WHITESTONE
An Employee-Owned Company

16 OLD FORGE ROAD
SUITE A
ROCKY HILL, CT 06067
860.726.7889
whitestoneassoc.com

June 21, 2023

via email

KINCORA WATERFORD, LLC
c/o KINCORA DEVELOPMENT, LLC
170 Worcester Street
Suite 204
Wellesley Hills, Massachusetts 02481

Attention: Mr. William H. McCabe, III
Principal

Regarding: LIMITED GEOTECHNICAL INVESTIGATION
PROPOSED CHIPOTLE RESTAURANT
122-124 BOSTON POST ROAD
MAP 133, PORTIONS OF LOTS 569 & 570
WATERFORD, NEW LONDON COUNTY, CONNECTICUT
WHITESTONE PROJECT NO.: GM1613982.001

Dear Mr. McCabe:

Whitestone Associates, Inc. (Whitestone) has completed a limited geotechnical investigation at the above-referenced site. The results of the investigation and recommendations presented below are based on the soil conditions disclosed from a limited number of soil explorations conducted during Whitestone's field investigation. The purpose of the investigation was to assess subsurface conditions within and adjacent to the proposed development area accessible to a tracked excavator. Recommendations for support of the proposed structure and pavement, and anticipated earthwork requirements are included herein.

1.0 PROJECT DESCRIPTION

1.1 Site Location & Existing Conditions

The subject property, which is located at 122-124 Boston Post Road in Waterford, New London County, Connecticut, is further identified as Map 133, Lots 569 and 570. The portion of the parcel proposed for the *Chipotle* development is west of the *M&T Bank* building and northwest of the *ALDI* grocery store. The site, which currently is vacant, was previously occupied by a commercial structure demolished around 2007.

1.2 Site Geology

Based on a review of the *Surficial Materials Map of Connecticut (1992)*, the site is underlain by glacial till. The *Bedrock Geologic Map of Connecticut (1985)* indicates that the site is underlain by Proterozoic Z-age New London Gneiss, consisting of gneiss with minor amphibolite, part of the Eastern Uplands; Avalonian (Continental) Terrane; Avalonian Anticlinorium.

1.3 Proposed Construction

Based on a March 8, 2023 *Conceptual Plan*, prepared by RJO'Connell & Associates, Inc. of Stoneham, Massachusetts, the proposed development will include the construction of a *Chipotle* restaurant with a footprint of 2,325 square feet, a drive-thru, new pavements, and utilities. Access will be from Boston Post Road by access roadways for the adjacent bank and grocery store. The location is shown on attached Figure 1 - *Test Location Plan*.

The proposed building is anticipated to be a single-story, masonry and metal-framed structure with a ground-supported floor slab and no basement or crawl space. An underground stormwater management system is planned to the south of the restaurant. No new retaining walls are indicated.

Detailed structural information was not available at the time of this report, however, based on experience with similar facilities, Whitestone anticipates that maximum column, wall, and floor loads will be less than about 50 kips, 2.0 kips per lineal foot, and 150 pounds per square foot, respectively.

2.0 FIELD EXPLORATION & TESTING

2.1 Field Exploration

Field exploration at the project site consisted of advancing eight test pits (identified as TP-1 through TP-8) within accessible portions of the site. The explorations subsequently were backfilled to the surface with excavated soils from the investigation. The locations of the explorations are shown on the accompanying *Test Location Plan* included as Figure 1. *Records of Subsurface Exploration* are provided in Appendix A.

The subsurface tests were conducted in the presence of a Whitestone engineer, who conducted field tests, recorded visual classifications, and collected samples of the various strata encountered. The tests were located in the field using normal taping procedures and estimated right angles. These locations are presumed to be accurate within a few feet.

Groundwater level observations, where encountered, were recorded during and immediately after the completion of field operations prior to backfilling the tests. Seasonal variations, temperature effects, man-made effects, and recent rainfall conditions may influence the levels of the groundwater, and the observed levels will depend on the permeability of the soils. Groundwater elevations derived from sources other than seasonally observed groundwater monitor wells may not be representative of true groundwater levels.

2.2 Infiltration Testing

Test pits were completed to evaluate soil conditions prior to infiltration testing. Test pits TP-2 and TP-3 were advanced to depths of 7.2 feet below ground surface (fbgs) and 7.7 fbgs, respectively. Infiltration tests I-1 and I-2 were conducted as falling head tests in cased holes at the locations shown on the *Test Location Plan*. PVC casing, four inches in diameter, was installed to depths of seven fbgs and six fbgs. A thin layer of clean sand was placed at the bottom of the casing. The soil was pre-soaked for approximately one hour. Following testing, the casings were removed. The results are tabulated below.

SUMMARY OF INFILTRATION TESTING				
Location	**Approximate Ground Elevation (ft NAVD)**	**Test Depth (fbgs)**	**Approximate Test Elevation (ft NAVD)**	**Infiltration Rate (in/hr)**
I-1 (TP-2)	± 74.5	7.0	± 67.5	3.0
I-2 (TP-3)	± 72.5	6.0	± 66.5	2.0

NAVD = North American Vertical Datum (1988); ft - feet; in/hor - inches per hour

The infiltration testing was conducted within the natural glacial till. The measured infiltration results are reasonably consistent with the Rawls Rate of 1.02 to 2.41 for similar silty sand material. Typically, a Factor of Safety (FoS) is applied to measured infiltration rates to account for siltation and consolidation of soil below the systems over time. Safety factors used should consider how critical the systems are to the development and the available storage. If the system is critical or storage limited, a higher FoS should be applied. Infiltration rates are variable and dependent on test depth and stratification.

2.3 Laboratory Testing

Laboratory testing was conducted to determine additional, pertinent engineering characteristics of representative samples of on-site soils. The laboratory testing was conducted in general accordance with applicable ASTM standard test methods and included physical/textural testing of representative samples.

The results of the laboratory testing are presented in this section in a general manner and qualitatively interpreted. The results are incorporated into the findings and recommendations discussed throughout this report. Quantitative test results are provided in Appendix B.

Physical and Textural Analysis: Three representative samples were subjected to a laboratory testing program that included moisture content determinations (ASTM D2216) and washed gradation analyses (ASTM D422) in order to conduct supplementary engineering soil classifications in general accordance with ASTM D2487. The soil strata tested were classified by the Unified Soil Classification System (USCS), provided in Appendix C. The results of the laboratory testing are summarized in the following table.

PHYSICAL/TEXTURAL ANALYSES SUMMARY					
Exploration	**Sample**	**Depth (fbgs)**	**Moisture Content (%)**	**Passing No. 200 Sieve (%)**	**USCS Classification**
TP-2	S-3	6.0	9.1	33.3	SM
TP-4	S-1	2.0	10.3	28.0	FILL (SM)
TP-6	S-2	7.0	7.7	22.6	SM

The gradation analyses for the samples of glacial till indicated USDA classifications of “sand” and “sandy loam”. However, the glacial till in New England is typically classified according to USDA as “loamy sand” or “sandy loam”. The gradation analysis for the sample of existing fill indicated a USDA classification of “loamy sand”.

