REPORT

OF

SUBSURFACE EXPLORATION

FOR

CUY-INNERBELT

INNERBELT CORRIDOR PROJECT – RETAINING WALLS

PID 77510 & 25795

For:

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DLZ Job No. 0422-1007.00

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1.0 INTRODUCTION

This document reports the findings of the preliminary subsurface exploration for the proposed structures along the Interstate 90 (I-90) alignment, between Chester Avenue and Cedar Avenue in the city of Cleveland. Included are preliminary evaluations of the proposed cast in place (CIP) retaining wall near the Mather Mansion and preliminary recommendations for the proposed tied-back soldier pile wall near the Juvenile Justice Center. It is anticipated that the proposed CIP retaining wall on the westbound side of I-90, between Chester Avenue and Euclid Avenue (Station 220+30 to 228+70), will be up to 31 feet in height. The proposed retaining wall structure along the eastbound I-90 Carnegie Avenue off-ramp (Station 200+10 to 209+80) will have an approximate maximum height of 35 feet.

The findings and recommendations presented in this report should be considered preliminary. Additional exploration and testing is planned to better define the soil conditions at the site.

2.0 GEOTECHNICAL RECONNAISSANCE AND PLANNING

2.1 Literature Reviews

2.1.1 Physical Setting and Geology

Physiographically, Cuyahoga County falls in the northern end of the Appalachian Plateaus Province and the Eastern Lake Section of the Central Lowlands Province. The physiographic units covering the Cleveland area are the Lake Plain, the Portage Escarpment and the Allegheny Plateau.

The Lake Plain slopes smoothly towards Lake Erie to a steep, fairly continuous, wave-cut cliff near the shoreline. The cliffs generally rise 30 to 50 feet from the lake level (approximately elevation 572 feet). The surficial materials on the Lake Plain consist of sand and gravel, lacustrine silts and clays, and urban land overlying the Lavery Till or, in the absence of till, shale bedrock. The Portage Escarpment rises abruptly from the Lake Plain near elevation 700 feet increasing to over 1,100 feet in elevation at the transition to the Plateau. The Escarpment slope is generally long and gentle and is covered with a thin layer of Lavery Till or silty clay. Farther south, the rolling uplands represent the northwest margin of the Appalachian Plateaus (Allegheny Plateau). The surficial material on the uplands consists of a mantle of Lavery Till generally thicker than on the Escarpment.

Shales, sandstones and siltstones of Devonian and Mississippian age are the predominant rock types in the Cleveland area. The depth to rock averages less than 25 feet. However, the Post-Illinoisan Massillon River passed just east of the existing Cuyahoga River. The bedrock surface is close to sea level in this old valley and the fill is locally up to several hundred feet thick. The project site is located within the limits of the old buried valley.

2.1.2 Soil Survey

The US Department of Agriculture Soil Conservation Service Soil Survey of Cuyahoga County was reviewed. The predominant soil type found along the project area is Udorthents in the Innerbelt trench and Urban Land above the trench. Udorthents are reported as being areas that have been cut or filled and the remaining soil material being typically similar to the subsoil of the adjacent areas. The Urban Land association is reported as being approximately 70 to 80% surficial coverage of the land with man-made effects. These areas are mostly miscellaneous materials placed in fills and almost totally covered with roads, buildings, and other structures. Examination and identification of soils or soil-like materials in Urban Land are impractical. Onsite investigation is needed to determine the potential and limitation for any proposed use.

2.1.3 Wetlands

The National Wetlands Inventory published in 1995, was reviewed for wetland soils in the study area. The inventory indicated no areas of wetland soils along the existing and proposed right-of-way.

2.1.4 Underground and Surface Mining

The Ohio Department of Natural Resource, Division of Geological Survey Abandoned Underground Mine GIS and Address Locator System and Mineral Industries Map of Ohio were utilized to determine if underground and surface mining activities are located within the project area. The only mine reported in the vicinity of the project is the Cleveland Salt Mine (Mine API# 340358003002) approximately two miles from the study area. The mine is at great depth, reportedly more than 1750 feet below grade at Cargill's Whiskey Island plant. The web site indicated that no surface mines are reported within the study area.

2.1.5 Karst Terrain

The Ohio Department of Natural Resources, Division of Geological Survey, Ohio Karst Areas Map was reviewed to identify if the project lies within a probable karst areas. The map indicated that the site is outside the known karst area.

