, clay loam, and clay soils. Generally, clayey soils were encountered near the surface while sandier soils were encountered at deeper depths.



Groundwater seepage was observed in 17 of the test pits (Test Pits 1 through 16, and 20) at depths of approximate 9.5 to 13 feet below grade, corresponding approximately to elevations ranging from +81 feet to +84.5 feet. In addition, groundwater levels were obtained in five wells installed on August 12, 2021 for an environmental baseline on the proposed Quick Chek property. Depths to groundwater varied from approximately 7.7 to 10.8 feet in the wells, corresponding approximately to elevations ranging from +84.2 feet and +85.6 feet. Mottling, which is indicative of seasonally saturated conditions, was observed in the test pits at depths ranging from 7 to 108 inches below grade. In addition, the sidewalls in some of the test pits collapsed during excavation within a few feet of the observed groundwater seepage levels, suggesting groundwater levels in those test pits are likely near sidewall caving depths.

Permeability Test Results

Laboratory tube permeameter permeability tests were performed on tube samples of the subsoils collected below the proposed stormwater management facilities in each test pit. The permeability tests indicate that the deeper sandy subsoils (sand, loamy sand, and sandy loam) generally exhibited permeabilities of 1 inch per hour to greater than 20 inches per hour, while the surficial silty and clayey soils (sandy clay loam, loam, clay loam, and clay) generally exhibited permeability of less than 1 inch per hour, and often less than 0.06 inches per hour. The laboratory tube permeability tests are summarized on Plate 7.

Cased borehole permeability testing was performed below proposed porous concrete pavement areas around the proposed Quick Chek building. Field permeability tests were performed in Boring 1 at a depth of 3.3 feet below grade and in Boring 2 at a depth of 8.5 feet below grade. The field permeability tests indicate that the silty clay soils in Boring 1 and loamy sand soils in Boring 2 exhibited permeabilities of less than 0.06



inches per hour. It is possible that the bottom of the cased borehole test for Boring 2 was at or near the groundwater level which may explain the slow rate observed even though the soils were sandy.

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 3-1 through 3-28 – Test Pit Logs
- Plates 4-1 and 4-2 – Test Boring Logs
- Plate 5 – USDA Soil Textural Triangle
- Plates 6-1 and 6-2 – Gradation Curves
- Plate 7 – Summary of Laboratory Tube Permeameter Permeability Test Results
- Appendix – Limitations

Respectfully submitted,

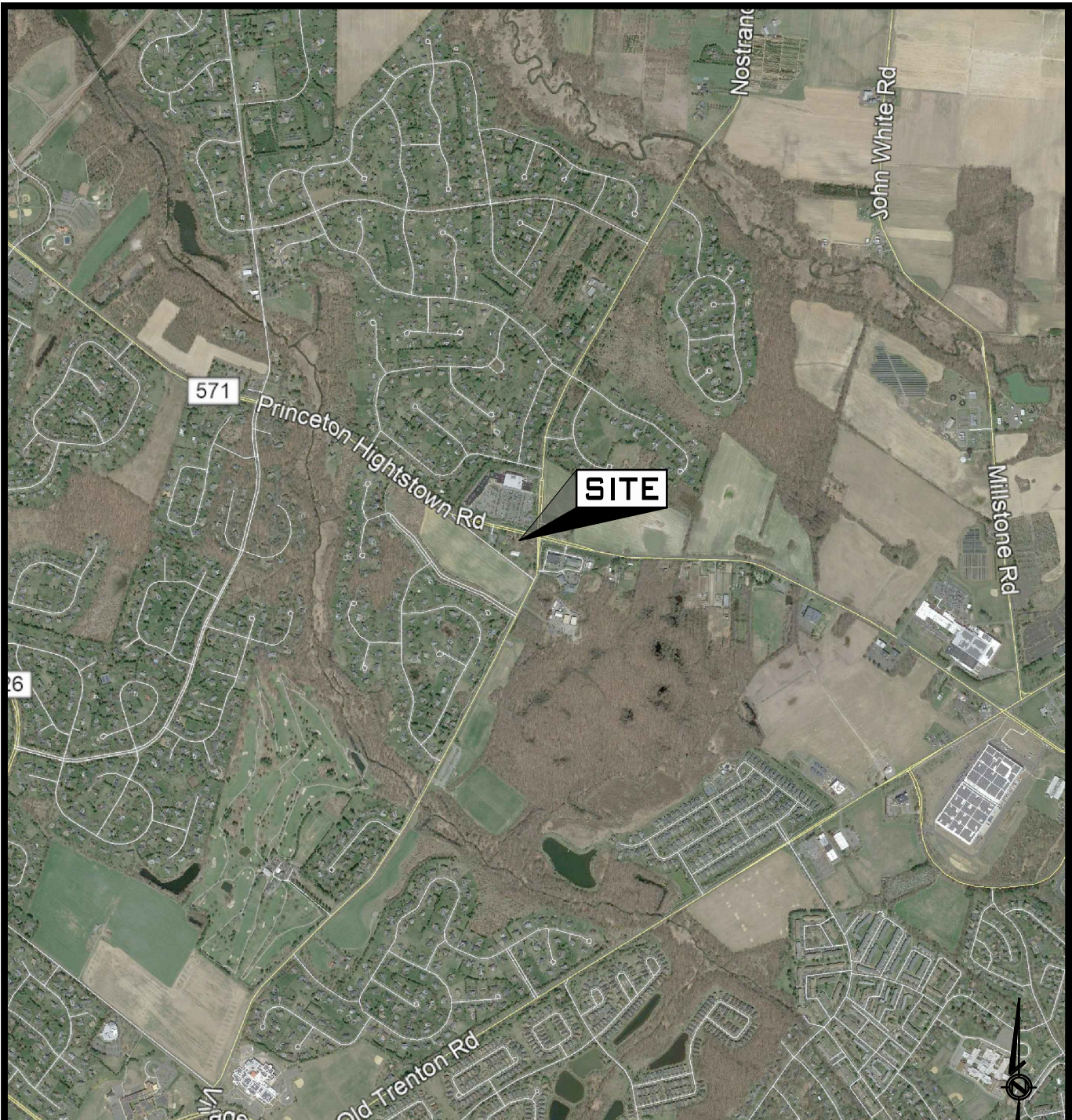
MELICK-TULLY and ASSOCIATES,
a Division of GZA GeoEnvironmental, Inc.

Cory S. Karinja, P.E.
Project Manager

Eugene M. Gallagher, Jr., P.E.
Principal

Mark R. Denno, P.E.
Consultant/Reviewer

CSK:EMG/mh
(1 copy submitted via e-mail)



Aerial Photo courtesy of Google Earth Pro

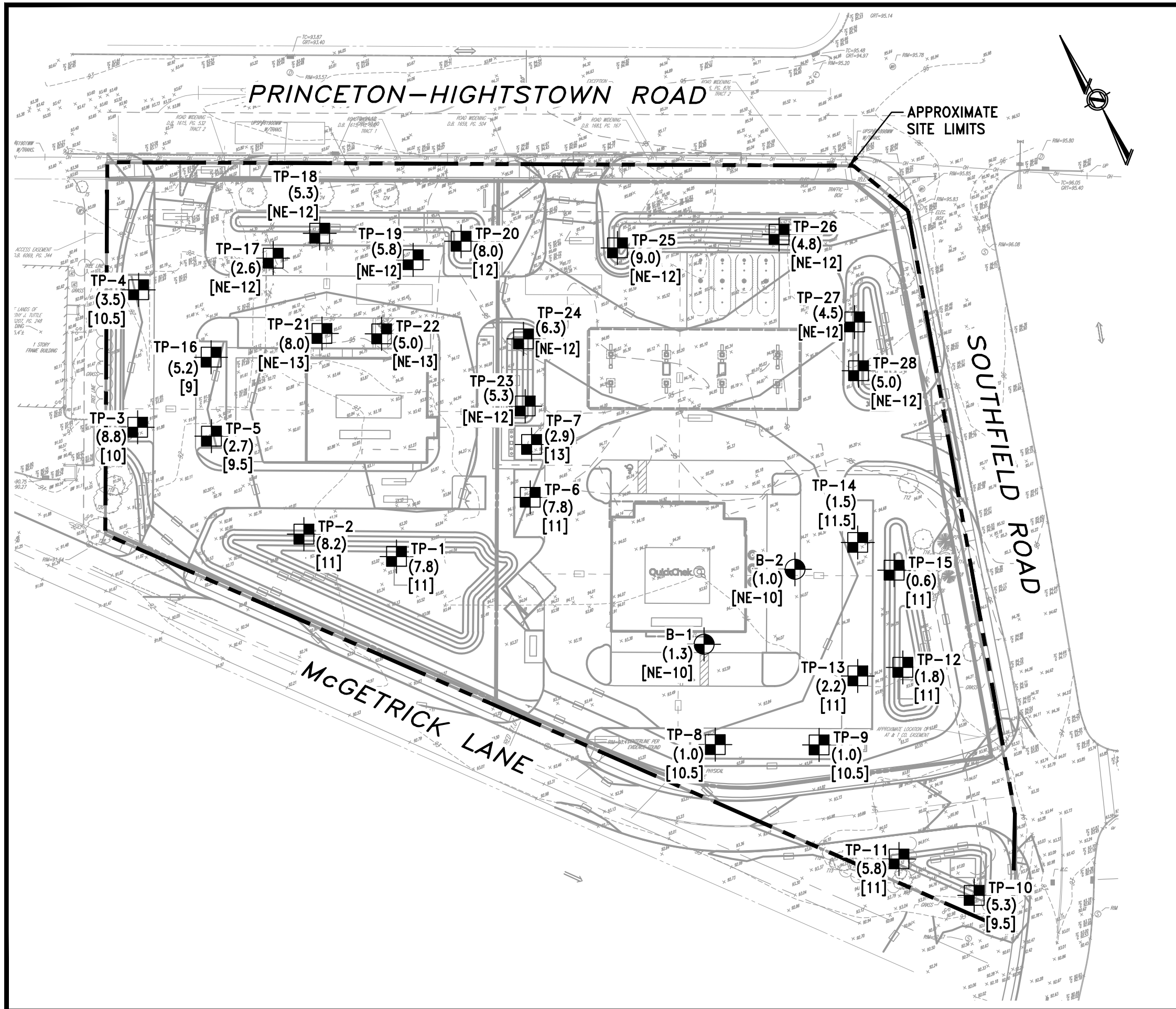


MELICK-TULLY AND ASSOCIATES
A Division of GZA
 Geotechnical Engineers & Environmental Consultants
 117 Canal Road
 South Bound Brook, New Jersey 08880
 (732) 356-3400

SITE LOCATION MAP

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

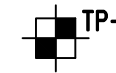
JOB NO. 26.0092434.00	FILE NO. -	DR. BY VJD	CHK. BY CSK	DATE 8/5/21	SCALE 1"=2,000'	PLATE 1
---------------------------------	----------------------	----------------------	-----------------------	-----------------------	---------------------------	-------------------



KEY:



B-1 NUMBER AND APPROXIMATE LOCATION OF BORINGS PERFORMED FOR THIS STUDY



TP-1 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

(1.0)

APPROXIMATE DEPTH IN FEET TO SOIL MOTTLING BELOW THE EXISTING GROUND SURFACE

[10]

APPROXIMATE DEPTH IN FEET TO GROUNDWATER BELOW THE GROUND SURFACE

NE

NOT ENCOUNTERED

NOTES:

1. This drawing is part of Melick-Tully and Associates, a Division of GZA, Report No. 26.0092434.00 and should be read together with the report for complete evaluation.
2. General layout was obtained from a drawing prepared by Bohler Eng., entitled "Grading Plan" dated 4/28/20 (revised 4/27/21), scale 1"= 30'.

PLOT PLAN

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



MELICK-TULLY AND ASSOCIATES
A Division of GZA
Geotechnical Engineers & Environmental Consultants
117 Canal Road
South Bound Brook, New Jersey 08880
(732) 356-3400

JOB NO.

26.0092434.00

FILE NO.