3.0 SUBSURFACE CONDITIONS

The subsurface soil conditions encountered within the subsurface tests conducted by Whitestone consisted of the following generalized strata in order of increasing depth. *Records of Subsurface Exploration* are provided in Appendix A.

Surface Cover Materials: The test pits encountered four inches to eight inches of topsoil at the ground surface. In test pit TP-4, the topsoil was underlain by two inches of asphaltic concrete.

Existing Fill: Beneath the surface cover materials, the test pits encountered existing fill, generally consisting of brown, silty sand with gravel to poorly graded sand with silt and gravel, brick and asphalt fragments, occasional cobbles and boulders. In test pits TP-5, TP-6, and TP-8, asphaltic concrete layers two inches to eight inches thick were encountered within the fill. Test pit TP-6 encountered refusal on a large boulder close to the ground surface and was offset to continue excavation. Where penetrated, the existing fill extended to depth of 1.7 fbgs to 5.6 fbgs.

Former Topsoil/Subsoil: Beneath the existing fill, test pits TP-2, TP-3, TP-5 and TP-8 encountered seven inches to 12 inches of former topsoil, generally underlain by 12 inches to 22 inches of former subsoil with roots. The former topsoil/subsoil extended to depths of 3.5 fbgs to 4.1 fbgs.

Glacial Till: Beneath the existing fill or former topsoil/subsoil, the test pits, except TP-4, encountered glacial till, consisting of gray, silty sand with gravel (USCS: SM), cobbles and boulders. Test pits TP-5 through TP-8 terminated in the glacial till at a depth of 10 fbgs. Test pits TP-1, TP-2, and TP-3 encountered excavator refusal on cobbles and boulders in the glacial till at depths of 7.2 fbgs to 8.5 fbgs.

Refusal Materials: Test pits TP-1, TP-2, and TP-3 encountered excavator refusal on boulders, at depths of 7.2 fbgs to 8.5 fbgs, that are likely directly above bedrock and may be dislodged pieces of bedrock. However, test pit TP-4 encountered excavator refusal on possible bedrock at a depth of 3.4 fbgs.

Groundwater: Groundwater was not encountered in the explorations during the investigation. There were no indications of estimated seasonal high groundwater (ESHGW) levels in the walls of the test pits. Groundwater levels should be expected to fluctuate seasonally and following periods of precipitation.

4.0 CONCLUSIONS & RECOMMENDATIONS

Contingent upon construction phase evaluation, Whitestone's findings indicate that the proposed building may be supported on conventional shallow foundations bearing on the approved glacial till and/or structural fill placed on the glacial till. Existing fill was encountered in the test pits up to a depth of 5.6 fbgs. Former topsoil/subsoil up to 2.5 feet in thickness was encountered beneath the existing fill in four test pits. Deeper existing fill and former topsoil/subsoil may be encountered during construction between the widely spaced explorations. Existing fill and former topsoil/subsoil should be overexcavated under footings and replaced with structural fill. A ground-supported floor slab may derive support from the inspected, approved, and improved existing fill, and/or controlled structural fill materials, provided any significant buried organic and asphaltic concrete materials are removed. Additionally, the site conditions support the use of typical pavement sections using standard CTDOT specified materials.

A commercial building previously occupied a portion of the site. Concrete elements associated with the demolished building may be encountered in excavations for the planned development.

The following recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions encountered within the limited exploration conducted. If there are any significant changes to the project characteristics or if significantly different subsurface conditions are encountered during construction, Whitestone should be consulted, such that the recommendations of this report can be reviewed.

4.1 Site Preparation & Earthwork

Surface Cover Stripping: Prior to stripping operations, utilities should be identified and secured. The surface cover materials to be stripped should be removed from within and at least five feet beyond the limits of the proposed building and pavement areas. The contractor should perform earthwork in accordance with the recommendations in this report, including backfilling any excavation with structural fill. Fill or backfill placed within areas requiring structural support, such as the proposed building area, should be placed as structural fill in accordance with Section 4.2 of this report.

Surface Preparation: Prior to placing granular subbase after grading is complete, the exposed soils should be compacted to a firm and unyielding surface with several passes in two perpendicular directions of a minimum 10-ton vibratory compactor. The surface should then be proofrolled with a loaded tandem axle truck in the presence of the geotechnical engineer to help identify soft or loose pockets that may require removal and replacement, or further evaluation. Proofrolling should be conducted after a suitable period of dry and non-freezing weather to reduce the likelihood of degrading an otherwise stable subgrade. Should construction be started during the winter months, Whitestone should be contacted for alternate surface preparation procedures. Fill and backfill should be placed and compacted in accordance with Section 4.2.

Excavation Difficulties: The very dense glacial till, which includes cobbles and boulders, will present excavation difficulties at marginal depths below the ground surface within portions of site. Excavation difficulties will be affected by excavation size and depth. The speed and ease of excavation also will depend on the type of equipment used and the skill of the operator. Although soil excavation will generally be feasible with a large excavator, a "hoe-ram" or other mechanical device may be required to break up larger boulders to facilitate excavation. In addition, possible shallow bedrock was encountered. The bedrock surface typically undulates and may also be encountered at shallow depths elsewhere on the site. The upper couple of feet of fractured/weathered bedrock can likely be broken up with the "hoe-ram" and removed with a large excavator. However, removal of any hard gneiss bedrock below the upper couple of feet of weathered and fractured rock will require significant effort.

Weather Performance Criteria: The site soils are moisture sensitive. Every effort should be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of excavations and prepared subgrades to rainfall. Accordingly, excavation and fill placement procedures should be conducted during favorable weather conditions. Overexcavation of wet or disturbed soils and replacement with controlled structural fill per the recommendations of this report may be required prior to resuming work on subgrade soils.

Subgrade Protection and Inspection: The site soils are moisture sensitive. Every effort should therefore be made to reduce disturbance of the on-site soils by construction traffic and surface runoff. The contractor should be responsible for protection of subgrades and minimization of exposure of the site soils to precipitation by covering stockpiles and subgrades with plastic and preventing ponding of water

by sealing subgrades before precipitation events and grading the site to allow proper drainage of surface water. The services of the geotechnical engineer should be retained to observe soil conditions during construction and review the suitability of prepared foundation subgrades for support of design loads.

Groundwater Control: Groundwater was not encountered during the exploration. However, shallow perched water may be encountered during construction above less permeable material, such as at the interface of the existing fill and natural glacial till. Construction phase dewatering may consist of removing surface water runoff, infiltrating water, or trapped water at this site. Whitestone anticipates that such construction phase dewatering would typically include installing temporary sump pits and filtered pumps within trenches and excavations. Whitestone recommends that foundation construction occur during periods of relatively dry weather. Every effort should be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of foundation areas to precipitation.

4.2 Structural Fill & Backfill

Imported Fill Material: Any imported material placed as structural fill or backfill to restore design grades should consist of clean, relatively well-graded sand or gravel with a maximum particle size of three inches and up to 15 percent of material finer than a #200 sieve. The material should be free of clay lumps, organics, and deleterious material. Any imported structural fill material should be approved by a qualified geotechnical engineer prior to delivery to the site.