2.1.6 Interviews with Personnel Knowledgeable of the Site

No ODOT construction and maintenance employees, ODOT employees who were involved with the original construction, nor current, former or adjacent landowners were interviewed as part of our investigation.

2.1.7 Previous Subsurface Investigations

DLZ reviewed plans dated October 1957 prepared for the construction of the original Innerbelt Bridge just west of the current project (CUY-42-17.43-18.02). These plans were provided by representatives of Burgess and Niple, who received them from ODOT District 12 personnel. The soil profile drawings included with the plans indicated the soils along this nearby alignment generally consisted of sands overlying cohesive soils. The borings, however, were located in the Cuyahoga River valley.

3.0 FIELD EXPLORATION

The exploration consisted of drilling nine borings, W-DLZ-1 to W-DLZ-9. The borings were spaced at intervals of between 250 and 450 feet. Borings W-DLZ-1 to W-DLZ-3 were drilled along Cedar Avenue with two borings in the Cuyahoga County Juvenile Justice Center parking area and the remaining boring adjacent to the Cedar Avenue overpass of I-90. These borings were drilled to depths of 120 feet each. Borings W-DLZ-4 to W-DLZ-9 were drilled along the westbound shoulder lane of Interstate 90. These borings were drilled to depths of 100 feet each. It should be noted that borings W-DLZ-4 to W-DLZ-6 were drilled along a proposed wall alignment that has been eliminated from the project. All borings were drilled between September 18 and October 5, 2006 using a truck-mounted rotary drill rig. Information concerning the drilling procedures is presented in Appendix I.

The approximated boring locations are shown on the boring location plan on Figure 1. Approximate ground surface elevations at the boring locations are presented on the boring logs in Appendix I. Laboratory test results are shown on the boring logs and are summarized in Table No. 1. The individual test reports are presented in Appendix II.

4.0 FINDINGS

The following text presents generalized subsurface conditions encountered by the borings. For more detailed information, please refer to the Boring Logs presented in Appendix I.

4.1 Juvenile Justice Center Retaining Wall

Borings W-DLZ-1 to W-DLZ-3 were drilled along Cedar Avenue, with boring W-DLZ-1 being drilled off of Cedar Avenue and borings W-DLZ-2 and 3 being drilled in the Cuyahoga County Juvenile Justice Center parking lot. Boring W-DLZ-1 encountered 6 inches of topsoil while borings W-DLZ-2 and 3 encountered up to 4 inches of asphalt concrete at the surface. The thickness and composition of the surficial materials

encountered in the borings are summarized on Table No. 2 and are also presented on the boring logs in Appendix I.

Borings W-DLZ-1 to 3 encountered fill underlying the surface material to progressively shallower depths from west to east. Boring W-DLZ-1 had fill to a depth of 25.5 feet while borings W-DLZ-2 and 3 encountered fill to depths of 8.5 and 5.5 feet, respectively. In all three borings the fill consisted of loose to very dense granular soils. Underlying the fill materials in the borings, very loose to dense granular soils (A-2-4, A-3a, A-4b) were encountered up to depths between 46.8 and 49.5 feet. Underlying the granular soils, cohesive soils (A-4a, A-4b, A-6a, A-6b, A-7-6) were encountered. These cohesive soils varied in consistency with alternating zones ranging between very soft to soft and stiff to very stiff.

Seepage was first encountered in the three borings between 23.9 and 26.0 feet. Water levels at completion of the borings ranged between 25.0 and 47.0 feet. It should be noted that water level measurements were made inside hollowstem augers or in open holes that may have partially collapsed. Consequently, these measurements may not represent actual groundwater conditions at the site.

4.2 Mather Mansion CIP Retaining Wall

Borings W-DLZ-7 to W-DLZ-9 were drilled along the alignment for the proposed CIP retaining wall. Borings W-DLZ-7 to 9 were drilled on the westbound shoulder of I-90 and encountered up to 10 inches of asphalt concrete. Boring W-DLZ-7 encountered 10 inches of Portland cement concrete underlying the asphalt pavement. The thickness and composition of the surficial materials encountered in the borings are summarized on Table No. 2 and are also presented on the boring logs in Appendix I.