-

DR. BY
VJD

CHK. BY
CSK

DATE
8/5/21

SCALE
1"= 60'

PLATE
2

TEST PIT LOG



**MTA, a Division of GZA
GeoEnvironmental, Inc**
Engineers and Scientists

**East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ**

**EXPLORATION NO.: TP-1
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja**

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12.5

Ground Surface Elev. (ft.): 93

Date Start - Finish: 7/26/2021 - 7/26/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/26/21		11	

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, 5/3) sandy loam, 10% gravel, moderate medium granular, slightly moist, friable, abrupt smooth boundary, common medium roots	1		
2			12-27	Light yellowish brown (10YR, 6/4) sandy clay loam, 5% gravel, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary	2		
3	S2, T2	3	27-42	Dark yellowish brown (10YR, 4/6) sandy loam, 30% gravel, 10% cobbles, moderate medium granular, slightly moist, friable, clear smooth boundary	3		
4			42-94	Strong brown (7.5YR, 5/8) sandy loam, moderate medium granular, slightly moist, friable, clear smooth boundary	4		
5	S3, T3	5.5		Yellowish brown (10YR, 5/6) sandy clay loam, 5% gravel, moderate medium crumb, wet, friable, common medium prominent light gray (10YR, 7/1) mottles encountered from 94 inches to 150 inches	5		
6					6		
7	S4, T4	9	94-150	End of exploration at 12.5 feet. Moderate groundwater seepage encountered @ 11' Soil mottling observed @ 94"	7		
8					8		
9					9		
10					10		
11				Note: Sidewalls caving below 10'	11		
12					12		
13							
14							
15							

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.: 3-1

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-2
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12.5

Ground Surface Elev. (ft.): 93

Date Start - Finish: 7/26/2021 - 7/26/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/26/21		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark	
1	S1, T1	1	0-10	Topsoil - Brown (10YR, 5/3) sandy loam, moderate medium granular, slightly moist, friable, abrupt smooth boundary, common medium roots	1			
2			10-23	Light yellowish brown (10YR, 6/4) sandy clay loam, 25% gravel, moderate medium crumb, slightly moist, friable, clear smooth boundary, few medium roots	2			
3	S2, T2	3	23-55	Yellowish brown (10YR, 5/6) sandy loam, 35% gravel, 10% cobbles, moderate medium granular, slightly moist, friable, clear smooth boundary	3			
4						4		
5	S3, T3	6	55-98	Light yellowish brown (10YR, 6/4) sandy loam, 10% gravel, moderate medium granular, moist, friable, clear smooth boundary	5			
6						6		
7						7		
8						8		
9	S4, T4	10	98-150	Yellowish brown (10YR, 5/6) sandy clay loam, 15% gravel, moderate medium crumb, wet, friable, common medium prominent light gray (10YR, 7/1) mottled encountered from 98 inches to 150 inches	9			
10						10		
11						11		
12					12			
13				End of exploration at 12.5 feet. Moderate groundwater seepage encountered @ 11' Soil mottling observed @ 98"				
14								
15								

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.: 3-2

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-3
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 13

Ground Surface Elev. (ft.): 91

Date Start - Finish: 7/26/2021 - 7/26/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/26/21		10	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2	0-7	Topsoil - Brown (10YR, 6/3) sandy loam, moderate medium granular, slightly moist, loose, abrupt smooth boundary, common medium roots	1		
2			7-38	Yellowish brown (10YR, 5/4) clay loam, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary	2		
3	S2, T2	4	38-64	Yellowish brown (10YR, 5/6) loamy sand, 25% gravel, moderate medium granular, slightly moist, friable, clear smooth boundary	3		
4					4		
5	S3, T3	7	64-106	Light brownish gray (10YR, 6/2) loamy sand, strong medium granular, slightly moist, loose, clear smooth boundary	5		
6					6		
7					7		
8	S4, T4	10	106-156	Yellowish brown (10YR, 5/6) sandy clay loam, 30% gravel, moderate medium granular, wet, friable, common medium prominent light gray (10YR, 7/1) mottles encountered from 106 inches to 156 inches	8		
9					9		
10					10		
11					11		
12					12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 10' Soil mottling observed @ 106"			
15							

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.: 3-3

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-4
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Final Test Pit Depth (ft.): 13
Ground Surface Elev. (ft.): 92
Date Start - Finish: 7/26/2021 - 7/26/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/26/21		10.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2	0-7	Topsoil - Brown (10YR, 5/3) sandy loam, moderate medium granular, slightly moist, loose, abrupt smooth boundary, common medium roots	1	16.6	
2			7-42	Yellowish brown (10YR, 5/4) clay loam, moderate medium subangular blocky, moist, friable, clear smooth boundary, common fine faint light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 27 inches to 42 inches	2		
3	S2, T2	4	42-82	Light brownish gray (10YR, 6/2) sandy clay loam, moderate medium subangular blocky, slightly moist, firm, clear smooth boundary, many coarse prominent strong brown (7.5YR, 4/6) mottles encountered from 42 inches to 82 inches	3		
4					4		
5					5		
6	S3, T3	8	82-94	Light yellowish brown (10YR, 6/4) sandy loam, moderate medium granular, moist, friable, clear smooth boundary	6		
7					7		
8					8		
9	S4, T4	9	94-156	Light gray (10YR, 7/2) fine sandy loam, moderate coarse granular, moist, friable, many coarse prominent strong brown (7.5YR, 4/6) mottles encountered from 94 inches to 140 inches	9		
10	St	12			10		
11							
12					12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 10.5' Soil mottling observed @ 42"			
15							

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.: 3-4

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-5
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12

Ground Surface Elev. (ft.): 92

Date Start - Finish: 7/26/2021 - 7/26/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/26/21		9.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	1	0-7	Topsoil - Brown (10YR, 5/3) sandy loam, moderate medium granular, slightly moist, loose, abrupt smooth boundary, common medium roots	1		
2			7-27	Yellowish brown (10YR, 5/4) clay, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary	2		
3			27-32	Yellowish brown (10YR, 5/8) loamy sand, 10% gravel, moderate coarse granular, slightly moist, loose, abrupt smooth boundary	3		
4	S2, T2	4	32-105	Pale brown (10YR, 6/3) sandy loam, moderate medium granular, moist, friable, clear smooth boundary, common medium prominent light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 32 inches to 105 inches	4		
5							
6					6		
7					7		
8					8		
9					9		
10	S3, T3	10	105-144	Strong brown (7.5YR, 4/6) sandy loam, strong coarse granular, wet, loose	10		
11							
12					12		
13				End of exploration at 12 feet. Moderate groundwater seepage encountered @ 9.5' Soil mottling observed @ 32"			
14							
15							

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.: 3-5

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-6
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Final Test Pit Depth (ft.): 13
Ground Surface Elev. (ft.): 94
Date Start - Finish: 7/26/2021 - 7/26/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/26/21		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2	0-3	Topsoil - Brown (10YR, 6/3) sandy loam, moderate medium granular, slightly moist, loose, abrupt smooth boundary, common medium roots	1		
2			3-34	Yellowish brown (10YR, 5/6) clay, moderate medium subangular blocky, slightly moist, firm, clear smooth boundary	2		
3	S2, T2	4	34-64	Strong brown (7.5YR, 4/6) loam, 10% gravel, moderate medium granular, slightly moist, friable, clear smooth boundary	3		
4					4		
5	S3, T3	6	64-156	Strong brown (7.5YR, 4/6) loamy sand, moderate medium granular, slightly moist, friable, common medium prominent light gray (10YR, 7/1) mottles encountered from 93 inches to 156 inches	5		
6					6		
7					7		
8					8		
9	S4, T4	11			9		
10					10		
11					11		
12					12		
13				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 11' Soil mottling observed @ 93"	13		
14							
15							

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.: 3-6

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-7
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 13

Ground Surface Elev. (ft.): 94

Date Start - Finish: 7/26/2021 - 7/26/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/26/21		13	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-13	Topsoil - Brown (10YR, 5/3) silt loam, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary, common medium roots	1		
2	S1, T1	2	13-35	Yellowish brown (10YR, 5/6) sandy loam, 40% gravel, moderate coarse granular, friable, clear smooth boundary	2		
3					3		
4	S2, T2	4	35-80	Yellowish brown (10YR, 5/6) sandy loam, 40% gravel, moderate medium subangular blocky, moist, firm, clear smooth boundary, common medium prominent light gray (10YR, 7/1) mottles encountered from 35 inches to 80 inches	4	8.8	
5					5		
6					6		
7					7		
8	S3, T3	8	80-156	Light brownish gray (10YR, 6/2) sandy loam, moderate medium granular, moist, friable	8		
9					9		
10					10		
11					11		
12					12		
13	S4	13			13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 13' Soil mottling observed @ 35"			
15							

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.: 3-7

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-8
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 13

Ground Surface Elev. (ft.): 94

Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/27/21		10.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2.5	0-12	Topsoil - Brown (10YR, 5/3) sandy loam, 20% gravel, 10% cobbles, moderate medium granular, slightly moist, loose, abrupt smooth boundary, common fine roots	1		
2			12-54	Light yellowish brown (10YR, 6/4) clay loam, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary, common medium distinct strong brown (7.5YR, 4/6) and light gray (10YR, 7/1) mottles encountered from 12 inches to 54 inches	2		
3	S2, T2	5.5	53-75	Yellowish brown (10YR, 5/4) loam, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary, common medium distinct light gray (10YR, 7/1) mottles encountered from 53 inches to 75 inches	3		
4					4		
5	S3, T3	6.5	75-156	Yellowish brown (10YR, 6/8) loamy sand, 15% gravel, moderate medium granular, slightly moist, loose, common fine distinct light gray (10YR, 7/1) mottles encountered from 75 inches to 156 inches	5		
6					6		
7				- (wet)	7		
8					8		
9					9		
10					10		
11					11		
12					12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 10.5' Soil mottling observed @ 12"			
15				Note: Sidewalls collapsing below 9'			

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.: 3-8

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-9
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

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

Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)			
Date	Time	Water Depth	Stab.Time
7/27/21		10.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-12	Topsoil - Brown (10YR, 5/3) sandy loam, 15% gravel, moderate fine granular, slightly moist, loose, abrupt smooth boundary, common fine roots	1		
2			12-65	Brown (10YR, 5/3) silty clay loam, moderate medium subangular blocky, slightly moist, friable, diffuse smooth boundary, common medium distinct light gray (10YR, 7/1) and yellowish brown (10YR, 5/8) mottles encountered from 12 inches to 65 inches	2		
3	S1, T1	3			3		
4			65-156	Yellowish brown (10YR, 5/6) sandy loam, 20% gravel, strong coarse granular, slightly moist, loose, common medium prominent light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 65 inches to 156 inches	4		
5					5		
6	S2, T2	6			6		
7			- (wet)		7		
8					8		
9					9		
10					10		
11					11		
12					12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 10.5' Soil mottling observed @ 12"			
15				Note: Sidewalls collapsing below 8'			

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.: 3-9

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-10
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

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

Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator

Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/27/21		9.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2.5	0-64	Fill - Light yellowish brown (10YR, 6/4) sandy loam, 10% gravel, weak fine granular, slightly moist, friable, abrupt smooth boundary, common medium roots	1		
2							
3							
4	S2, T2	6	64-105	Strong brown (7.5YR, 4/6) loam, 20% gravel, moderate coarse granular, moist, loose, clear smooth boundary, common coarse prominent light gray (10YR, 7/1) mottles encountered from 64 inches to 105 inches	4		
5							
6							
7	S3, T3	10	105-156	Light brownish gray (10YR, 6/2) loamy sand, 20% gravel, strong coarse granular, wet, loose, many coarse distinct light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 105 inches to 156 inches	7		
8							
9							
10							
11							
12							
13							
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 9.5' Soil mottling observed @ 64"			
15							

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.: 3-10

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-11
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 13

Ground Surface Elev. (ft.): 94.5

Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/27/21		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1				Fill - Brown (10YR, 5/3) sandy clay loam, 20% gravel, 10% cobbles, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary, common medium roots	1		
2					2		
3	S1, T1	3	0-70		3		
4				Brown (10YR, 5/3) loam, 10% gravel, moderate medium granular, slightly moist, friable, clear smooth boundary, common medium distinct light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 70 inches to 98 inches	4		
5					5		
6	S2, T2	6.5	70-98		6		
7				Yellowish brown (10YR, 5/6) sandy loam, 10% gravel, moderate medium granular, wet, loose, common medium distinct light gray (10YR, 7/1) mottled encountered 98 inches to 156 inches	7		
8					8		
9	S3, T3	9	98-156		9		
10				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 11' Soil mottling observed @ 70"	10		
11					11		
12					12		
13				Note: Sidewalls caving below 10'	13		
14					14		
15					15		

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.: 3-11

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
 Prop. Quick Chek Food Store and Restaurant
 West Windsor, NJ

EXPLORATION NO.: TP-12
 SHEET: 1 of 1
 PROJECT NO: 26.0092434.00
 REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 13

Ground Surface Elev. (ft.): 94

Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab. Time
7/27/21		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	3	0-12	Topsoil - Brown (10YR, 5/3) sandy loam, weak medium granular, moist, loose, clear smooth boundary, common medium roots	1	9.3	
2			12-78	Yellowish brown (10YR, 5/6) clay, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary, common medium distinct light gray (10YR, 7/1) mottles encountered from 21 inches to 78 inches	2		
3	S2, T2	7.5	78-130	Brown (10YR, 5/3) sandy loam, 15% gravel, moderate medium subangular blocky, moist, friable, clear smooth boundary, common medium distinct light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 78 inches to 130 inches	3		
4				130-156	Yellowish brown (10YR, 5/8) sandy loam, moderate medium granular, wet, friable		
5	S3, T3	11	130-156	End of exploration at 13 feet. Moderate groundwater seepage encountered @ 11' Soil mottling observed @ 21"	5		
6							6
7					7		
8					8		
9					9		
10					10		
11					11		
12					12		
13					13		
14							
15							

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.: 3-12

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-13
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

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

Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator

Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/27/21		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-26	Topsoil - Brown (10YR, 5/3) sandy loam, 10% gravel, moderate medium crumb, moist, friable, abrupt smooth boundary, common medium roots	1		
2					2		
3	S1, T1	3	26-68	Yellowish brown (10YR, 5/4) clay, moderate medium subangular blocky, slightly moist, firm, clear smooth boundary, common medium prominent light gray (10YR, 7/1) mottles encountered from 26 inches to 68 inches	3		
4					4		
5					5		
6	S2, T2	6.5	68-105	Light brownish gray (10YR, 6/2) sandy loam, 20% gravel, moderate medium granular, moist, loose, clear smooth boundary	6		
7					7		
8					8		
9	S3, T3	9.5	105-156	Yellowish red (5YR, 4/6) sandy loam, 35% gravel, moderate coarse granular, moist, loose, common medium distinct light brownish gray (10YR, 6/2) mottles from 132 inches to 156 inches	9		
10					10		
11					11		
12					12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 11' Soil mottling observed @ 26"			
15							

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.: 3-13

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-14
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