Soil Reuse: Whitestone anticipates that only limited portions of the existing fill and glacial till will be suitable for selective reuse as structural fill/backfill material, provided that soil moisture contents are controlled within three percent of optimum moisture level, particles larger than three inches in diameter are either removed or crushed, and any deleterious material, such as the former topsoil/organic subsoil and asphaltic concrete, is segregated. The site soils have a relatively high fines content. Prior to reuse, drying will likely be necessary for these materials or mixing with more granular materials. In addition, reuse of on-site soil with a higher fines content should not be attempted during inclement weather or in damp conditions. Cobbles and boulders should be crushed or discarded. Reuse of the site soils will be contingent on careful review in the field by the owner's geotechnical engineer by visual observation during construction as recommended herein.

Compaction and Placement Requirements: Fill and backfill should be placed in maximum 12-inch thick loose lifts when compacted using a vibratory drum roller with a minimum weight of one ton, and in maximum eight-inch thick loose lifts when compacted with a plate compactor. Structural fill and backfill should be compacted to at least 95 percent of the maximum dry density within three percent of the optimum moisture content, as determined by ASTM D1557 (Modified Proctor). Whitestone recommends using only a small hand-held vibratory compactor to compact the on-site soils within footing excavations.

4.3 Foundation Design Criteria

Foundations: Contingent upon construction phase evaluation, Whitestone preliminarily recommends supporting the proposed building on conventional shallow spread foundations designed to bear within the approved glacial till and/or on controlled structural fill materials that are properly placed and compacted as described herein. Existing fill was encountered in the test pits up to a depth of 5.6 fbgs. Former topsoil/subsoil up to 2.5 feet in thickness was encountered beneath the existing fill in four test pits. Deeper existing fill and former topsoil/subsoil may be encountered during construction between the widely spaced explorations. Existing fill and former topsoil/subsoil should be overexcavated under footings and replaced with structural fill. Foundations bearing within these materials may be designed

using a presumptive load-bearing value of 4,000 pounds per square foot. Regardless of loading conditions, new foundations should be sized no less than minimum dimensions of 24 inches for continuous wall footings and 36 inches for isolated column footings.

Foundation subgrades should be reviewed by the geotechnical engineer. Where exposed in footing excavations, significant organic and asphaltic concrete materials should be "chased out" under the proposed floor slab and replaced with structural fill. Foundation subgrades should be compacted in the presence of the geotechnical engineer to densify loose upper soils and disturbed soils.

Footings subject to lateral loads and/or overturning should be designed so that the maximum toe pressure due to the combined effect of vertical loads and overturning moment does not exceed the presumptive load-bearing value. In addition, positive contact pressure should be maintained throughout the base of the footings such that no uplift or tension exists between the base of the footings and the supporting soil. Uplift loads should be resisted by the weight of the concrete. Side friction should be neglected when proportioning the footings so that lateral resistance should be provided by friction resistance at the base of the footings. An allowable coefficient of friction against sliding of 0.4 is recommended for use in the design of the foundations bearing within the existing site soils or imported structural fill soils.

Seismic Site Class: Based on a review of the subsurface conditions relevant to the *Connecticut State Building Code*, the subject site has been assigned a Site Class C. The site soils are not susceptible to earthquake induced liquefaction.

Inspection/Overexcavation Criteria: Whitestone recommends that the suitability of the bearing soils at the footing bottoms be reviewed by a geotechnical engineer immediately prior to placing concrete for the footings. In the event that areas of unsuitable materials are encountered, additional overexcavation and replacement of the materials may be necessary to provide a suitable footing subgrade. Any overexcavation to be restored with structural fill should extend at least one foot laterally beyond footing edges for each vertical foot of overexcavation. Lateral overexcavation may be eliminated if grades are restored with lean concrete.

Frost Coverage: Footings subject to frost action should be placed at least 42 inches below adjacent exterior grades, in accordance with the *Connecticut State Building Code*, to provide protection from frost penetration. Interior footings not subject to frost action (including during construction) may be placed at a minimum depth of 18 inches below the floor slab subgrade, but should not be placed on existing fill or over former topsoil/subsoil.

Settlement: Whitestone estimates post construction settlements of proposed foundations of less than one inch, if the recommendations outlined in this report are properly implemented. Differential settlement of spread foundations should be less than one half inch.

4.4 Floor Slab

Whitestone anticipates that the properly inspected and approved existing fill (improved with thorough surface compaction), and/or compacted structural fill will be suitable for support of the proposed floor slab, provided these materials are properly evaluated, compacted, and proofrolled in accordance with the recommendations of this report during favorable weather conditions. Areas of overexcavation should be anticipated if the subgrades are exposed to precipitation and because of the inherent variability of the existing fill and presence of organic materials. However, supporting the floor slab on existing fill will require that significant organic material and asphaltic concrete layers be removed under the building

footprint. Where exposed in footing excavations, significant organic material and asphaltic concrete layers should be "chased out" under the proposed floor slab and replaced with structural fill. Shallow test pits should also be excavated within the building footprint to further delineate significant organic material and asphaltic concrete layers, and facilitate their removal and replacement with structural fill.

Areas that are, or become, softened or disturbed as a result of wetting and/or repeated exposure to construction traffic should be removed and replaced with compacted structural fill. The properly prepared on-site soils are expected to yield a minimum subgrade modulus (k) of 150 psi/in.

A minimum 12-inch layer of CTDOT *M.05.01 Processed Aggregate Base* (or approved equivalent) should be placed below the floor slab to provide a uniform granular base. If the floor slab has a moisture-sensitive covering and/or supports moisture-sensitive equipment, a moisture vapor barrier should be installed beneath the slab in accordance with flooring manufacturer's recommendations.

4.5 Pavement Design

Whitestone anticipates that the properly inspected and approved existing fill (improved with thorough surface compaction), and/or compacted structural fill and/or backfill placed to raise or restore design elevations will be suitable for support of the proposed pavements, provided these materials are properly evaluated, compacted, and proofrolled in accordance with the recommendations in this report during favorable weather conditions.

A California Bearing Ratio value of 8.0 has been assigned to the properly prepared subgrade soils for pavement design purposes. This value was correlated with pertinent soil support values and assumed traffic loads to a prepare flexible pavement design per the AASHTO *Guide for the Design of Pavement Structures*.

Design traffic loads were assumed based on typical volumes for similar facilities and correlated with 18-kip equivalent single axle loads (ESAL) for a 20-year life. Estimated maximum pavement loads of 30,000 ESALs and 75,000 ESALs were used for the standard-duty and heavy-duty pavement areas, respectively. These values assume the pavements primarily will accommodate both automobile and limited heavier truck traffic, with the heavier truck traffic designated to the main drive lanes. Actual loading experienced is anticipated to be less than these values.