Beneath the surficial materials, the borings encountered fill to depths between 5.5 and 8.0 feet below the ground surface. The fill consisted of loose to medium dense granular soils (A-1-b, A-2-4, A-3a). Underlying the fill soils, loose to medium dense granular soils (A-2-4, A-4a, A-4b) were encountered to depths of 20.5 to 23.0 feet, where cohesive soils (A-4a, A-4b, A-6a, A-6b, A-7-6) were encountered to the 100-foot completion depth of the borings. These cohesive soils varied in consistency with alternating zones ranging between very soft to soft and stiff.

Seepage was first encountered in the three borings between 5.5 and 8.0 feet. Water levels at completion of the borings ranged between 25.0 and 47.0 feet. Mud rotary methods were used in the boring and consequently water levels at completion could not be taken.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Juvenile Justice Center Retaining Wall

Based on preliminary design plans from Burgess & Niple, it is understood that the earth retention system at this location will consist of tied back soldier piles and lagging. The

preliminary plans indicate the proposed tip elevation of the soldier piles is 623 feet. Proposed grade at the base of the wall ranges between elevations 635 and 640 feet.

Soil conditions at the retaining wall site typically consist of loose to medium dense granular soils to an elevation of approximately 630 feet; however, zones of very loose to loose granular soils were encountered in boring W-DLZ-1. Information regarding lateral earth pressures, lateral support of piles, grouted soil anchors and global stability is presented in the following sections.

5.1.1 Lateral Earth Pressure

The wall must be designed to resist lateral loads imposed by the soil, groundwater, and the surcharge effect of adjacent structures or equipment. The increase in lateral pressure for uniform surcharges is given as follows:

$$\Delta\sigma_h = K_a q_s$$

Where: $\Delta\sigma_h$ = increase in lateral earth pressure
K_a = active earth pressure coefficient
q_s = uniform surcharge loading

If traffic is expected to come within a distance of one-half the wall height from the wall, a uniform live load surcharge pressure of at least 240 psf should be used in the design.

The lateral earth pressure should be determined based on the properties of the soil within the zone defined by the wall and a line that rises from the base of the wall at an angle of $45°+\phi/2$ from the horizontal. The lateral earth pressure coefficients recommended for the materials encountered in the borings as well as values for select granular fill are presented in the following table. These values are based on a horizontal surface behind the wall.

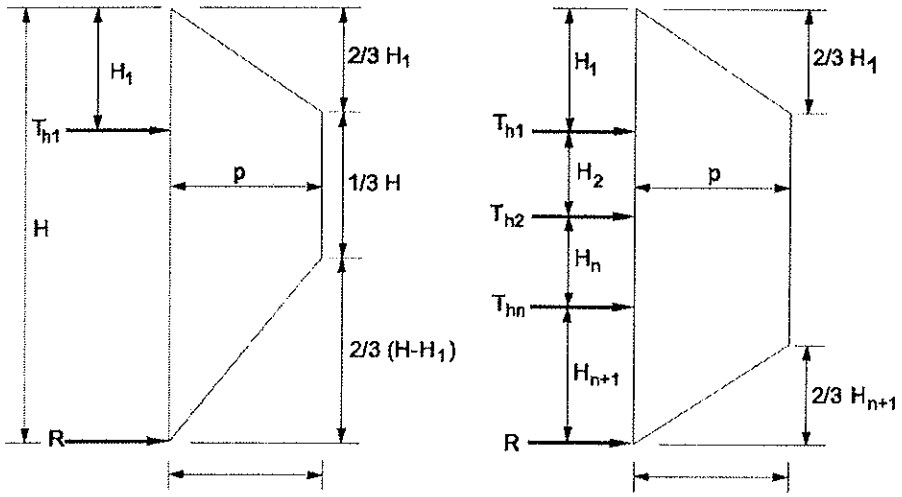
Lateral Earth Pressure Coefficients

Type of Material	At Rest	Active	Passive
Select granular embankment material ($\phi = 34°$, $\gamma = 120$ pcf)	0.44	0.28	3.54
In-situ loose to medium dense granular soils ($\phi = 32°$, $\gamma = 125$ pcf)	0.47	0.31	3.25
In-situ stiff to very stiff silty clays ($\phi = 30°$, $\gamma = 125$ pcf)	0.50	0.33	3.00

At a minimum, a free-draining granular backfill should be placed against the wall for a distance of 2 to 3 feet from the wall to prevent the buildup of hydrostatic

pressures. The top one-foot of backfill should consist of cohesive soil and be graded away from the wall to reduce the amount of surface water that infiltrates into the backfill.