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

Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator

Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/27/21		11.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-12	Topsoil - Brown (10YR, 5/3) sandy loam, moderate medium granular, moist, loose, clear smooth boundary, common medium roots	1		
2				Yellowish brown (10YR, 5/4) silty clay loam, strong coarse subangular blocky, slightly moist, firm, clear smooth boundary, common medium distinct light gray (10YR, 7/1) mottles encountered from 17 inches to 58 inches	2		
3	S1, T1	3	12-58		3		
4				Strong brown (7.5YR, 4/6) loamy sand, moderate coarse granular, moist, loose, clear smooth boundary	4		
5					5		
6	S2, T2	6	58-92		6		
7				Brownish yellow (10YR, 6/6) sandy loam, strong coarse granular, moist, loose, common medium distinct light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 92 inches to 156 inches	7		
8					8		
9	S3, T3	9			9		
10			92-156		10		
11				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 11.5' Soil mottling observed @ 12" Note: Sidewalls collapsing below 10.5'	11		
12					12		
13					13		
14							
15							

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.: 3-14

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-15
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 13

Ground Surface Elev. (ft.): 94

Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/27/21		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	3	0-7	Topsoil - Brown (10YR, 5/3) sandy loam, moderate fine crumb, moist, loose, abrupt smooth boundary, common medium roots	1		
2				Yellowish brown (10YR, 5/4) clay loam, moderate coarse subangular blocky, slightly moist, firm, clear smooth boundary, common medium distinct light gray (10YR, 7/1) mottles encountered from 7 inches to 65 inches	2		
3	S2, T2	6.5	7-65		3		
4					Yellowish brown (10YR, 5/6) sandy loam, moderate medium granular, moist, loose, clear smooth boundary	4	
5	S3, T3	9	65-98		5		
6					Light brownish gray (10YR, 6/2) sandy loam, moderate medium granular, moist, loose, many coarse prominent strong brown (7.5YR, 4/6) mottles encountered from 98 inches to 156 inches	6	
7			98-156		7		
8					8		
9					9		
10					10		
11					11		
12					12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 11' Soil mottling observed @ 7"			
15							

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.: 3-15

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-16
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 91.5

Final Test Pit Depth (ft.): 12
Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator

Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/27/21		9	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark	
1	S1, T1	1.5	0-2	2" Asphalt	1	4.1		
			2-15					
2	S2, T2	3	15-27	Yellowish brown (10YR, 5/6) sandy clay loam, moderate medium subangular blocky, moist, friable, clear smooth boundary	2			
3			27-62	Fill - Dark gray (10YR, 4/1) clay, 45% gravel, moderate coarse subangular blocky, slightly moist, firm, clear smooth boundary	3			
4	S3, T3	6	62-104	Yellowish brown (10YR, 5/6) sand, single grain, slightly moist, loose, clear smooth boundary	4			
5								5
6								6
7	S4, T4	10	104-144	Brownish yellow (10YR, 6/6) loam, 5% gravel, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary, common medium faint light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 62 inches to 104 inches	7			
8								8
9								9
10				Strong brown (7.5YR, 4/6) sandy loam, 20% gravel, moderate medium granular, wet, friable	10			
11					11			
12					12			
13				End of exploration at 12 feet. Moderate groundwater seepage encountered @ 9' Soil mottling observed @ 62"				
14								
15								

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.: 3-16

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-17
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12

Ground Surface Elev. (ft.): 94.5

Date Start - Finish: 7/28/2021 - 7/28/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab. Time
7/28/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-16	Topsoil - Grayish brown (10YR, 5/2) loam, 10% gravel, moderate medium crumb, slightly moist, firm, abrupt smooth boundary, common medium roots	1		
2	S1, T1	2	16-31	Fill - Yellowish brown (10YR, 5/8) sandy loam, 10% gravel, moderate medium granular, slightly moist, friable, abrupt smooth boundary	2		
3					3		
4	S2, T2	3.5	31-46	Brown (10YR, 4/3) sandy clay loam, 35% gravel, moderate coarse subangular blocky, slightly moist, firm, clear smooth boundary, common medium distinct light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 31 inches to 46 inches	4		
5					5		
6	S3, T3	5	46-90	Yellowish brown (10YR, 5/6) sandy loam, 10% gravel, moderate medium granular, slightly moist, firm, clear smooth boundary, common medium faint light gray (10YR, 7/1) mottles encountered from 46 inches to 90 inches	6		
7					7		
8					8		
9					9		
10			90-144	Yellowish brown (10YR, 5/6) loam, 20% gravel, moderate medium subangular blocky	10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 31"			
14							
15							

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.: 3-17

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-18
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12

Ground Surface Elev. (ft.): 96

Date Start - Finish: 7/28/2021 - 7/28/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/28/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-16	Topsoil - Dark gray (10YR, 4/1) sandy loam, moderate medium granular, slightly moist, friable, clear smooth boundary, common medium roots	1		
2				Yellowish brown (10YR, 5/6) loam, 20% gravel, moderate coarse granular, slightly moist, friable, clear smooth boundary	2		
3	S1, T1	3	16-64		3		
4					4		
5					5		
6	S2, T2	6		Yellowish brown (10YR, 5/6) sandy loam, 15% gravel, moderate medium granular, slightly moist, friable, common medium faint light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 64 inches to 144 inches	6		
7					7		
8					8		
9			64-144		9		
10					10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 64"			
14							
15							

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.: 3-18

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-19
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12

Ground Surface Elev. (ft.): 95

Date Start - Finish: 7/28/2021 - 7/28/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/28/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
			0-2	2" Asphalt			
1	S1, T1	1.5	2-18	Dark gray (10YR, 4/1) sandy loam, 45% gravel, moderate medium granular, slightly moist, firm, abrupt smooth boundary	1	12.3	
2			18-34	Yellowish brown (10YR, 5/8) sandy clay loam, 10% gravel, moderate coarse subangular blocky, slightly moist, firm, clear smooth boundary	2		
3			34-70	Yellowish brown (10YR, 5/6) sandy loam, 10% gravel, moderate medium granular, slightly moist, firm, clear smooth boundary	3		
4	S2, T2	4			4		
5					5		
6	S3, T3	7	70-144	Light yellowish brown (10YR, 6/4) sandy loam, 10% gravel, moderate coarse granular, moist, friable, common medium distinct light gray (10YR, 7/1) mottles encountered from 70 inches to 144 inches	6		
7					7		
8							8
9					9		
10					10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 70"			
14							
15							

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.: 3-19

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-20
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12

Ground Surface Elev. (ft.): 95.5

Date Start - Finish: 7/28/2021 - 7/28/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/28/21		12	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2	0-12	Topsoil - Brown (10YR, 5/3) sandy loam, 5% gravel, moderate medium crumb, slightly moist, loose, clear smooth boundary, common coarse roots	1		
2			12-44	Yellowish brown (10YR, 5/6) clay, moderate coarse subangular blocky, slightly moist, firm, clear smooth boundary	2		
3	S2, T2	4.5	44-130	Yellowish brown (10YR, 5/6) sandy loam, 10% gravel, moderate medium granular, slightly moist, loose, clear smooth boundary, common medium faint light gray (10YR, 7/1) mottles encountered from 96 inches to 130 inches	3		
4					4		
5					5		
6	S3, T3	11	130-144	Brownish yellow (10YR, 6/6) sandy loam, moderate medium granular, wet, friable	6		
7					7		
8					8		
9					9		
10					10		
11					11		
12				End of exploration at 12 feet. Slight groundwater seepage encountered @ 12' Soil mottling observed @ 96"	12		
13							
14							
15							

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.: 3-20

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-21
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 13

Ground Surface Elev. (ft.): 95

Date Start - Finish: 7/29/2021 - 7/29/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/29/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2	0-8	Topsoil - Very dark brown (7.5YR, 2.5/2) loam, moderate fine crumb, slightly moist, loose, clear smooth boundary, common medium roots	1		
2				Fill - Brown (10YR, 5/3) sandy clay loam, 10% gravel, moderate medium subangular blocky, slightly moist, firm, clear wavy boundary	2		
3	S2, T2	6	8-60		3		
4						4	
5	S3, T3	10	60-96	Yellowish brown (10YR, 5/6) sandy clay loam, 15% gravel, moderate medium subangular blocky, moist, firm, gradual smooth boundary	5		
6						6	
7					7		
8					8		
9					9		
10					10		
11			96-156	Strong brown (7.5YR, 5/8) sandy loam, 10% gravel, strong fine crumb, moist, firm, few fine faint light gray (7.5YR, 7/1) mottles encountered from 96 inches to 156 inches	11		
12					12		
13					13		
14				End of exploration at 13 feet. Groundwater seepage not encountered Soil mottling observed @ 96"			
15							

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.: 3-21

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-22
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 13

Ground Surface Elev. (ft.): 95

Date Start - Finish: 7/29/2021 - 7/29/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/29/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	T1	2	0-8	Topsoil - Very dark brown (7.5YR, 2.5/2) loam, weak fine crumb, slightly moist, loose, abrupt smooth boundary, many medium roots	1		
2			8-54	Fill - Brown (10YR, 5/3) sandy clay loam, 10% gravel, moderate medium subangular blocky	2		
3	T2	6	54-90	Yellowish brown (10YR, 5/6) loam, 10% gravel, weak medium subangular blocky, slightly moist, firm, clear smooth boundary, few fine faint gray (7.5YR, 5/1) mottles encountered from 60 inches to 90 inches	3		
4					4		
5					5		
6	T3	10	90-156	Strong brown (7.5YR, 5/8) loamy sand, 10% gravel, moderate medium crumb, moist, firm, few fine faint light gray (7.5YR, 7/1) mottles encountered from 90 inches to 156 inches	6		
7					7		
8					8		
9					9		
10					10		
11					11		
12					12		
13					13		
14				End of exploration at 13 feet. Groundwater seepage not encountered Soil mottling observed @ 60"			
15							

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.: 3-22

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-23
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12

Ground Surface Elev. (ft.): 95

Date Start - Finish: 7/28/2021 - 7/28/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/28/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2	0-7	Topsoil - Brown (10YR, 5/3) sandy loam, 10% gravel, moderate medium granular, slightly moist, loose, clear smooth boundary, common medium roots	1		
2			7-50	Brown (10YR, 5/3) clay loam, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary, few fine roots	2		
3	S2, T2	5	50-144	Yellowish brown (10YR, 5/6) loam, 30% gravel, moderate medium crumb, slightly moist, firm, common medium distinct light gray (10YR, 7/1) mottles encountered from 64 inches to 144 inches	3		
4					4		
5					5		
6					6		
7					7		
8					8		
9					9		
10					10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 64"			
14							
15							

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.: 3-23

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-24
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12

Ground Surface Elev. (ft.): 95

Date Start - Finish: 7/28/2021 - 7/28/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/28/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark	
1	S1, T1	3	0-7	Topsoil - Brown (10YR, 5/3) sandy loam, moderate medium granular, slightly moist, loose, abrupt smooth boundary, common medium roots	1			
2				Yellowish brown (10YR, 5/6) clay, 5% gravel, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary	2			
3	S2, T2	7.5	7-75		3			
4						4		
5						5		
6	S3, T3	12	75-137	Yellowish brown (10YR, 5/8) loam, 10% gravel, moderate medium granular, moist, friable, clear smooth boundary, common medium distinct light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 75 inches to 137 inches	6			
7						7		
8						8		
9			137-144	Yellowish brown (10YR, 5/4) sandy loam, moderate medium granular, moist, friable	9			
10					10			
11					11			
12				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 75"	12			
13								
14								
15								

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.: 3-24

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-25
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan **Final Test Pit Depth (ft.):** 12
Ground Surface Elev. (ft.): 95.5 **Date Start - Finish:** 7/29/2021 - 7/29/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/29/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	T1	2	0-6	Topsoil - Very dark brown (7.5YR, 2.5/2) sandy loam, weak fine crumb, slightly moist, loose, abrupt smooth boundary, few fine roots	1	8.4	
2				Yellowish brown (10YR, 5/6) sandy loam, 10% gravel, weak medium subangular blocky, slightly moist, firm, gradual smooth boundary	2		
3				3			
4				4			
5			6-108	5			
6				6			
7	S1, T2	7		7			
8				8			
9				9			
10	S2, T3	10	108-144	Brownish yellow (10YR, 6/8) sandy loam, 10% gravel, moderate medium crumb, moist, firm, common fine distinct light gray (7.5YR, 7/1) mottles encountered from 108 inches to 144 inches	10		
11				11			
12				12			
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 108"			
14							
15							

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.: 3-25

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-26
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12

Ground Surface Elev. (ft.): 96

Date Start - Finish: 7/29/2021 - 7/29/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/29/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2	0-6	Topsoil - Very dark brown (7.5YR, 2.5/2) loam, weak fine crumb, slightly moist, loose, abrupt smooth boundary, common medium roots	1	11.1	
2			6-54	Yellowish brown (10YR, 5/6) clay loam, 5% gravel, moderate medium angular blocky, slightly moist, firm, clear wavy boundary	2		
3	S2, T2	6	54-96	Strong brown (7.5YR, 5/8) loam, 10% gravel, weak medium crumb, moist, firm, gradual smooth boundary, few fine faint light gray (7.5YR, 7/1) mottles encountered from 54 inches to 96 inches	3		
4			96-144	Brownish yellow (10YR, 6/8) sandy loam, 5% gravel, moderate medium crumb, moist, friable, common fine distinct light gray (7.5YR, 7/1) mottles encountered from 96 inches to 144 inches	4		
5	S3, T3	10			5		
6						6	
7					7		
8					8		
9					9		
10					10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 54"			
14							
15							

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.: 3-26

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-27
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12

Ground Surface Elev. (ft.): 96

Date Start - Finish: 7/29/2021 - 7/29/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/29/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2	0-4	Topsoil - Very dark brown (7.5YR, 2.5/2) sandy loam, 5-10% gravel, weak fine crumb, slightly moist, loose, abrupt smooth boundary, few fine roots	1		
2			4-60	Yellowish brown (10YR, 5/6) sandy clay loam, 10% gravel, moderate fine subangular blocky, slightly moist, firm, gradual smooth boundary, few fine faint light gray (7.5YR, 7/1) mottles encountered from 54 inches to 60 inches	2		
3	S2, T2	6	60-102	Brownish yellow (10YR, 6/8) sandy loam, 5% gravel, weak medium subangular blocky, moist, firm, clear smooth boundary, common fine distinct light gray (7.5YR, 7/1) mottles encountered from 60 inches to 102 inches	3		
4					6		
5	S3, T3	10	102-144	Strong brown (7.5YR, 5/8) loam, 15% gravel, moderate medium subangular blocky, moist, firm, common medium distinct light gray (7.5YR, 7/1) mottles encountered from 102 inches to 144 inches	5		
6					6		
7					7		
8					8		
9					9		
10					10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 54"			
14							
15							

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.: 3-27

TEST PIT LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-28
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan

Final Test Pit Depth (ft.): 12

Ground Surface Elev. (ft.): 96

Date Start - Finish: 7/29/2021 - 7/29/2021

Type of Excavator: Track Excavator

Groundwater Depth (ft.)