Pavement components should meet material specifications from CTDOT *Standard Specifications* specified below. The recommended flexible pavement sections are tabulated below:

FLEXIBLE PAVEMENT SECTION			
Layer	**Material**	**Standard-Duty Thickness (inches)**	**Heavy-Duty Thickness (inches)**
Asphalt Wearing Course	CTDOT HMA S0.375 (Superpave); PG 64S-22	1.5	1.5
Asphalt Binder Course	CTDOT HMA S0.5 (Superpave); PG 64S-22	1.5	2.5
Granular Base	CTDOT M.05.01 Processed Aggregate Base	6.0	6.0
Granular Subbase	CTDOT M.02.02 Subbase; M.02.06 Gradation A	6.0	6.0

Rigid concrete pavement should be used to provide suitable support at areas of high traffic or severe turns, such as at ingress/egress locations and the trash enclosure. The recommended rigid pavement is tabulated in the following table:

RIGID PAVEMENT SECTION		
Layer	**Material**	**Thickness (inches)**
Surface	4,000 psi Air-Entrained Concrete	6.0 [1]
Granular Base	CTDOT M.05.01 Processed Aggregate Base	6.0
Granular Subbase	CTDOT M.02.02 Subbase; M.02.06 Gradation A	6.0

[1] The outer edges of concrete pavements are susceptible to damage as trucks move from rigid pavement to adjacent flexible pavement. Therefore, the thickness at the outer two feet of the rigid concrete pavement should be 12 inches. The concrete should be reinforced with at least one layer of 6-inch by 6-inch W5.4/W5.4 welded wire fabric (ASTM A185).

The pavement section thickness designs presented in this report are based on the design parameters detailed herein and are contingent on proper construction, inspection, and maintenance. Additional pavement thickness may be required by local code. The designs are contingent on achieving the minimum soil support value in the field. To accomplish this requirement, subgrade soil and supporting fill or backfill should be placed, compacted, and evaluated in accordance with the recommendations of this report. Proper drainage should be provided for the pavement structure, including appropriate grading and surface water control.

The performance of the pavement also will depend on the quality of materials and workmanship. Whitestone recommends that CTDOT standards for materials, workmanship, and maintenance be applied to this site. Project specifications should include verifying that the installed asphaltic concrete material composition is within tolerance for the specified materials and that the percentage of air voids of the installed pavement is within specified ranges for the respective materials. Rigid concrete pavements should be suitably air-entrained, jointed, and reinforced in general accordance with ACI 330R-08 *Guide for the Design and Construction of Concrete Parking Lots*.

4.6 Excavations

The site soils encountered during this investigation typically are, at a minimum, consistent with Type C Soil Conditions as defined by 29 CFR Part 1926 (OSHA), which require a maximum unbraced excavation angle of 1.5:1 (horizontal:vertical). Actual conditions encountered during construction should be evaluated by a competent person (as defined by OSHA), so that safe excavation methods and/or shoring and bracing requirements are implemented.

5.0 SUPPLEMENTAL POST INVESTIGATION SERVICES

Construction Phase Evaluation of Existing Fill and Organic/Asphaltic Concrete Material: Whitestone recommends further reviewing the condition of the site soils for floor slab support, and/or re-use of existing fill as structural fill by means of supplemental test pit evaluation during the early stages of construction, as discussed further herein, to identify areas requiring removal and possible uncontrolled conditions or deleterious materials not disclosed by the soil explorations conducted during the exploration. The test pits should also further delineate the buried organic and asphaltic concrete materials, and facilitate their removal and replacement with structural fill.

Construction Inspection and Monitoring: The owner's geotechnical engineer with specific knowledge of the site subsurface conditions and design intent should conduct inspection, testing, and consultation during construction as described in previous sections of this report. Monitoring and testing should also be conducted to confirm that any encountered underground structures, such as foundations and slabs of the former building on the site, are properly backfilled and suitable materials, used for controlled fill, are properly placed and compacted over suitable subgrade soils. The proofrolling of all subgrades prior to foundation, floor slab, and pavement support should be witnessed and documented by the owner's geotechnical engineer.

6.0 CLOSING

Whitestone's Geotechnical Division appreciates the opportunity to be of service to Kincora Waterford, LLC and Kincora Development, LLC. Please note that Whitestone has the capability to conduct the additional geotechnical engineering services recommended herein. Please contact us with any questions regarding this report.

Sincerely,

WHITESTONE ASSOCIATES, INC.

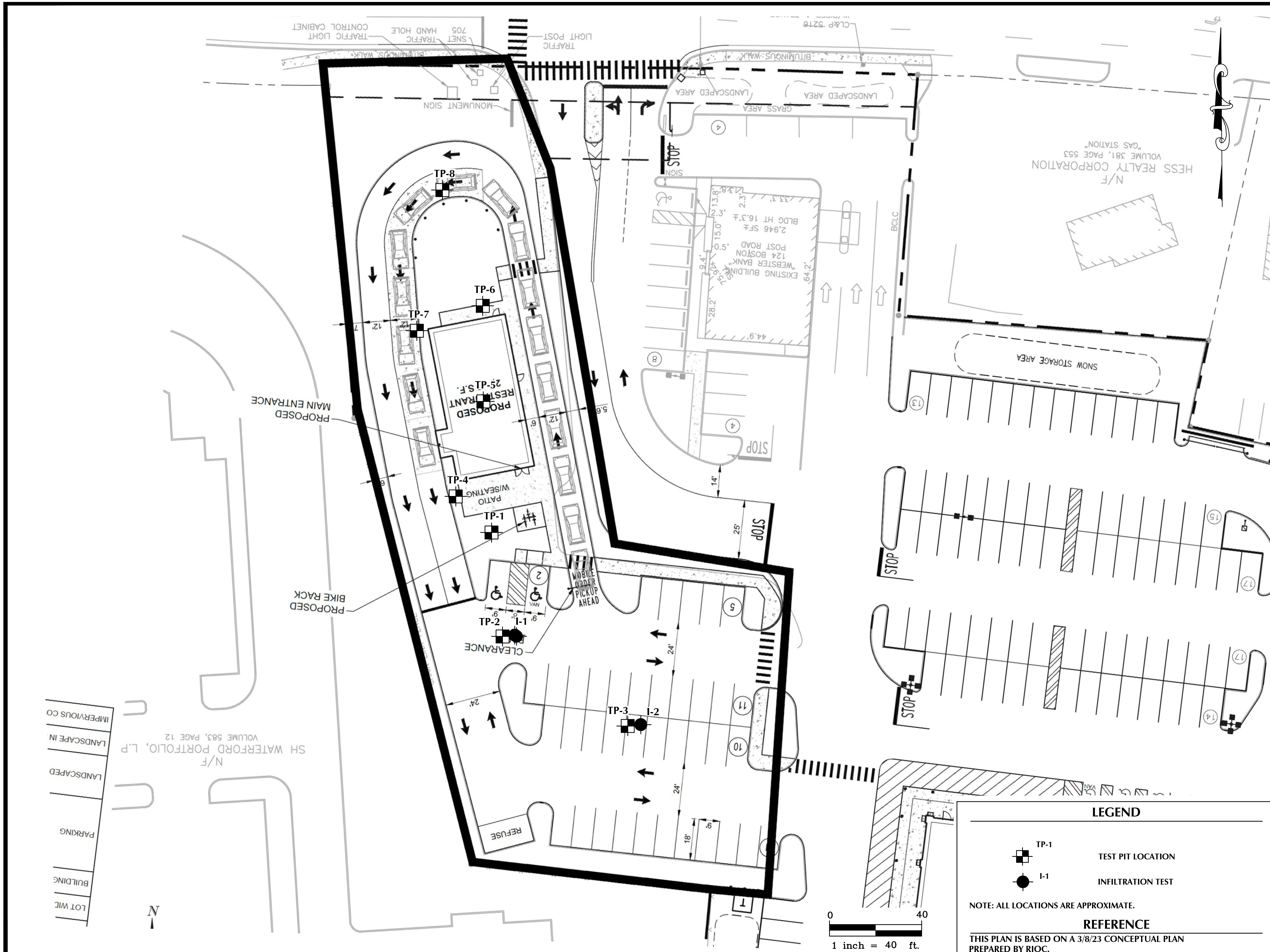
Jason R. Landry
Senior Project Manager

Ryan R. Roy, P.E.
Vice President

RWM/lc N:\Job Folders\2016\1613982GM\Reports and Submittals\Kincora Chipotle Waterford CT GM1613982.001 LimGI 6-21-23.docx,