The preceding earth pressure coefficients and ordinary active stress distribution should not be used to analyze anchored walls. For anchored walls, the lateral forces should be determined using an apparent earth pressure diagram similar to that used for braced excavations. The recommended apparent earth pressure diagram for anchored walls in sands is shown in the following figure.



$$p = \frac{\text{TOTAL LOAD}}{2/3\ H} \approx K_A \gamma H$$

(a) Walls with one level of ground anchors

$$p = \frac{\text{TOTAL LOAD}}{H - 1/3\ H_1 - 1/3\ H_{n+1}}$$

(b) Walls with multiple levels of ground anchors

H_1 = Distance from ground surface to uppermost ground anchor

H_{n+1} = Distance from base of excavation to lowermost ground anchor

T_{hi} = Horizontal load in ground anchor i

R = Reaction force to be resisted by subgrade (i.e., below base of excavation)

p = Maximum ordinate of diagram

TOTAL LOAD = $0.65\ K_A \gamma H^2$

Apparent Earth Pressure Diagram for Anchored Walls in Sand
(From FHWA Publication No. FHWA-IF-99-015)

5.1.2 Lateral Resistance of Piles

The borings generally encountered loose to medium dense granular materials from the surface to approximately elevation 630 underlain by a layer of stiff to very stiff cohesive soil. For lateral capacity of piles, the coefficient of lateral subgrade reaction, k_h, for granular soils is usually assumed to increase linearly with depth as follows:

$$k_h = n_h (z/d) \qquad \text{(NAVFAC DM-7.2)}$$

where: n_h = coefficient of variation of lateral subgrade reaction
z = depth
d = pile diameter/width

For the loose/medium dense granular soil, it is recommended that a coefficient of variation of lateral subgrade reaction, n_h, of 10 tons per cubic foot be used.

For stiff to hard clays, the coefficient of lateral subgrade reaction is a function of cohesion and is normally assumed constant with depth. For the stiff/very stiff cohesive soil, a coefficient of lateral subgrade reaction, k_h, of 75 tons per cubic foot should be used.

5.1.3 Grouted Soil Anchors

Our recommendations for the preliminary design of soil anchors are presented in the following paragraphs. It should be noted that the information presented herein should only be used for preliminary design purposes. Actual bond length dimensions for specific design loads are dependent on installation methods and should, therefore, be determined by the specialty anchor contractor. The actual anchor capacity must be verified by field-testing each anchor.

The following recommendations are also contingent on the soil conditions within the tieback zone being consistent with the soil conditions encountered in borings W-DLZ-1 through W-DLZ-3. Additional borings may be needed to confirm soil conditions within the tieback zone.

The ultimate load transfer for straight shaft, small diameter, gravity grouted anchors in the loose to medium dense granular soils is estimated to be 10 kips per linear foot of bond length. For working values, the ultimate values should be reduced by a factor of safety of 2.0. Drilling methods are left to the contractor; however, the selected method must establish a stable hole of suitable dimensions. The drill hole diameter must be large enough to provide at least 0.5 inches of grout cover over the bar or strand tendon. For multi-element tendons, the hole diameter must be such that the area of the tendon is no more than 15 percent of the total area of the hole. In selecting the installation method, special consideration must be given to stabilizing the holes and controlling groundwater

since the anchors will be installed in granular soils and may extend below the water table. The use of drilling fluids and/or casing to stabilize the holes should be anticipated.

Soil anchor bond lengths commonly range from 20 to 40 feet. A minimum bond length of 15 feet is recommended regardless of soil type. Bond lengths in excess of 50 feet are not effective unless special provisions are made to transfer load to the bottom of the bond zone. In addition to the bonded length, an unbonded, free stressing length is also necessary. The minimum free stressing lengths are generally 15 feet for strand tendons and 10 feet for bar tendons. The free length must also be sufficient to ensure the anchor bond zone is located behind the potential failure surface. The unbonded length is usually extended a minimum distance of one-fifth the wall height or five feet behind the potential failure surface whichever is greater. In cohesionless soils, the potential failure surface corresponds to the active wedge (i.e. a surface extending from the base of the wall upward at an angle (α) of $45°+\phi/2$ from the horizontal). A friction angle, ϕ, of 32 degrees should be used to determine the limit of the active wedge.