Excavator Model: CAT 308

Date	Time	Water Depth	Stab.Time
7/29/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	T1	2	0-4	Topsoil - Very dark brown (7.5YR, 2.5/2) loam, weak fine crumb, slightly moist, loose, abrupt smooth boundary, common medium roots	1		
2			4-60	Yellowish brown (10YR, 5/6) sandy clay loam, 5-10% gravel, weak medium subangular blocky, slightly moist, firm, clear wavy boundary	2		
3	S2	6	60-90	Brownish yellow (10YR, 6/8) clay loam, 5% gravel, weak fine angular blocky, slightly moist, firm, clear smooth boundary, common fine distinct light gray (7.5YR, 7/1) mottles encountered from 60 inches to 90 inches	3		
4					4		
5	S3	10	90-144	Brownish yellow (10YR, 6/8) sandy loam, 5% gravel, moderate medium crumb, moist, firm, common fine distinct light gray (7.5YR, 7/1) mottles encountered from 90 inches to 144 inches	5		
6					6		
7					7		
8					8		
9					9		
10					10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 60"			
14							
15							

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.: 3-28

TEST BORING LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

Quick Chek
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: B-1
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Ohm Patel
Contractor: Gold Star
Operator: Darren/Brian

Test Pit Location: See Plan **Final Test Pit Depth (ft.):** 10
Ground Surface Elev. (ft.): 94 **Date Start - Finish:** 8/13/2021 - 8/13/2021

Type of Excavator: Geoprobe

Groundwater Depth (ft.)

Excavator Model:

Date	Time	Water Depth	Stab.Time
8/13/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1	1.5	0-9	9" Topsoil - Brown (10YR, 4/3) silt loam, moderate medium crumb, dry, loose, few fine roots	1	26.0	
2			9-48	Yellowish brown (10YR, 5/4) silty clay, moderate medium subangular blocky, slightly moist, firm, common medium distinct light gray (10YR, 7/2) mottles encountered at 16 inches to 48 inches	2		
3					3		
4	S2	6.5	48-90	Light gray (10YR, 7/1) silt loam, moderate medium subangular blocky, slightly moist, friable, many coarse prominent dark reddish brown (5YR, 3/4) mottles encountered at 48 inches to 90 inches	4		
5							
6					6		
7					7		
8	S3	8.5	90-120	Brownish yellow (10YR, 6/8) loamy sand, 25% gravel, weak medium granular, slightly moist, friable, common medium distinct light brownish gray (10YR, 6/2) mottles encountered at 90 inches to 120 inches	8		
9							
10					10		
11				End of exploration at 10 feet. Groundwater seepage not encountered Soil mottling observed @ 16"			
12							
13							
14							
15							

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.: 4-1

TEST BORING LOG



MTA, a Division of GZA
GeoEnvironmental, Inc
Engineers and Scientists

Quick Chek
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: B-2
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Ohm Patel
Contractor: Gold Star
Operator: Darren/Brian

Test Pit Location: See Plan **Final Test Pit Depth (ft.):** 10
Ground Surface Elev. (ft.): 94 **Date Start - Finish:** 8/13/2021 - 8/13/2021

Type of Excavator: Geoprobe

Groundwater Depth (ft.)

Excavator Model:

Date	Time	Water Depth	Stab.Time
8/13/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1	2	0-6	6" Topsoil - Brown (10YR, 4/3) silt loam, weak medium crumb, dry, loose, few fine roots	1	12.5	
2			6-45	Yellowish brown (10YR, 5/4) silty clay, moderate medium subangular blocky, dry, friable, common medium distinct light gray (10YR, 7/2) mottles encountered at 12 inches to 45 inches	2		
3							
4				4			
5	S2	6.5	45-90	Light gray (10YR, 7/1) loam, moderate medium subangular blocky, dry, friable, common medium distinct dark reddish brown (5YR, 3/4) mottles encountered at 45 inches to 90 inches	5		
6					6		
7					7		
8	S3	8	90-120	Brownish yellow (10YR, 6/8) loamy sand, weak medium granular, slightly moist, friable, common medium distinct very pale brown (10YR, 8/4) mottles encountered at 90 inches to 120 inches	8		
9					9		
10					10		
11				End of exploration at 10 feet. Groundwater seepage not encountered Soil mottling observed @ 12"			
12							
13							
14							
15							

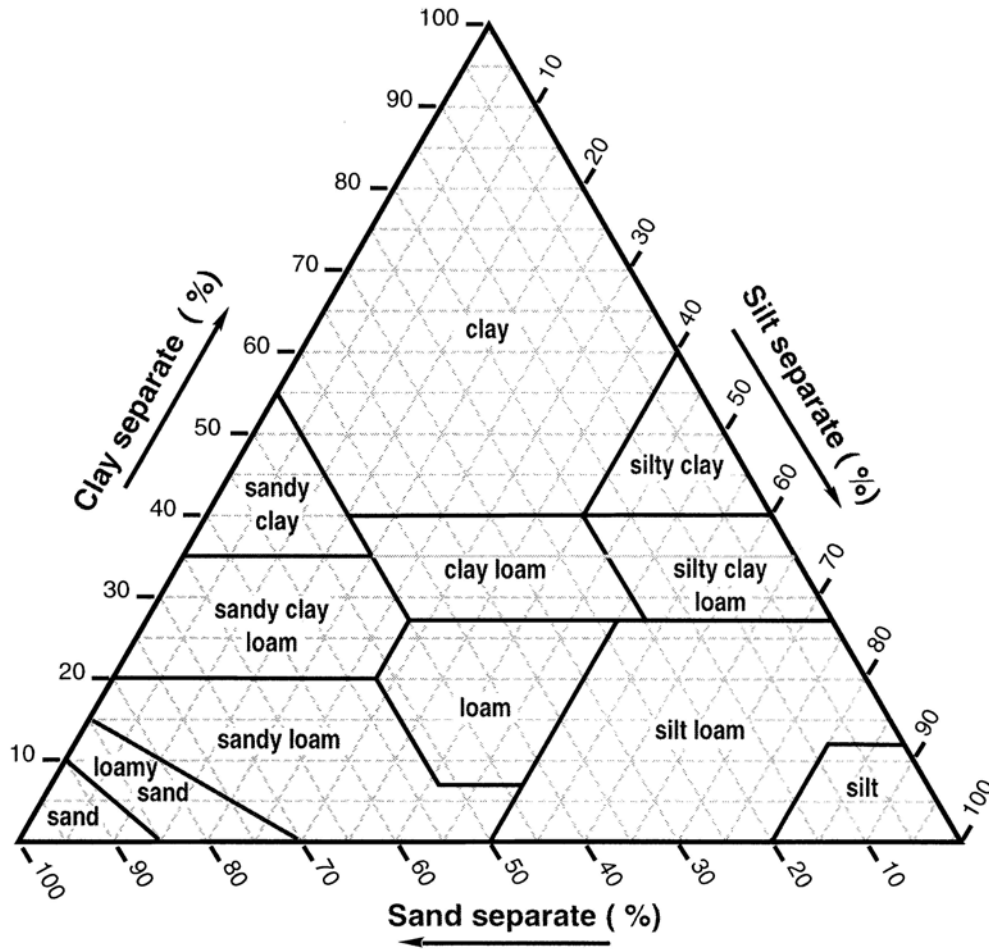
REMARKS

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.: 4-2

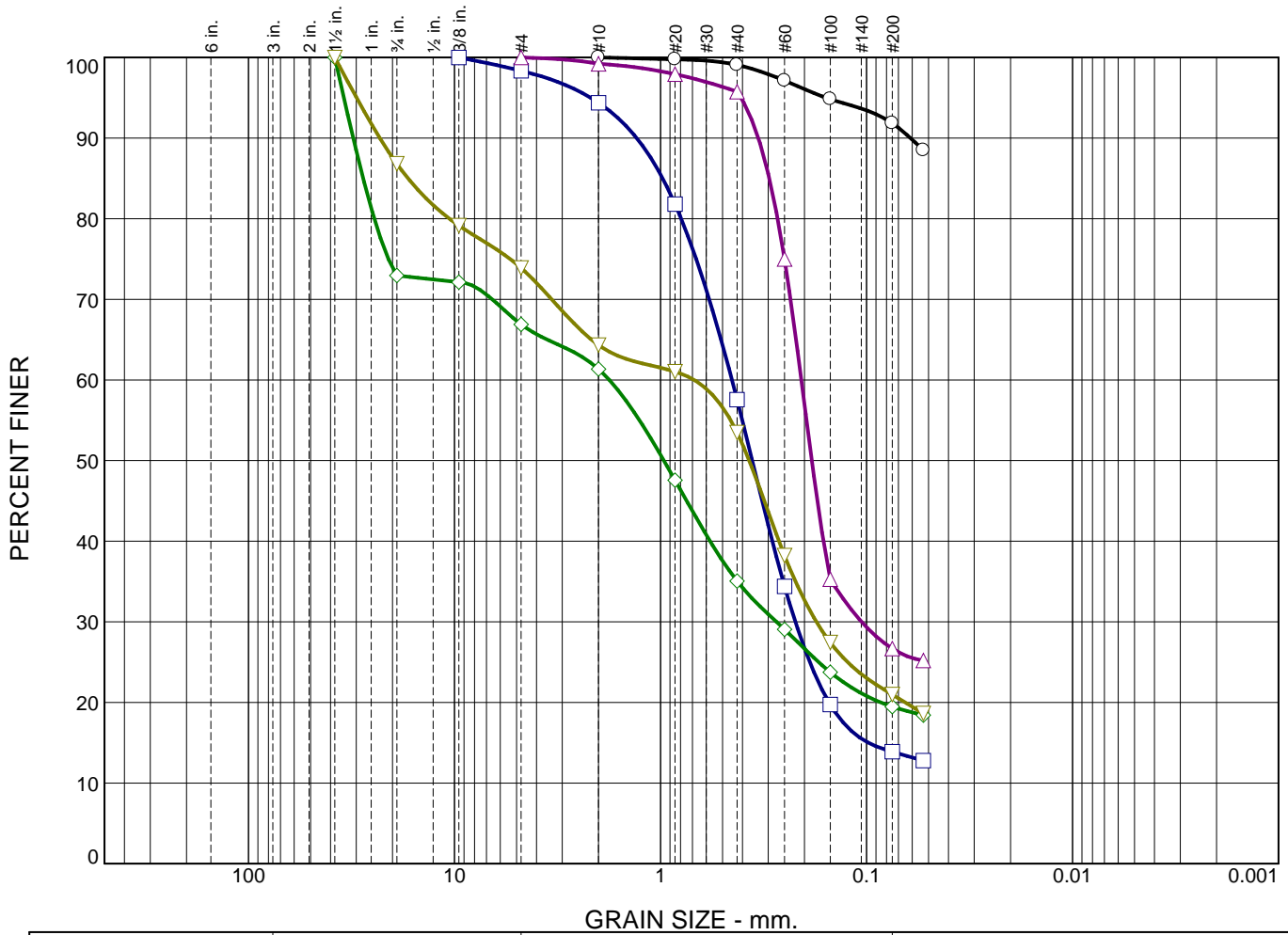
Texture Triangle:

Fine Earth Texture Classes (———)



USDA SOIL CLASSIFICATION SYSTEM

Gradation Curve(s)



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.9	7.3	91.8	
□	0.0	0.0	1.7	3.9	36.8	43.7	13.9	
△	0.0	0.0	0.0	0.8	3.4	69.1	26.7	
◇	0.0	27.0	6.1	5.6	26.2	15.6	19.5	
▽	0.0	13.2	12.9	9.6	10.8	32.5	21.0	

SOIL DATA					
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	B-1	1	1.5	Silty Clay (MC=26.0%)	CL
□	B-2	3	8	Loamy Sand (MC=12.5%)	SM
△	TP-4	4	9	Sandy Loam (MC=16.6%)	SM
◇	TP-7	2	4	Sandy Loam (MC=8.8%)	SM
▽	TP-12	2	7.5	Sandy Loam (MC=9.3%)	SM

Melick-Tully & Associates
a Division of GZA GeoEnvironmental, Inc.
South Bound Brook, NJ

Client: ER/UDC West Windsor
Project: Proposed Quick Chek Food Store and Restaurant
Project No.: 26.0092434.00

Summary of Laboratory Tube Permeameter Permeability Test Results
ER/UDC West Windsor LLC - West Windsor, NJ
26.0092434.00