WHITESTONE

FIGURE 1
Test Location Plan



LEGEND

TP-1 — TEST PIT LOCATION

I-1 — INFILTRATION TEST

NOTE: ALL LOCATIONS ARE APPROXIMATE.

REFERENCE

THIS PLAN IS BASED ON A 3/8/23 CONCEPTUAL PLAN PREPARED BY RJOC.

WHITESTONE
An Employee-Owned Company
16 OLD FORGE ROAD, SUITE A, ROCKY HILL, CT 06067
860.726.7889 WHITESTONEASSOC.COM

DRAWING TITLE: **TEST LOCATION PLAN**

CLIENT: **KINCORA WATERFORD, LLC**

PROJECT: **PROPOSED CHIPOTLE RESTAURANT 122-124 BOSTON POST ROAD WATERFORD, NEW LONDON COUNTY, CONNECTICUT**

PROJECT #: GM1613982.001	
DESIGNED BY: MR	PROJ. MGR.: RR
DATE: 6/20/23	FIGURE: 1
SCALE: 1" = 40'	

WHITESTONE

APPENDIX A
Records of Subsurface Exploration

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-1

Page 1 of 1

Project: Proposed Chipotle Restaurant | **WAI Project No.:** GM1613982.001

Location: 122-124 Boston Post Road, Waterford, New London County, Connecticut | **Client:** Kincora Waterford, LLC

Surface Elevation:	± 75.0 feet NAVD88	**Date Started:**	5/23/2023	**Water Depth (feet bgs) | Elevation (ft NAVD88)**	**Cave-In Depth (feet bgs) | Elevation (ft NAVD88)**
Termination Depth:	8.5 feet bgs	**Date Completed:**	5/23/2023		
Proposed Location:	Building	**Logged By:**	ZH	**During:** -- | --	
Excavating Method:	Compact Excavator	**Contractor:**	GS	**At Completion:** -- | --	**At Completion:** -- | --
Test Method:	Visual Observation	**Rig Type:**	John Deere 60G	**24 Hours:** -- | --	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		4" Topsoil	No indication of ESHGW
1	1	Grab		EXISTING FILL		Brown, Silty Sand with Gravel, Brick/Asphalt Fragments, Cobbles, Boulders (FILL)	
3	2	Grab					
			4.3				
			5.0				
6	3	Grab		GLACIAL TILL		Gray, Silty Sand with Gravel, Occasional Cobbles and Boulders (SM)	
						Test Pit Log TP-1 Terminated upon Refusal at Depth of 8.5 Feet Below Ground Surface	
			10.0				
			15.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-2

Page 1 of 1

Project:	Proposed Chipotle Restaurant	**WAI Project No.:**	GM1613982.001
Location:	122-124 Boston Post Road, Waterford, New London County, Connecticut	**Client:**	Kincora Waterford, LLC

Surface Elevation:	± 75.0 feet NAVD88	**Date Started:**	5/23/2023		**Water Depth (feet bgs) | Elevation (ft NAVD88)**	**Cave-In Depth (feet bgs) | Elevation (ft NAVD88)**	
Termination Depth:	7.2 feet bgs	**Date Completed:**	5/23/2023				
Proposed Location:	SWM Area	**Logged By:**	ZH	**During:**	-- | --		
Excavating Method:	Compact Excavator	**Contractor:**	GS	**At Completion:**	-- | --	**At Completion:**	-- | --
Test Method:	Visual Observation	**Rig Type:**	John Deere 60G	**24 Hours:**	-- | --		

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		6" Topsoil	No indication of ESHGW
1	1	Grab		EXISTING FILL		Brown, Silty Sand (FILL)	
			2.5				
				TOPSOIL		12" Former Topsoil	
			3.5				
4	2	Grab		GLACIAL TILL		Brown to Gray, Silty Sand with Gravel, Occasional Cobbles and Boulders (SM)	
			5.0				
6	3	Grab					Infiltration Test @ 6 fbgs
			10.0			Test Pit Log TP-2 Terminated upon Refusal at Depth of 7.2 Feet Below Ground Surface	
			15.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-3

Page 1 of 1

Project:	Proposed Chipotle Restaurant	**WAI Project No.:**	GM1613982.001
Location:	122-124 Boston Post Road, Waterford, New London County, Connecticut	**Client:**	Kincora Waterford, LLC
Surface Elevation:	± 72.0 feet NAVD88	**Date Started:**	5/23/2023
Termination Depth:	7.7 feet bgs	**Date Completed:**	5/23/2023
Proposed Location:	SWM Area	**Logged By:**	ZH
Excavating Method:	Compact Excavator	**Contractor:**	GS
Test Method:	Visual Observation	**Rig Type:**	John Deere 60G

	Water Depth (feet bgs)	Elevation (ft NAVD88)	Cave-In Depth (feet bgs)	Elevation (ft NAVD88)
During:	--	--		
At Completion:	--	--	**At Completion:**	-- / --
24 Hours:	--	--		

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		8" Topsoil	No indication of ESHGW
1	1	Grab		EXISTING FILL		Brown, Silty Sand with Gravel, Asphalt Fragments, Occ. Cobbles and Boulders (FILL)	
			2.0				
			3.0	TOPSOIL		12" Former Topsoil	
			4.0	SUBSOIL		12" Former Subsoil, Roots	
			5.0				
6	2	Grab		GLACIAL TILL		Gray, Silty Sand with Gravel (SM)	Infiltration Test @ 6 fbgs
			10.0			Test Pit Log TP-3 Terminated upon Refusal at Depth of 7.7 Feet Below Ground Surface	
			15.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-4

Page 1 of 1

Project:	Proposed Chipotle Restaurant	**WAI Project No.:**	GM1613982.001
Location:	122-124 Boston Post Road, Waterford, New London County, Connecticut	**Client:**	Kincora Waterford, LLC