Anchors in cohesionless soils should be installed such that a minimum of 15 feet of overburden is maintained over the bond length. The spacing between anchors should be greater than four feet to avoid anchor interaction or even intersection due to drilling deviations. If closer spacing is necessary, the inclination of adjacent anchors should be varied or the bond lengths should be staggered. In addition, the south end of the wall is near the existing Juvenile Justice Center. Care must be taken to ensure that the anchors do not interfere with existing utilities or foundation elements of nearby structures.

Since these anchors will be part of the permanent structure and the consequences of failure would be severe, it is recommended that the anchors have Class I corrosion protection (sometimes referred to as encapsulated tendons or double corrosion protection).

Additional information regarding the design of soil anchors, construction methods, anchor and grout materials, corrosion protection and load testing can be found in the Post Tensioning Institute's *Recommendations for Prestressed Rock and Soil Anchors* and the Federal Highway Administration's *Geotechnical Engineering Circular No. 4, Ground Anchors and Anchored Systems* (Publication No. FHWA-IF-99-015).

5.1.4 Global Stability

A section was developed for global stability analysis based on the results of the borings and a preliminary cross section of the proposed wall configuration. Beneath the wall, the borings generally show granular soil over layers of cohesive soil that is typically stiff to very stiff at shallower depths and becoming very soft at depths greater than 100 feet beneath the ground surface. The preliminary plans

indicate the "Innerbelt Trench" in this area will be widened toward the Juvenile Justice Center and the new wall will be constructed behind the existing wall. Since the foundation soils will not be subjected to increased load, this wall section has only been analyzed for long-term (drained strength) conditions. Soil parameters selected for use in the analysis were based on a combination of standard penetration test N-values, index testing, shear strength testing, typical values and past experience with similar soils. For the upper granular soil layers, an angle of internal friction of 32 degrees was selected for use in the analysis. Consolidated-undrained strength testing of undisturbed samples of the underlying clays indicated effective friction angles ranging from 31 to 33 degrees. Since there were only a few tests results and meaningful statistical analysis could not be performed, the lowest test value (31 degrees) was conservatively selected for use in the analysis.

The stability analysis resulted in a critical failure surface passing just beneath the tied-back wall with a factor of safety of 1.33, above the required minimum of 1.3. Deeper failure surfaces had higher factors of safety. The results of the analysis are shown on Figure 2 of 5.

5.2 Mather Mansion CIP Retaining Wall

Preliminary plans indicate the proposed CIP wall between Chester and Euclid Avenues will range between approximately 22 and 31 feet above finished grade. The proposed finished grade generally varies from two to seven feet below existing grade along this portion of I-90.

Preliminary analyses consisting of pile capacity and global stability have been performed for the proposed CIP wall. Soil parameters were selected for use in the analyses based on a combination of standard penetration test (SPT) N-values, hand penetrometer readings, index testing, shear strength testing, typical values and past experience with similar soils. However, it should be noted that the material properties at different depths varied considerably between borings and, in some cases, within the individual borings over relatively small vertical intervals. Consequently, these analyses will need to be reevaluated once the final phase of exploration and testing is completed and the properties and vertical and lateral extent of the various layers are better defined.

No borings have yet been advanced behind the existing bin wall. Soil conditions in this area must be explored during detailed design to finalize the global stability analysis. For the preliminary analysis presented herein, granular soils with an angle of internal friction of 30 degrees have been assumed. For the upper granular soils encountered in the borings, an internal friction angle of 32 degrees was selected based on SPT N-values, index test results and typical values. Undrained shear strengths ranging from 500 to 1,750 pounds per square foot (psf) were selected for the various underlying cohesive layers based on the results of unconsolidated-undrained triaxial tests, unconfined compression tests and hand penetrometer readings. Consolidated-undrained strength testing of undisturbed samples of the underlying clays indicated effective friction angles

ranging from 31 to 33 degrees. Since there were only a few tests results and meaningful statistical analysis could not be performed, the lowest test value (31 degrees) was conservatively selected for use in the analysis.

The preliminary analyses indicate that issues may exist with regard to global stability. The analyses are discussed in more detail in the following paragraphs.

5.2.1 Global Stability

A section was developed for global stability analysis based on the results of the borings and the proposed wall section provided in the preliminary plans. Beneath the wall, the borings generally show granular soil over layers of medium stiff, stiff and soft cohesive soil. This section was analyzed for the end-of-construction (undrained strength) and long-term (drained strength) conditions.