Test Pit No.	Depth (ft)	Permeability Rate (in/hr)	USDA Visual Soil Classification
TP-1	5.5	>20	Loamy Sand
TP-1	9	0.91	Sandy Clay Loam
TP-2	3	3.5	Sandy Loam
TP-2	6	11.1	Sandy Loam
TP-2	10	0.44	Sandy Clay Loam
TP-3	4	>20	Loamy Sand
TP-3	7	17.5	Loamy Sand
TP-4	4	<0.06	Sandy Clay Loam
TP-4	9	<0.06	Fine Sandy Loam
TP-5	1	<0.06	Clay
TP-5	4	1.0	Sandy Loam
TP-6	4	4.0	Sandy Loam
TP-6	6	>20	Loamy Sand
TP-7	4	2.8	Sandy Loam
TP-7	8	4.0	Sandy Loam
TP-8	2.5	<0.06	Clay Loam
TP-8	6.5	16.6	Loamy Sand
TP-9	3	<0.06	Silty Clay Loam
TP-9	6	14.9	Sandy Loam
TP-10	6	1.9	Loam
TP-10	10	>20	Loamy Sand
TP-11	6.5	0.30	Loam
TP-11	9	2.2	Sandy Loam
TP-12	3	<0.06	Clay
TP-12	7.5	1.4	Sandy Loam
TP-13	3	<0.06	Clay
TP-13	6.5	1.5	Sandy Loam
TP-14	3	<0.06	Silty Clay Loam
TP-14	6	>20	Loamy Sand
TP-15	3	<0.06	Clay Loam
TP-15	6.5	16.3	Sandy Loam
TP-16	1.5	<0.06	Sandy Clay Loam
TP-16	3	>20	Sand
TP-17	3.5	<0.06	Sandy Clay Loam
TP-17	5	2.0	Sandy Loam
TP-18	3	<0.06	Loam
TP-18	6	6.4	Sandy Loam
TP-19	1.5	0.52	Sandy Clay Loam
TP-19	4	17.5	Sandy Loam

Summary of Laboratory Tube Permeameter Permeability Test Results
ER/UDC West Windsor LLC - West Windsor, NJ
26.0092434.00

Test Pit No.	Depth (ft)	Permeability Rate (in/hr)	USDA Visual Soil Classification
TP-20	2	<0.06	Clay
TP-20	4.5	>20	Sandy Loam
TP-21	6	2.6	Sandy Loam
TP-21	10	>20	Loamy Sand
TP-22	6	1.9	Loam
TP-22	10	>20	Loamy Sand
TP-23	2	<0.06	Clay Loam
TP-23	5	3.6	Sandy Loam
TP-24	3	<0.06	Clay
TP-24	7.5	7.7	Sandy Loam
TP-25	2	1.0	Sandy Loam
TP-25	7	1.5	Sandy Loam
TP-25	10	2.2	Sandy Loam
TP-26	2	<0.06	Clay Loam
TP-26	6	1.0	Sandy Loam
TP-27	6	5.5	Sandy Loam
TP-27	10	10.2	Loamy Sand
TP-28	2	0.74	Sandy Clay Loam
TP-28	10	7.1	Sandy Loam



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.

117 Canal Road | South Bound Brook, NJ 08880
732-356-340

32 Offices Nationwide
www.gza.com

Copyright© 2022 GZA GeoEnvironmental Inc.



Known for excellence.
Built on trust.

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION
MANAGEMENT

117 Canal Road
South Bound Brook, NJ
T: 732.356.3400
www.gza.com

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.

A handwritten signature in blue ink, appearing to read "Cory Karinja".

Cory S. Karinja, P.E.
Project Manager

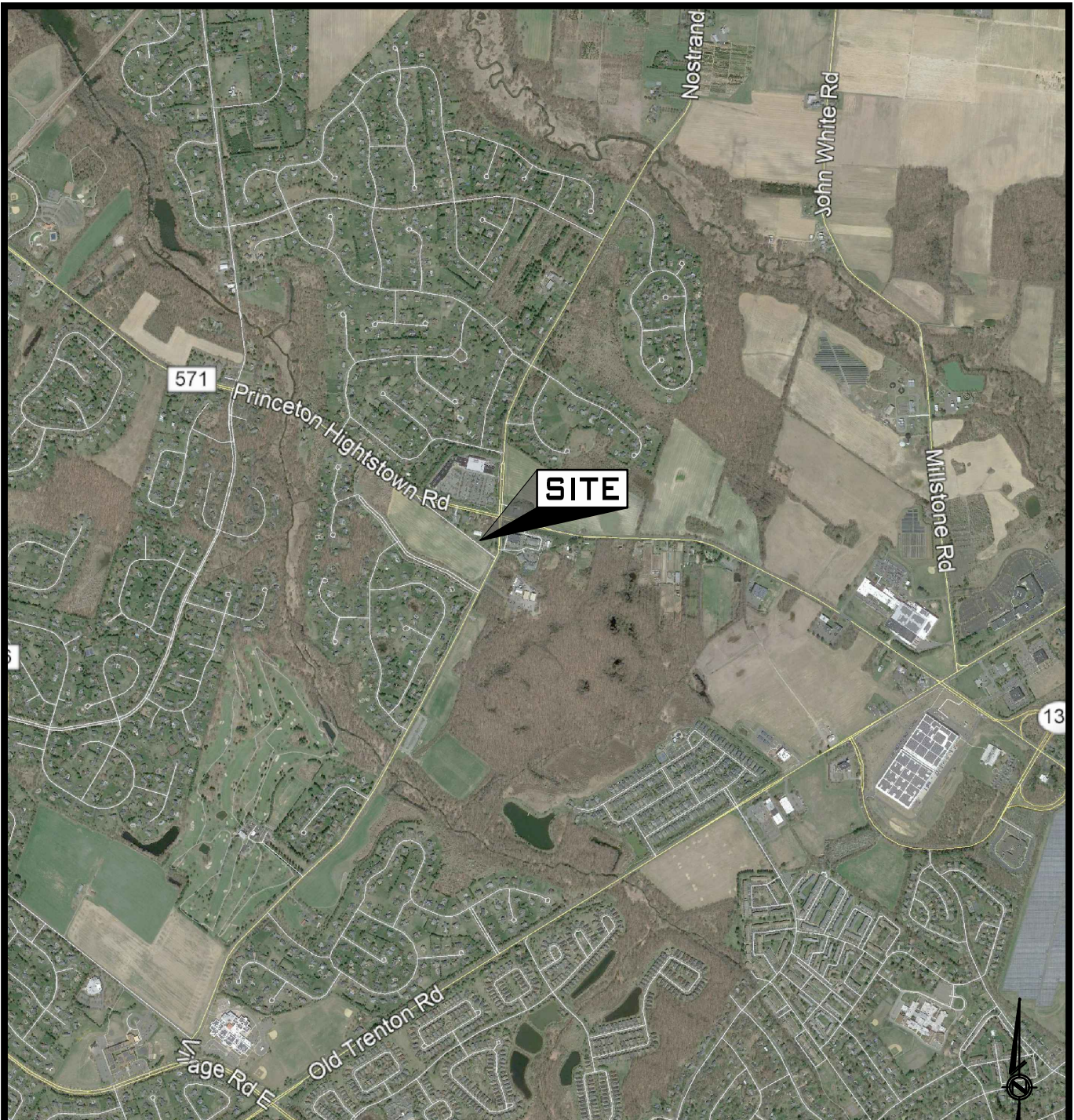
A handwritten signature in blue ink, appearing to read "Mark R. Denno".

Mark R. Denno, P.E.
Principal

A handwritten signature in blue ink, appearing to read "Christopher P. Tansey".

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

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



Aerial Photo courtesy of Google Earth Pro



GZA GeoEnvironmental, Inc.
Engineers and Scientists

Known for excellence. Built on trust.
www.gza.com

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

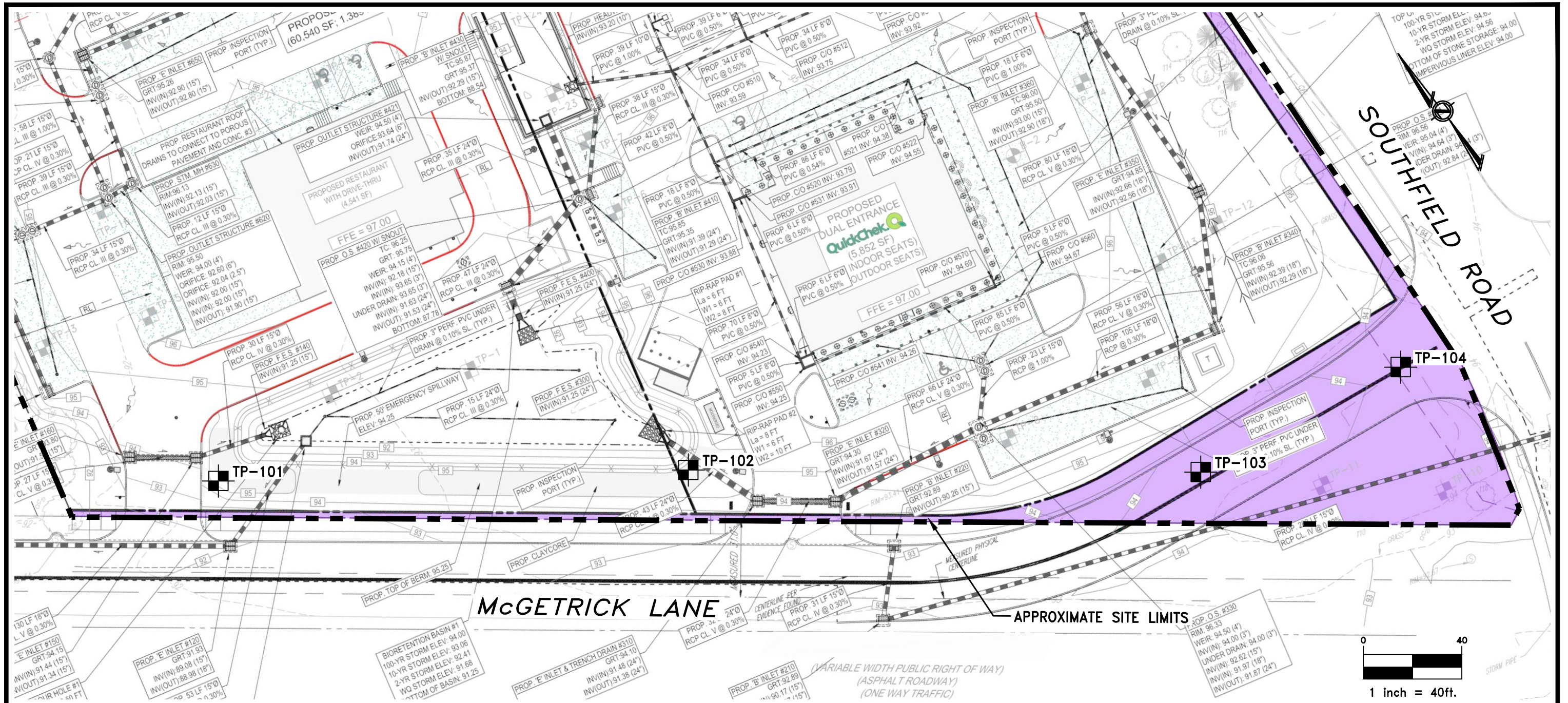
6/22/22

SCALE

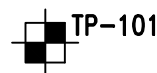
1"=2,000'

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				
		GZA GeoEnvironmental, Inc. Engineers and Scientists <small>Known for excellence. Built on trust. www.gza.com</small>		
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'			
16				1.6 in/hr @ 5'			
17				14.2 in/hr @ 10'			
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. Slight groundwater seepage encountered @ 11' Estimated seasonal high groundwater observed @ 42"			
14				Tube Permeability Test Results: 0.48 in/hr @ 2.5' 0.52 in/hr @ 5' 3.3 in/hr @ 8'			
15							
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.: 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					5		
6	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	6		
7					7		
8					8		
9					9		
10			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	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							

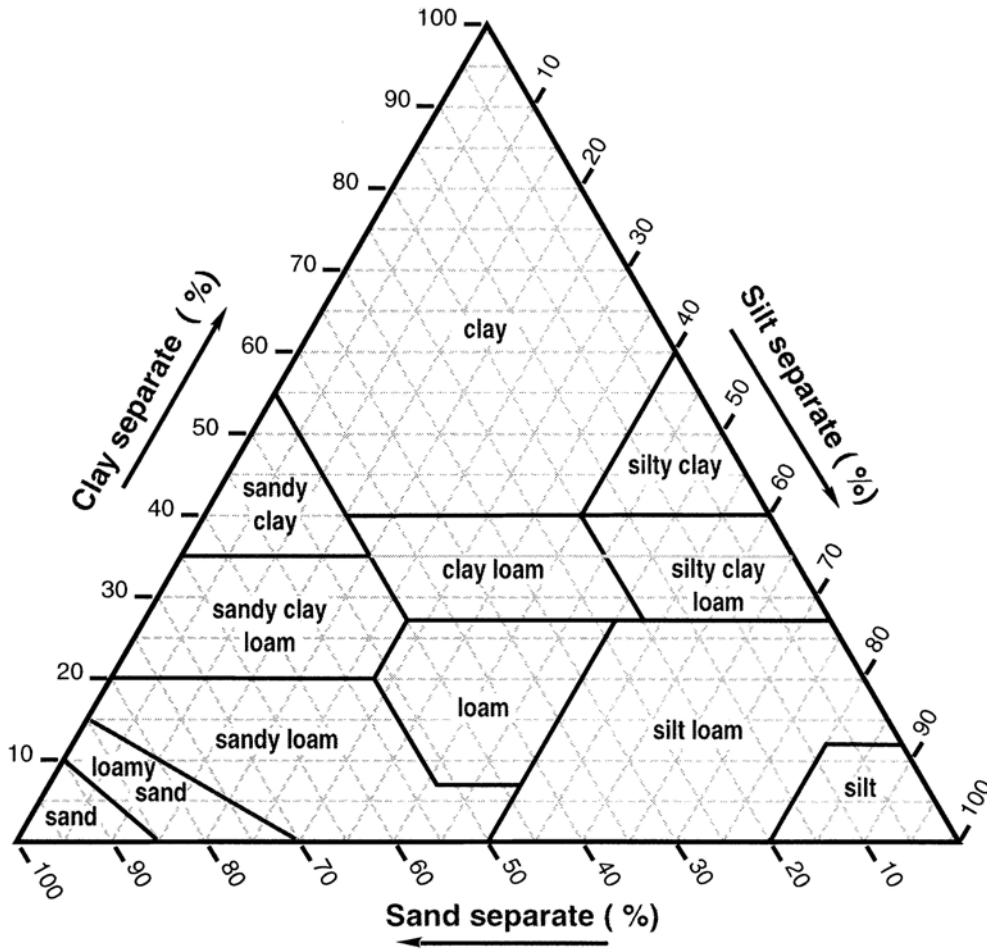
REMARKS

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.