Surface Elevation:	± 76.0 feet NAVD88	**Date Started:**	5/23/2023		**Water Depth (feet bgs)**	**Elevation (ft NAVD88)**	**Cave-In Depth (feet bgs)** / **Elevation (ft NAVD88)**
Termination Depth:	3.4 feet bgs	**Date Completed:**	5/23/2023				
Proposed Location:	Building	**Logged By:**	ZH	**During:**	--	--	
Excavating Method:	Compact Excavator	**Contractor:**	GS	**At Completion:**	--	--	**At Completion:** -- / --
Test Method:	Visual Observation	**Rig Type:**	John Deere 60G	**24 Hours:**	--	--	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		4" Topsoil over 2" Asphalt	No indication of ESHGW
				EXISTING FILL		Brown, Silty Sand with Gravel (FILL)	
2	1	Grab					
						Test Pit Log TP-4 Terminated upon Refusal at Depth of 3.4 Feet Below Ground Surface	
			5.0				
			10.0				
			15.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-5

Page 1 of 1

Project:	Proposed Chipotle Restaurant	**WAI Project No.:**	GM1613982.001
Location:	122-124 Boston Post Road, Waterford, New London County, Connecticut	**Client:**	Kincora Waterford, LLC

Surface Elevation:	± 76.0 feet NAVD88	**Date Started:**	5/23/2023		**Water Depth (feet bgs)**	**Elevation (ft NAVD88)**	**Cave-In Depth (feet bgs) / Elevation (ft NAVD88)**
Termination Depth:	10.0 feet bgs	**Date Completed:**	5/23/2023				
Proposed Location:	Building	**Logged By:**	ZH	**During:**	--	--	
Excavating Method:	Compact Excavator	**Contractor:**	GS	**At Completion:**	--	--	**At Completion:** -- / --
Test Method:	Visual Observation	**Rig Type:**	John Deere 60G	**24 Hours:**	--	--	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		6" Topsoil	No indication of ESHGW
				EXISTING FILL		Brown, Poorly Graded Sand with Silt and Gravel (FILL)	2" Asphalt @ 1.4 fbgs
2	1	Grab	1.8				
			2.7	TOPSOIL		10" Former Topsoil	
				SUBSOIL		12" Former Subsoil, Roots	
			3.5				
			5.0	GLACIAL TILL		Gray, Silty Sand with Gravel, Occasional Cobbles and Boulders (SM)	
			10.0				
						Test Pit Log TP-5 Terminated at Depth of 10 Feet Below Ground Surface	
			15.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-6

Page 1 of 1

Project:	Proposed Chipotle Restaurant	**WAI Project No.:**	GM1613982.001
Location:	122-124 Boston Post Road, Waterford, New London County, Connecticut	**Client:**	Kincora Waterford, LLC

Surface Elevation:	± 77.0 feet NAVD88	**Date Started:**	5/23/2023		**Water Depth (feet bgs)**	**Elevation (ft NAVD88)**	**Cave-In Depth (feet bgs) / Elevation (ft NAVD88)**
Termination Depth:	10.0 feet bgs	**Date Completed:**	5/23/2023				
Proposed Location:	Building	**Logged By:**	ZH	**During:**	--	--	
Excavating Method:	Compact Excavator	**Contractor:**	GS	**At Completion:**	--	--	**At Completion:** -- / --
Test Method:	Visual Observation	**Rig Type:**	John Deere 60G	**24 Hours:**	--	--	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		5" Topsoil	No indication of ESHGW
				EXISTING FILL		Brown, Poorly Graded Sand with Silt and Gravel, Occ. Cobbles and Boulders (FILL)	Boulder @ 2 fbgs Test pit offset 5" Asphalt @ 1.2 fbgs
4	1	Grab					
			5.0				
			5.6				
7	2	Grab		GLACIAL TILL		Gray, Silty Sand with Gravel, Occasional Cobbles and Boulders (SM)	
			10.0				
						Test Pit Log TP-6 Terminated at Depth of 10 Feet Below Ground Surface	
			15.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-7

Page 1 of 1

Project: Proposed Chipotle Restaurant — **WAI Project No.:** GM1613982.001

Location: 122-124 Boston Post Road, Waterford, New London County, Connecticut — **Client:** Kincora Waterford, LLC

Surface Elevation: ± 77.0 feet NAVD88
Termination Depth: 10.0 feet bgs
Proposed Location: Building
Excavating Method: Compact Excavator
Test Method: Visual Observation

Date Started: 5/23/2023
Date Completed: 5/23/2023
Logged By: ZH
Contractor: GS
Rig Type: John Deere 60G

	Water Depth (feet bgs)	Elevation (ft NAVD88)
During:	--	--
At Completion:	--	--
24 Hours:	--	--

Cave-In Depth (feet bgs)	Elevation (ft NAVD88)
At Completion: --	--

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		4" Topsoil	No indication of ESHGW
2	1	Grab		EXISTING FILL		Brown, Poorly Graded Sand wth Silt and Gravel, Asphalt Fragments, Occ. Cobbles and Boulders (FILL)	
			4.0				Pipe encountered.
			5.0				
7	2	Grab		GLACIAL TILL		Gray, Silty Sand with Gravel, Occasional Cobbles and Boulders (SM)	
			10.0				
						Test Pit Log TP-7 Terminated at Depth of 10 Feet Below Ground Surface	
			15.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-8

Page 1 of 1

Project:	Proposed Chipotle Restaurant	**WAI Project No.:**	GM1613982.001
Location:	122-124 Boston Post Road, Waterford, New London County, Connecticut	**Client:**	Kincora Waterford, LLC

				Water Depth | Elevation (feet bgs) | (ft NAVD88)	Cave-In Depth | Elevation (feet bgs) | (ft NAVD88)
Surface Elevation:	± 77.0 feet NAVD88	**Date Started:**	5/23/2023		
Termination Depth:	10.0 feet bgs	**Date Completed:**	5/23/2023		
Proposed Location:	Drive-thru	**Logged By:**	ZH	**During:** -- | --	
Excavating Method:	Compact Excavator	**Contractor:**	GS	**At Completion:** -- | --	**At Completion:** -- | --
Test Method:	Visual Observation	**Rig Type:**	John Deere 60G	**24 Hours:** -- | --	