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 findings 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 stormwater management facilities. 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 recommendations contained in this report shall not be considered valid unless the changes are reviewed and the findings of this report modified or verified in writing.

Changed Conditions During Construction: The analyses and recommendations submitted in this report are based in part upon the data obtained from 2 widely-spaced test borings and 28 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 and recommendations 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 engineering report was prepared for the project by Melick-Tully and Associates, a Division of GZA GeoEnvironmental Inc. (MTA) for 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 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 MTA be retained to provide on-site soils engineering services during the earthwork construction phase 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.

Part II- Field Manuals

Attachment of Field Manuals for Stormwater Management Measures on this Site

As per N.J.A.C. 7:8-5.8(b)&(e), preventative and corrective maintenance shall be performed to maintain the function of stormwater management measures, including repair or replacement of the structure; removal of sediment, debris or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; repair or replacement of non-vegetated linings, and removal of rodent/wildlife and repair/restoration to damaged affected areas caused by them.

Each Field Manual attached to this Maintenance Plan is a separate document pertaining to one specific stormwater management measure, and should be used by inspections and maintenance crews in order to carry out the maintenance work required by N.J.A.C. 7:8-5.8(e). Design engineers should prepare the field manuals in accordance with the design of each measure and the specific requirements of the site. See the sample field manuals for further guidance.

- Maintenance Logs and Inspection Records

Maintenance Logs and Inspection Records

As per N.J.A.C. 7:8-5.8(e), preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure(s), including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of non-vegetated linings.

As per N.J.A.C. 7:8-5.8(f), the person responsible for maintenance shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.

The responsible party shall maintain a record of all maintenance actions performed, including:

- Inspection checklists from each performed inspection
- Preventative maintenance logs
- Corrective maintenance logs, including work orders
- Other maintenance records

Field Manual for Snout by Best Management Products, Inc.



Maintenance Considerations for SNOUT[®] Stormwater Quality Systems

Background:

The SNOUT system from Best Management Products, Inc. (BMP, Inc.) is based on a vented hood that can reduce floatable trash and debris, free oils, and other solids from stormwater discharges. In its most basic application, a SNOUT hood is installed over the outlet pipe of a catch basin or other stormwater quality structure which incorporates a deep sump (see Installation Drawing). The SNOUT forms a baffle in the structure which collects floatable debris and free oils on the surface of the captured stormwater, while permitting heavier solids to sink to the bottom of the sump. The clarified intermediate layer is forced out of the structure through the open bottom of the SNOUT by displacement from incoming flow. The resultant discharge contains considerably less unsightly trash and other gross pollutants, and can also offer reductions of free-oils and finer solids.

As with any structural stormwater quality BMP (Best Management Practice), design and maintenance considerations will have a dramatic impact on SNOUT system performance over the life of the facility. The most important factor to consider when designing structures which will incorporate a SNOUT is the depth of the sump (the sump is defined as the depth from beneath the invert of the outlet pipe to the bottom of the structure). Simply put, the deeper the sump, the more effective the unit will be both in terms of pollutant removals and reducing frequency of maintenance. More volume in a structure means more quiescence, thus allowing the pollutant constituents a better chance to separate out. Secondly, more volume means fewer cycles between maintenance operations, because the structure has a greater capacity.

Maintenance Recommendations:

First year only recommendations:

- ❖ Monthly monitoring of a new installation after the site has been stabilized.
- ❖ Measurements should be taken after each rain event of .5 inches or more, or monthly, as determined by local weather conditions.
- ❖ Checking sediment depth and noting the surface pollutants in the structure will be helpful in planning maintenance. Rainfall volume vs. sediment and debris capture can then be plotted as an accurate predictor of service intervals.

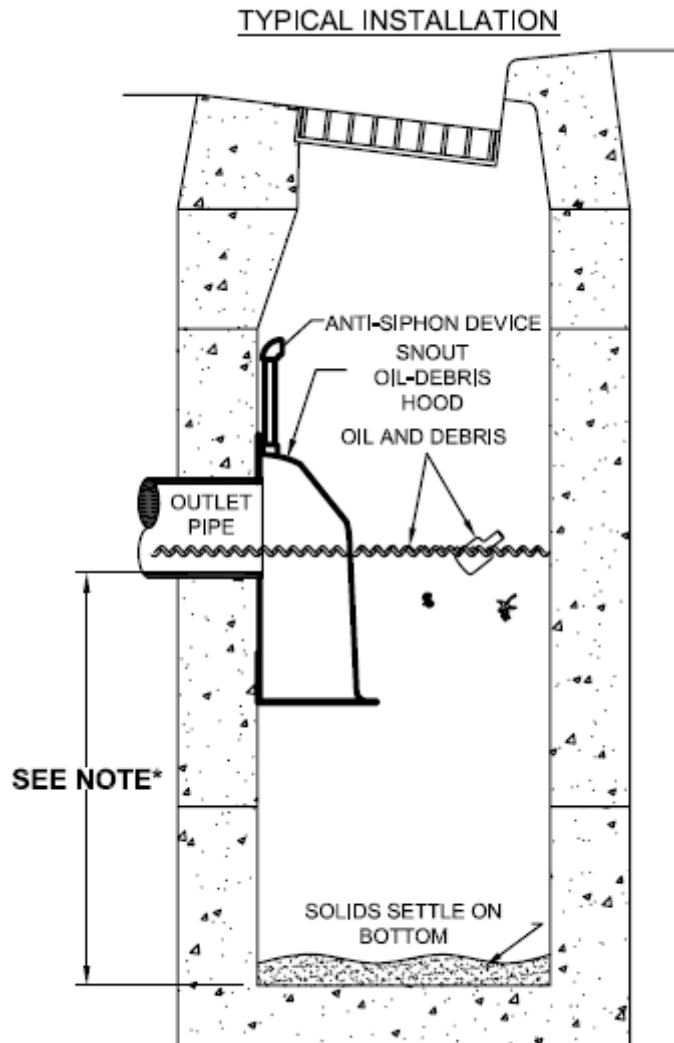
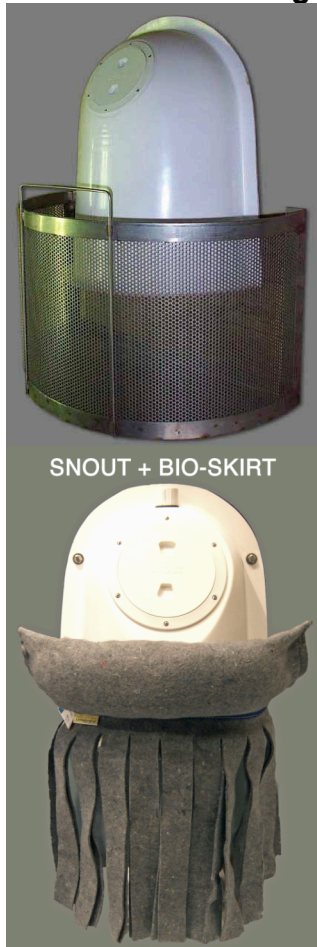
For ongoing maintenance after first year:

- ❖ The pollutants collected in SNOUT equipped structures will consist of floatable debris, trash and oils on the surface of the captured water, and grit and sediment on the bottom of the structure.
- ❖ It is best to schedule maintenance based on the solids collected in the sump.
- ❖ Optimally, the structure should be cleaned when the sump is half full (e.g. when 2 feet of material collects in a 4 foot sump, clean it out).
- ❖ For Floatables and Trash only (with or without TrashScreen), service when 6" of floating material accumulates on surface above static water level.
- ❖ Structures should also be cleaned if a spill or other incident causes a larger than normal accumulation of pollutants in a structure.
- ❖ Maintenance is best done with a vacuum truck.
- ❖ If Bio-Skirts™ are being used in the structure to enhance hydrocarbon capture and/or bacteria removals, they should be checked on a monthly basis, and serviced or replaced when more than 2/3 of the boom is submerged, indicating a nearly saturated state. Assuming a typical pollutant-loading environment exists, Bio-Skirts should be serviced* or replaced annually.
- ❖ In the case of an oil spill, the structure should be serviced and Bio-Skirts replaced (if any) immediately
- ❖ All collected wastes must be handled and disposed of according to local environmental requirements.
- ❖ To maintain the SNOUT hoods themselves, an annual inspection of the anti-siphon vent and access hatch are recommended. A simple flushing of the vent, or a gentle rodding with a flexible wire are all that's typically needed to maintain the anti-siphon properties. Opening and closing the access hatch once a year ensures a lifetime of trouble-free service.
- ❖ To maintain TrashScreen, hose off debris from screen (if any) prior to removal of pollutants by vacuum truck.

Further structural design guidelines including CAD drawings, hydraulic spreadsheets, and site inspection and maintenance field reports and installation inspection sheets are available from BMP, Inc.

*To extend the service life of a Bio-Skirt, the unit may be "wrung out" to remove accumulated oils and washed in an industrial washing machine in warm water. The Bio-Skirt may then be re-deployed as long as the material maintains its structural integrity.

Installation Drawing:



*NOTE- SUMP DEPTH OF 36" MIN. FOR $\leq 12"$ DIAM. OUTLET. FOR OUTLETS $\geq 15"$, DEPTH = 2.5-3X DIAM.

Contact Information:

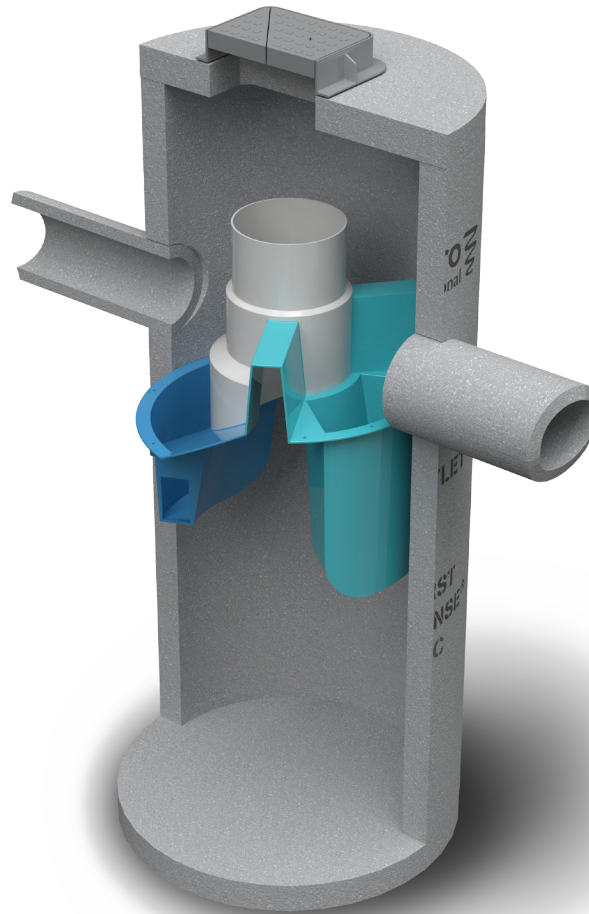
Please contact us if we can offer further assistance. 53 Mt. Archer Rd. Lyme, CT 06371. Technical Assistance: T. J. Mullen (800-504-8008, tjm@bmpinc.com) or Lee Duran (888-434-0277).

Website: www.bmpinc.com

The SNOUT® is protected by: US PATENT # 6126817 and CANADIAN PATENT # 2285146

SNOUT® is a registered trademark of Best Management Products, Inc.

Field Manual for First Defense Unit by Hydro International



Operation and Maintenance Manual

First Defense[®] and First Defense[®] High Capacity

Vortex Separator for Stormwater Treatment

Table of Contents

3	FIRST DEFENSE® BY HYDRO INTERNATIONAL
	- INTRODUCTION
	- OPERATION
	- POLLUTANT CAPTURE AND RETENTION
4	MODEL SIZES & CONFIGURATIONS
	- FIRST DEFENSE® COMPONENTS
5	MAINTENANCE
	- OVERVIEW
	- MAINTENANCE EQUIPMENT CONSIDERATIONS
	- DETERMINING YOUR MAINTENANCE SCHEDULE
6	MAINTENANCE PROCEDURES
	- INSPECTION
	- FLOATABLES AND SEDIMENT CLEAN OUT
8	FIRST DEFENSE® INSTALLATION LOG
9	FIRST DEFENSE® INSPECTION AND MAINTENANCE LOG

COPYRIGHT STATEMENT: The contents of this manual, including the graphics contained herein, are intended for the use of the recipient to whom the document and all associated information are directed. Hydro International plc owns the copyright of this document, which is supplied in confidence. It must not be used for any purpose other than that for which it is supplied and must not be reproduced, in whole or in part stored in a retrieval system or transmitted in any form or by any means without prior permission in writing from Hydro International plc. First Defense® is a trademarked hydrodynamic vortex separation device of Hydro International plc. A patent covering the First Defense® has been granted.

DISCLAIMER: Information and data contained in this manual is exclusively for the purpose of assisting in the operation and maintenance of Hydro International plc's First Defense®. No warranty is given nor can liability be accepted for use of this information for any other purpose. Hydro International plc has a policy of continuous product development and reserves the right to amend specifications without notice.

I. First Defense® by Hydro International

Introduction

The First Defense® is an enhanced vortex separator that combines an effective and economical stormwater treatment chamber with an integral peak flow bypass. It efficiently removes total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants. The First Defense® is available in several model configurations (refer to *Section II. Model Sizes & Configurations*, page 4) to accommodate a wide range of pipe sizes, peak flows and depth constraints.

Operation

The First Defense® operates on simple fluid hydraulics. It is self-activating, has no moving parts, no external power requirement and is fabricated with durable non-corrosive components. No manual procedures are required to operate the unit and maintenance is limited to monitoring accumulations of stored pollutants and periodic clean-outs. The First Defense® has been designed to allow for easy and safe access for inspection, monitoring and clean-out procedures. Neither entry into the unit nor removal of the internal components is necessary for maintenance, thus safety concerns related to confined-space-entry are avoided.

Pollutant Capture and Retention

The internal components of the First Defense® have been designed to optimize pollutant capture. Sediment is captured and retained in the base of the unit, while oil and floatables are stored on the water surface in the inner volume (Fig.1).

The pollutant storage volumes are isolated from the built-in bypass chamber to prevent washout during high-flow storm events. The sump of the First Defense® retains a standing water level between storm events. This ensures a quiescent flow regime at the onset of a storm, preventing resuspension and washout of pollutants captured during previous events.

Accessories such as oil absorbent pads are available for enhanced oil removal and storage. Due to the separation of the oil and floatable storage volume from the outlet, the potential for washout of stored pollutants between clean-outs is minimized.

Applications

- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line
- Pretreatment for filters, infiltration and storage

Advantages

- Inlet options include surface grate or multiple inlet pipes
- Integral high capacity bypass conveys large peak flows without the need for "offline" arrangements using separate junction manholes
- Proven to prevent pollutant washout at up to 500% of its treatment flow
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Delivered to site pre-assembled and ready for installation

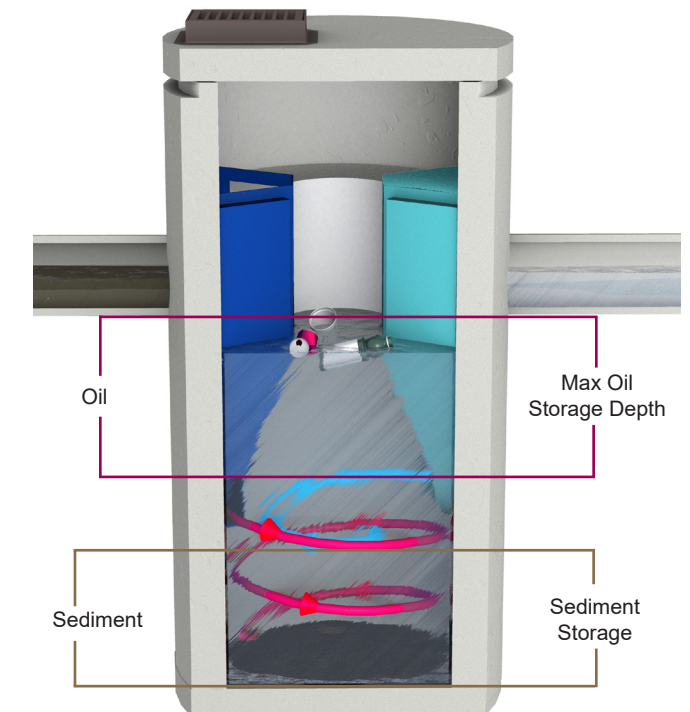


Fig.1 Pollutant storage volumes in the First Defense®.

II. Model Sizes & Configurations

The First Defense® inlet and internal bypass arrangements are available in several model sizes and configurations. The components of the First Defense®-4HC and First Defense®-6HC have modified geometries as to allow greater design flexibility needed to accommodate various site constraints.

All First Defense® models include the internal components that are designed to remove and retain total suspended solids (TSS), gross solids, floatable trash and hydrocarbons (Fig.2a - 2b). First Defense® model parameters and design criteria are shown in Table 1.

First Defense® Components

- 1. Built-In Bypass
- 2. Inlet Pipe
- 3. Inlet Chute
- 4. Floatables Draw-off Port
- 5. Outlet Pipe
- 6. Floatables Storage
- 7. Sediment Storage
- 8. Inlet Grate or Cover

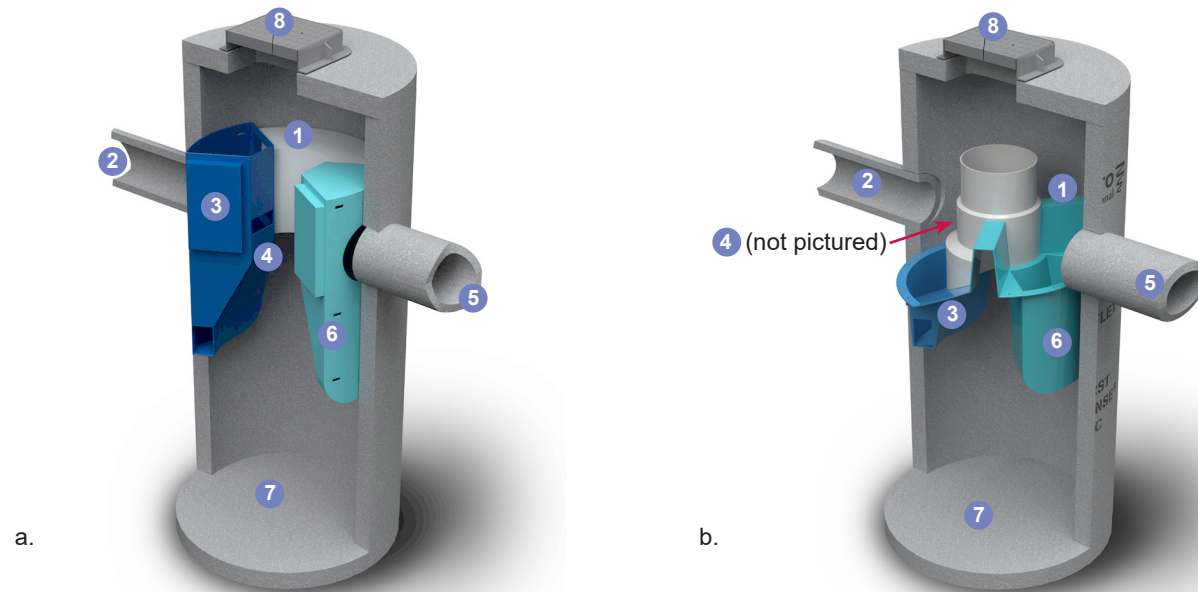


Fig.2a) First Defense®-4 and First Defense®-6; b) First Defense®-4HC and First Defense®-6HC, with higher capacity dual internal bypass and larger maximum pipe diameter.

First Defense® High Capacity Model Number	Diameter	Typical TSS Treatment Flow Rates	Peak Online Flow Rate	Maximum Pipe Diameter ¹	Oil Storage Capacity	Typical Sediment Storage Capacity ²	Minimum Distance from Outlet Invert to Top of Rim ³	Chamber Depth
		NJDEP Certified						
	(ft / m)	(cfs / L/s)	(cfs / L/s)	(in / mm)	(gal / L)	(yd ³ / m ³)	(ft / m)	(ft / m)
FD-3HC	3 / 0.9	0.85 / 24.0	15 / 424	18 / 457	125 / 473	0.4 / 0.3	2.0 - 3.5 / 0.6 - 1.0	3.75 / 1.14
FD-4HC	4 / 1.2	1.50 / 42.4	18 / 510	24 / 600	191 / 723	0.7 / 0.5	2.3 - 3.9 / 0.7 - 1.2	5.00 / 1.52
FD-5HC	5 / 1.5	2.35 / 66.2	20 / 566	24 / 609	300 / 1135	1.1 / .84	2.5 - 4.5 / 0.7 - 1.3	5.25 / 1.60
FD-6HC	6 / 1.8	3.38 / 95.7	32 / 906	30 / 750	496 / 1878	1.6 / 1.2	3.0 - 5.1 / 0.9 - 1.6	6.25 / 1.90
FD-7HC	7 / 2.1	4.60 / 130.2	40 / 1133	42 / 1067	750 / 2839	2.1 / 1.9	3.0 - 5.5 / 0.9 - 1.7	7.25 / 2.20
FD-8HC	8 / 2.4	6.00 / 169.9	50 / 1,415	48 / 1219	1120 / 4239	2.8 / 2.1	3.0 - 6.0 / 0.9 - 1.8	8.00 / 2.43

¹Contact Hydro International when larger pipe sizes are required.
²Contact Hydro International when custom sediment storage capacity is required.
³Minimum distance for models depends on pipe diameter.

III. Maintenance

Overview

The First Defense® protects the environment by removing a wide range of pollutants from stormwater runoff. Periodic removal of these captured pollutants is essential to the continuous, long-term functioning of the First Defense®. The First Defense® will capture and retain sediment and oil until the sediment and oil storage volumes are full to capacity. When sediment and oil storage capacities are reached, the First Defense® will no longer be able to store removed sediment and oil. Maximum pollutant storage capacities are provided in Table 1.

The First Defense® allows for easy and safe inspection, monitoring and clean-out procedures. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables. Access ports are located in the top of the manhole.

Maintenance events may include Inspection, Oil & Floatables Removal, and Sediment Removal. Maintenance events do not require entry into the First Defense®, nor do they require the internal components of the First Defense® to be removed. In the case of inspection and floatables removal, a vactor truck is not required. However, a vactor truck is required if the maintenance event is to include oil removal and/or sediment removal.

Maintenance Equipment Considerations

The internal components of the First Defense®-HC have a centrally located circular shaft through which the sediment storage sump can be accessed with a sump vac hose. The open diameter of this access shaft is 15 inches in diameter (Fig.3). Therefore, the nozzle fitting of any vactor hose used for maintenance should be less than 15 inches in diameter.

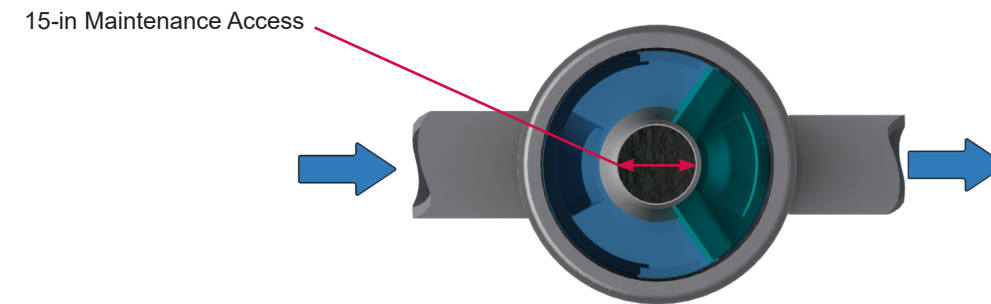


Fig.3 The central opening to the sump of the First Defense®-HC is 15 inches in diameter.

Determining Your Maintenance Schedule

The frequency of clean out is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge-Judge® can be used to determine the level of accumulated solids stored in the sump. This information can be recorded in the maintenance log (see page 9) to establish a routine maintenance schedule.

The vactor procedure, including both sediment and oil / floatables removal, for a 6-ft First Defense® typically takes less than 30 minutes and removes a combined water/oil volume of about 765 gallons.

Inspection Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.
2. Remove the grate or lid to the manhole.
3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities. Fig.4 shows the standing water level that should be observed.
4. Without entering the vessel, use the pole with the skimmer net to remove floatables and loose debris from the components and water surface.
5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel.
6. On the Maintenance Log (see page 9), record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.
7. Securely replace the grate or lid.
8. Take down safety equipment.
9. Notify Hydro International of any irregularities noted during inspection.

Floatables and Sediment Clean Out

Floatables clean out is typically done in conjunction with sediment removal. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables (Fig.5).

Floatables and loose debris can also be netted with a skimmer and pole. The access port located at the top of the manhole provides unobstructed access for a vactor hose and skimmer pole to be lowered to the base of the sump.

Scheduling

- Floatables and sump clean out are typically conducted once a year during any season.
- Floatables and sump clean out should occur as soon as possible following a spill in the contributing drainage area.



Fig.4 Floatables are removed with a vactor hose (First Defense model FD-4, shown).

Recommended Equipment

- Safety Equipment (traffic cones, etc)
- Crow bar or other tool to remove grate or lid
- Pole with skimmer or net (if only floatables are being removed)
- Sediment probe (such as a Sludge Judge®)
- Vactor truck (flexible hose recommended)
- First Defense® Maintenance Log

Floatables and sediment Clean Out Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.
2. Remove the grate or lid to the manhole.
3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities.
4. Remove oil and floatables stored on the surface of the water with the vactor hose (Fig.5) or with the skimmer or net (not pictured).
5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel and record it in the Maintenance Log (page 9).
6. Once all floatables have been removed, drop the vactor hose to the base of the sump. Vactor out the sediment and gross debris off the sump floor (Fig.5).
7. Retract the vactor hose from the vessel.
8. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components, blockages, or irregularly high or low water levels.
9. Securely replace the grate or lid.