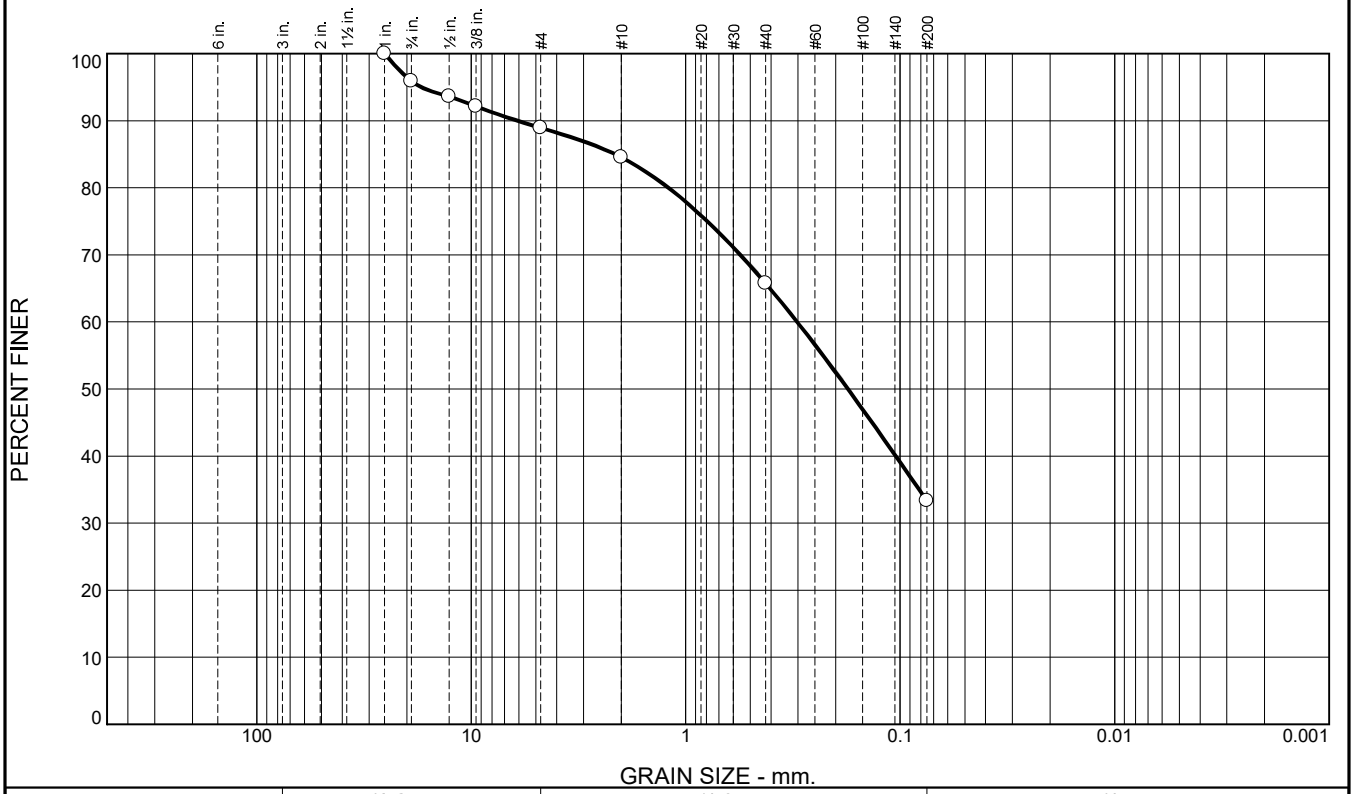
SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TOPSOIL		6" Topsoil	No indication of ESHGW
				EXISTING FILL		Brown, Poorly Graded Sand with Silt and Sand, Occ. Cobbles and Boulders (FILL)	8" Asphalt @ 1 fbgs
			1.7				
			2.3	TOPSOIL		7" Former Topsoil	
				SUBSOIL		22" Former Subsoil, Roots	
4	1	Grab	4.1				
			5.0				
7	2	Grab		GLACIAL TILL		Gray, Silty Sand with Gravel, Occasional Cobbles and Boulders (SM)	
			10.0				
						Test Pit Log TP-8 Terminated at Depth of 10 Feet Below Ground Surface	
			15.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

APPENDIX B
Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.1	7.0	4.4	18.7	32.5	33.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	95.9		
1/2"	93.6		
3/8"	92.1		
#4	88.9		
#10	84.5		
#40	65.8		
#200	33.3		

* (no specification provided)

Material Description

Silty Sand

Atterberg Limits

PL= NP LL= NV PI= NV

Coefficients

D_{90}= 6.1104 D_{85}= 2.1410 D_{60}= 0.3025
D_{50}= 0.1755 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 9.1%

Location: TP-2
Depth: 6'

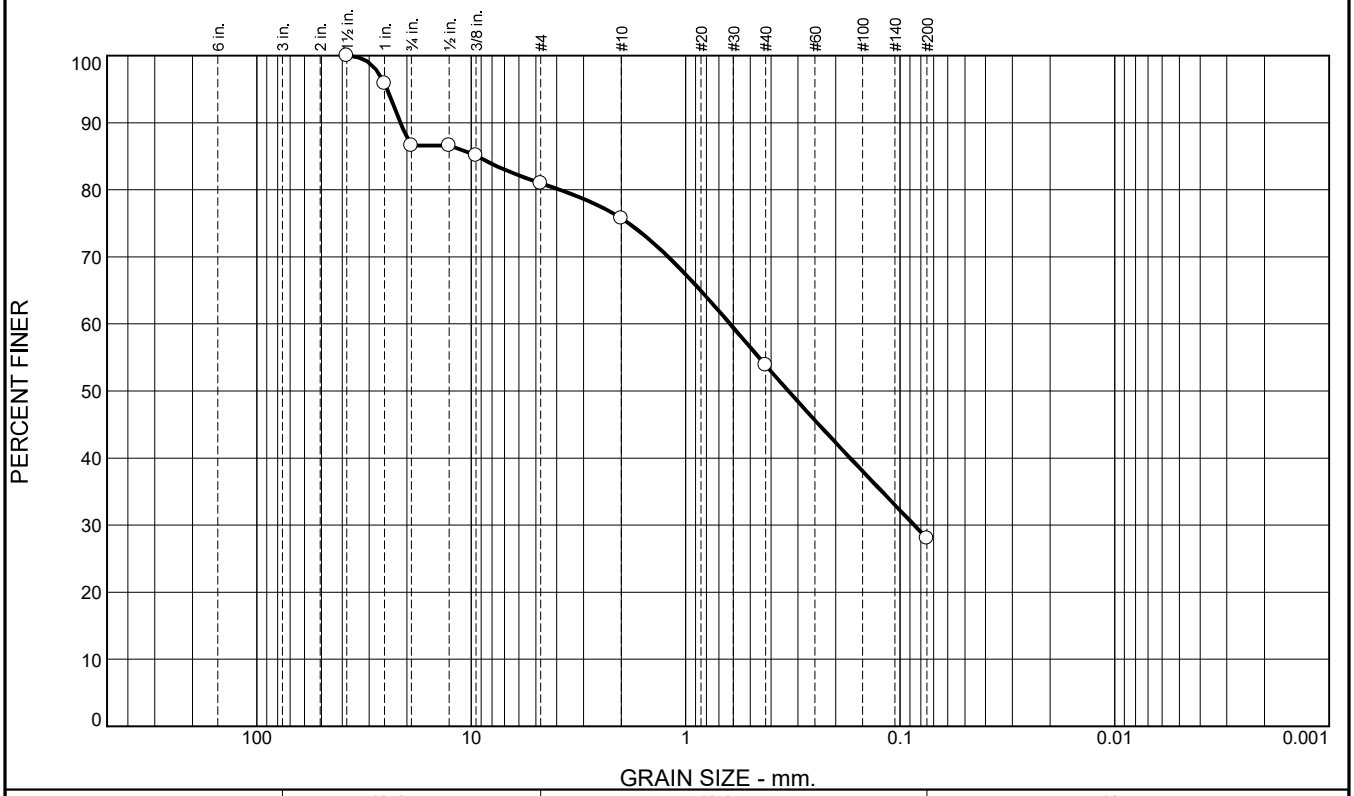
Date: 5/25/23

WHITESTONE

Client: Kincora Waterford, LLC
Project: Proposed Chipotle Restaurant
122-124 Boston Post Road, Waterford, New London County, CT
Project No: GM1613982.001 **Figure** S-1