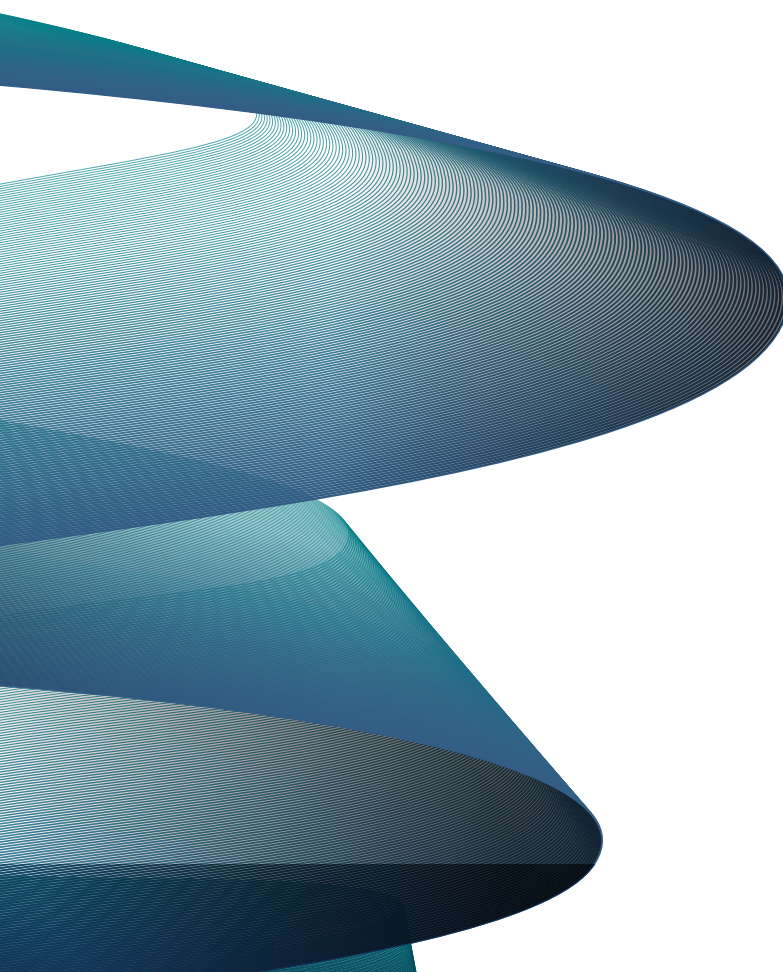


Fig.5 Sediment is removed with a vactor hose (First Defense model FD-4, shown).

Maintenance at a Glance

Inspection	- Regularly during first year of installation - Every 6 months after the first year of installation
Oil and Floatables Removal	- Once per year, with sediment removal - Following a spill in the drainage area
Sediment Removal	- Once per year or as needed - Following a spill in the drainage area

NOTE: For most clean outs the entire volume of liquid does not need to be removed from the manhole. Only remove the first few inches of oils and floatables from the water surface to reduce the total volume of liquid removed during a clean out.



Stormwater Solutions

94 Hutchins Drive
Portland, ME 04102

Tel: (207) 756-6200

Fax: (207) 756-6212

stormwaterinquiry@hydro-int.com

www.hydro-int.com

MAINTENANCE LOGS AND INSPECTION RECORDS

**MAINTENANCE LOG
FOR STORMWATER MANAGEMENT FACILITIES**

NAME OF FACILITY _____
 LOCATION _____ DATE _____
 CREW _____ WORK STARTED _____
 EQUIPMENT _____ WORK COMPLETED _____
 WEATHER _____ TOTAL MANPOWER OF WORK _____

A. PREVENTATIVE MAINTENANCE

WORK ITEMS	ITEMS REQUIRED	DATE REQUIRED	ITEMS DONE	DATE DONE	COMMENTS AND SPECIAL INSTRUCTIONS
1. GRASS CUTTING					
A. BOTTOMS					
B. EMBANKMENTS AND SIDE SLOPES					
C. PERIMETER AREAS					
D. ACCESS AREAS AND ROADS					
E. OTHERS					
2. GRASS MAINTENANCE					
A. FERTILIZING					
B. RE-SEEDING					
C. DE-THATCHING					
D. PEST CONTROL					
E. OTHERS					
3. VEGETATIVE COVER					
A. FERTILIZING					
B. PRUNING					
C. PEST CONTROL					
D. OTHERS					
4. TRASH AND DEBRIS REMOVAL					
A. BOTTOMS					
B. EMBANKMENTS AND SIDE SLOPES					
C. PERIMETER AREAS					
D. ACCESS AREAS AND ROADS					
E. INLETS					
F. OUTLETS AND TRASH RACKS					
G. OTHERS					
5. SEDIMENT REMOVAL					
A. INLETS					
B. OUTLETS AND TRASH RACKS					
C. BOTTOM					
D. OTHERS					
6. ELIMINATION OF POTENTIAL MOSQUITO BREEDING HABITATS					
7. UNDERGROUND BASIN MAINTENANCE					
A. BOTTOMS					
B. OUTLETS AND TRASH RACKS					
C. ACCESS HATCHES					
D. OTHERS					
8. OTHER PREVENTIVE MAINTENANCE					
A. PARKING LOT SWEEPING					
B. EMPTYING TRASH RECEPTACLES					

**MAINTENANCE LOG
FOR STORMWATER MANAGEMENT FACILITIES**

NAME OF FACILITY _____
 LOCATION _____ DATE _____
 CREW _____ WORK STARTED _____
 EQUIPMENT _____ WORK COMPLETED _____
 WEATHER _____ TOTAL MANPOWER OF WORK _____

B. CORRECTIVE MAINTENANCE

WORK ITEMS	ITEMS REQUIRED	DATE REQUIRED	ITEMS DONE	DATE DONE	COMMENTS AND SPECIAL INSTRUCTIONS
1. REMOVAL OF DEBRIS AND SEDIMENT					
2. STRUCTURAL REPAIRS					
3. EMBANKMENTS AND SIDE SLOPES					
4. DEWATERING					
5. BASIN MAINTENANCE					
6. CONTROL OF MOSQUITOES					
7. EROSION REPAIR					
8. FENCE REPAIR					
9. SNOW AND ICE REMOVAL					
10. SAND LAYER REPLACEMENT					
11. OTHER					

C. AESTHETIC MAINTENANCE

WORK ITEMS	ITEMS REQUIRED	DATE REQUIRED	ITEMS DONE	DATE DONE	COMMENTS AND SPECIAL INSTRUCTIONS
1. GRAFFITI REMOVAL					
2. GRASS TRIMMING					
3. WEEDING					
4. OTHERS					

REMARKS (REFER TO ITEM NO. IF APPLICABLE) _____

WORK PERFORMED BY: _____

**MAINTENANCE WORK ORDER AND CHECKLIST
FOR STORMWATER MANAGEMENT FACILITIES**

NAME OF FACILITY _____
 LOCATION _____ DATE _____
 CREW _____ WORK STARTED _____
 EQUIPMENT _____ WORK COMPLETED _____
 WEATHER _____ TOTAL MANPOWER OF WORK _____

A. PREVENTATIVE MAINTENANCE

WORK ITEMS	ITEMS REQUIRED	ITEMS DONE	COMMENTS AND SPECIAL INSTRUCTIONS
1. GRASS CUTTING			
A. BOTTOMS			
B. EMBANKMENTS AND SIDE SLOPES			
C. PERIMETER AREAS			
D. ACCESS AREAS AND ROADS			
E. OTHERS			
2. GRASS MAINTENANCE			
A. FERTILIZING			
B. RE-SEEDING			
C. DE-THATCHING			
D. PEST CONTROL			
E. OTHERS			
3. VEGETATIVE COVER			
A. FERTILIZING			
B. PRUNING			
C. PEST CONTROL			
D. OTHERS			
4. TRASH AND DEBRIS REMOVAL			
A. BOTTOMS			
B. EMBANKMENTS AND SIDE SLOPES			
C. PERIMETER AREAS			
D. ACCESS AREAS AND ROADS			
E. INLETS			
F. OUTLETS AND TRASH RACKS			
G. OTHERS			
5. SEDIMENT REMOVAL			
A. INLETS			
B. OUTLETS AND TRASH RACKS			
C. BOTTOM			
D. OTHERS			
6. ELIMINATION OF POTENTIAL MOSQUITO BREEDING HABITATS			
7. UNDERGROUND BASIN MAINTENANCE			
A. BOTTOMS			
B. OUTLETS AND TRASH RACKS			
C. ACCESS HATCHES			
D. OTHERS			
8. INFILTRATION BASIN - TILING BOTTOM SAND LAYER			
9. OTHER PREVENTIVE MAINTENANCE			
A. PARKING LOT SWEEPING			
B. EMPTYING TRASH RECEPTACLES			

**MAINTENANCE WORK ORDER AND CHECKLIST
FOR STORMWATER MANAGEMENT FACILITIES**

NAME OF FACILITY _____
 LOCATION _____ DATE _____
 CREW _____ WORK STARTED _____
 EQUIPMENT _____ WORK COMPLETED _____
 WEATHER _____ TOTAL MANPOWER OF WORK _____

B. CORRECTIVE MAINTENANCE

WORK ITEMS	ITEMS REQUIRED	ITEMS DONE	COMMENTS AND SPECIAL INSTRUCTIONS
1. REMOVAL OF DEBRIS AND SEDIMENT			
2. STRUCTURAL REPAIRS			
3. EMBANKMENTS AND SIDE SLOPES			
4. DEWATERING			
5. BASIN MAINTENANCE			
6. CONTROL OF MOSQUITOES			
7. EROSION REPAIR			
8. FENCE REPAIR			
9. SNOW AND ICE REMOVAL			
10. OTHER			

C. AESTHETIC MAINTENANCE

WORK ITEMS	ITEMS REQUIRED (X)	ITEMS DONE (X)	LOCATION AND COMMENTS
1. GRAFFITI REMOVAL			
2. GRASS TRIMMING			
3. WEEDING			
4. OTHERS			

REMARKS (REFER TO ITEM NO. IF APPLICABLE) _____

WORK ORDER PREPARED BY: _____

**INSPECTION LOG
FOR STORMWATER MANAGEMENT FACILITIES**

NAME OF FACILITY _____
 LOCATION _____
 DATE _____
 WEATHER _____

A. PREVENTIVE MAINTENANCE

FACILITY ITEM	ITEMS REQUIRED	ITEMS DONE	COMMENTS AND SPECIAL INSTRUCTION
1. GRASS CUTTING			
A. BOTTOMS			
B. EMBANKMENTS AND SIDE SLOPES			
C. PERIMETER AREAS			
D. ACCESS AREAS AND ROADS			
E. OTHERS			
2. GRASS MAINTENANCE			
A. FERTILIZING			
B. RE-SEEDING			
C. DE-THATCHING			
D. PEST CONTROL			
E. OTHERS			
3. VEGETATIVE COVER			
A. FERTILIZING			
B. PRUNING			
C. PEST CONTROL			
D. OTHERS			
4. TRASH AND DEBRIS REMOVAL			
A. BOTTOMS			
B. EMBANKMENTS AND SIDE SLOPES			
C. PERIMETER AREAS			
D. ACCESS AREAS AND ROADS			
E. INLETS			
F. OUTLETS AND TRASH RACKS			
G. OTHERS			
5. SEDIMENT REMOVAL			
A. INLETS			
B. OUTLETS AND TRASH RACKS			
C. BOTTOM			
D. VORTECHNIC UNITS			
E. OTHERS			
6. ELIMINATION OF POTENTIAL MOSQUITO			
7. OTHER PREVENTIVE MAINTENANCE			
A. PARKING LOT SWEEPING			
B. EMPTYING TRASH RECEPTACLES			

**INSPECTION LOG
FOR STORMWATER MANAGEMENT FACILITIES**

NAME OF FACILITY _____
 LOCATION _____
 DATE _____
 WEATHER _____

B. CORRECTIVE MAINTENANCE

FACILITY ITEM	ITEMS REQUIRED	ITEMS DONE	COMMENTS AND SPECIAL INSTRUCTION
1. REMOVAL OF DEBRIS AND SEDIMENT			
2. STRUCTURAL REPAIRS			
3. EMBANKMENTS AND SIDE SLOPES			
4. BASIN MAINTENANCE			
5. CONTROL OF MOSQUITOES			
6. EROSION REPAIR			
7. FENCE REPAIR			
8. SNOW AND ICE REMOVAL			
9. BASIN DRAIN TIME			
10. OTHER			

C. AESTHETIC MAINTENANCE

FACILITY ITEM	ITEMS REQUIRED	ITEMS DONE	COMMENTS AND SPECIAL INSTRUCTION
1. GRASS TRIMMING			
2. WEEDING			
3. OTHERS			

REMARKS (REFER TO ITEM NO. IF APPLICABLE) _____

- (1) ITEMS CHECKED ARE IN GOOD CONDITION, AND THE MAINTENANCE PROGRAM IS ADEQUATE.
 - (2) ITEMS CHECKED REQUIRE ATTENTION, BUT DOES NOT PRESENT AN IMMEDIATE THREAT TO THE FACILITY FUNCTION OR OTHER FACILITY COMPONENTS.
 - (3) THE ITEMS CHECKED REQUIRES IMMEDIATE ATTENTION TO KEEP THE FACILITY OPERATIONAL OR TO PREVENT DAMAGE TO OTHER FACILITY COMPONENTS.
 - (4) PROVIDE EXPLANATION AND DETAILS IF COLUMNS 2 OR 3 ARE CHECKED.
- REMARKS (REFER TO ITEM NO. IF APPLICABLE)

INSPECTOR: _____