Tested By: MM **Checked By:** RR

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.4	5.6	5.3	21.8	25.9	28.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5"	100.0		
1"	95.8		
3/4"	86.6		
1/2"	86.6		
3/8"	85.1		
#4	81.0		
#10	75.7		
#40	53.9		
#200	28.0		

* (no specification provided)

Material Description

Silty Sand with Gravel

Atterberg Limits

PL= NP LL= NV PI= NV

Coefficients

D_{90}= 21.4387 D_{85}= 9.3718 D_{60}= 0.6217
D_{50}= 0.3323 D_{30}= 0.0861 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 10.3%

Location: TP-4
Depth: 2'

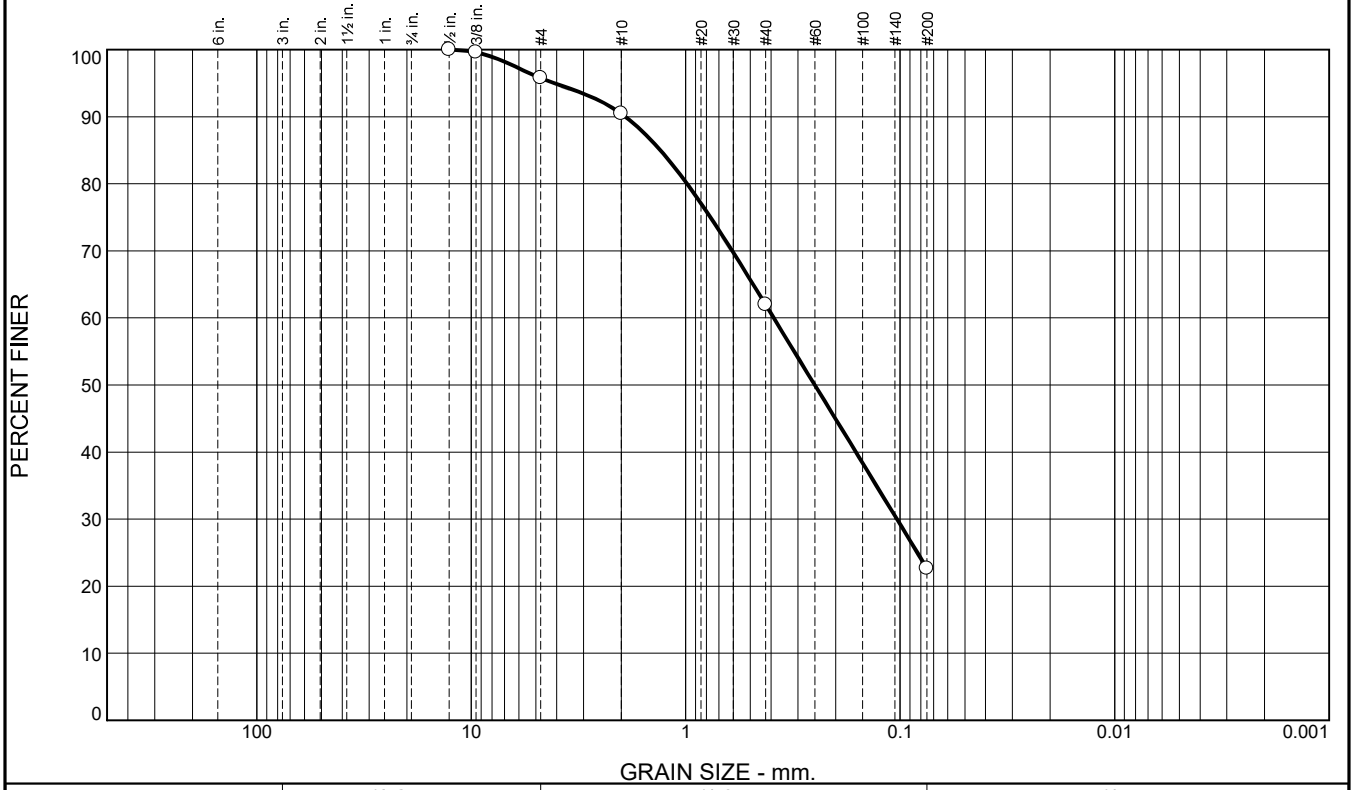
Date: 6/12/23

WHITESTONE

Client: Kincora Waterford, LLC
Project: Proposed Chipotle Restaurant
122-124 Boston Post Road, Waterford, New London County, CT
Project No: GM1613982.001 **Figure** S-2

Tested By: MM **Checked By:** RWM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.2	5.4	28.4	39.4	22.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	99.6		
#4	95.8		
#10	90.4		
#40	62.0		
#200	22.6		

* (no specification provided)

Material Description

Silty Sand

Atterberg Limits

PL= NP LL= NV PI= NV

Coefficients

D_{90}= 1.9148 D_{85}= 1.3166 D_{60}= 0.3892
D_{50}= 0.2503 D_{30}= 0.1037 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 7.7%

Location: TP-6
Depth: 7'

Date: 6/12/23

WHITESTONE

Client: Kincora Waterford, LLC
Project: Proposed Chipotle Restaurant
122-124 Boston Post Road, Waterford, New Haven County, CT
Project No: GM1613982.001 **Figure** S-3

Tested By: MM **Checked By:** RWM

WHITESTONE

APPENDIX C
Supplemental Information (USCS, Terms & Symbols)

WHITESTONE
An Employee-Owned Company

16 Old Forge Road
Suite A
Rocky Hill, CT 06067
860.726.7889
whitestoneassoc.com

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMITS LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMITS GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

GRADATION*

% FINER BY WEIGHT

TRACE..... 1% TO 10%
LITTLE..... 10% TO 20%
SOME..... 20% TO 35%
AND..... 35% TO 50%

COMPACTNESS*
Sand and/or Gravel

RELATIVE DENSITY

LOOSE. ..... 0% TO 40%
MEDIUM DENSE.... 40% TO 70%
DENSE..... 70% TO 90%
VERY DENSE..... 90% TO 100%

CONSISTENCY*
Clay and/or Silt

RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT

VERY SOFT..... LESS THAN 250
SOFT..... ..... 250 TO 500
MEDIUM..... 500 TO 1000
STIFF..... 1000 TO 2000
VERY STIFF..... 2000 TO 4000
HARD..... GREATER THAN 4000

** VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.*

L:\Geotechnical Forms and References\Reports\USCSTRMSSYM CT.docx

WHITESTONE
An Employee-Owned Company

16 OLD FORGE ROAD
SUITE A
ROCKY HILL, CT 06067
860.726.7889
whitestoneassoc.com

GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.
Qu: Unconfined compressive strength, TSF.
Qp: Penetrometer value, unconfined compressive strength, TSF.
Mc: Moisture content, %.
LL: Liquid limit, %.
PI: Plasticity index, %.
δd: Natural dry density, PCF.
▼: Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

NE: Not Encountered (Groundwater was not encountered).
SS: Split-Spoon - 1 ⅜" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
AU: Auger Sample.
OB: Diamond Bit.
CB: Carbide Bit
WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

Term (Non-Cohesive Soils)	Standard Penetration Resistance
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

Term (Cohesive Soils)	Qu (TSF)
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		