The proposed wall alignment is located in the "Innerbelt Trench" where the area was previously excavated to establish the existing I-90 alignment. Construction of the wall and placement of fill behind it will essentially refill a relatively small portion of the trench. Consequently, we believe an undrained strength condition will only exist beneath the wall backfill beyond the pile supported wall footing.

For the end-of-construction analysis, undrained strength conditions are typically assumed for the entire cross section under consideration. The stability analysis for this condition results in a deep critical failure surface extending 200 feet or more laterally in each direction from the centerline of the proposed wall and backfill. The safety factor for this critical failure surface is 1.12, below the required minimum of 1.3. The analysis is shown on attached Figure 3 of 5.

Because of the relatively small width of unsupported fill in this particular case, it does not seem reasonable to assume an undrained condition will develop for the entire cross section/failure surface. To more realistically model this unusual case, a second end-of-construction analysis was performed and undrained strengths were assumed only for a zone of influence approximated by a 1/2H:1V projection beneath the narrow wedge of wall backfill. Outside of this zone, the soils were assumed to remain in a drained state since they do not appear to be subjected to altered stresses. The stability analysis for this condition indicates a minimum safety factor of 1.53, above the required minimum of 1.3. This analysis is shown on attached Figure 4 of 5.

It should be noted that the global stability analysis of the wall is very sensitive to the cohesion of the clay soils and geometry of these layers and will therefore need to be reevaluated once the final design phase of exploration is performed and the subsurface conditions better defined. If it is required that safety factors for the conventional undrained analysis meet the required minimum of 1.3 and further exploration and analysis continues to yield inadequate safety factors for this case, methods to mitigate the undrained condition will need to be considered.

It may be possible to extend the pile supported wall footing in order to support all of the backfill between the new wall and the existing bin wall. A controlled rate of filling or staged fill placement behind the wall could also be considered. Wick drains would most likely be needed to speed consolidation and the resulting strength gain of the low permeability foundation soils so that the rate of filling (or delay between fill stages) can be kept reasonable. The fill rate or waiting period between stages would then be a function of wick spacing.

Stability was also checked for long-term conditions (drained strengths). This analysis resulted in a critical failure surface passing just beneath the CIP wall. The factor of safety for this critical surface is above the required minimum of 1.3. Deeper failure surfaces had higher factors of safety. This analysis is shown on attached Figure 5 of 5.

5.2.2 Pile Foundation

It is our understanding that the proposed wall will be supported on multiple rows of piles. It further understood that the desired ultimate bearing capacity of the piles is 94 tons. Piles should be installed in accordance with ODOT Item 507, "Bearing Piles." Depending on the boring used for the pile capacity analysis, 16-inch diameter cast-in-place reinforced concrete piles of lengths ranging from 77 to 94 feet would be required to meet the desired ultimate bearing capacity of 94 tons. The pile capacity calculations are presented in the "Figures and Tables" section.

It is recommended that test piles be driven to indicate required pile lengths. The actual length of pile required to support the design working load should be established in the field using the dynamic pile driving capacity formula.

5.3 Excavations and Groundwater Considerations

Excavations deeper than five feet must be laid back or braced to protect workers entering the excavations. All excavations should be designed and constructed in accordance with applicable local, state and federal safety regulations including the current OSHA Excavation and Trench Safety Standards (29 CFR Part 1926).

The above information is provided only for general guidance. Under no circumstances should the information provided be interpreted to mean that anyone other than the construction contractor assumes responsibility for construction site safety. The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom.

Seepage was first encountered in the borings between depths of 6.0 and 26.0 feet. Additional, seepage may be encountered in isolated granular seams/layers not disclosed by the borings. The amount of water entering excavations from such perched layers will vary seasonally. Contractors should be prepared to deal with any water from

precipitation or seepage from water bearing seams or layers that enters excavations or collects on the subgrade surface during construction.

6.0 CLOSING REMARKS

We appreciate the opportunity to be of service on this project. Please do not hesitate to call if you have any questions concerning the information presented herein or if you would like to discuss the preliminary findings and analyses in greater detail.

Sincerely,

DLZ OHIO, INC.

Richard Hessler
Geotechnical Engineer

Bryan Wilson, MSCE, P.E.
Senior Geotechnical Engineer

FIGURES AND TABLES

Figure 1 of 5:
Boring Location Plan

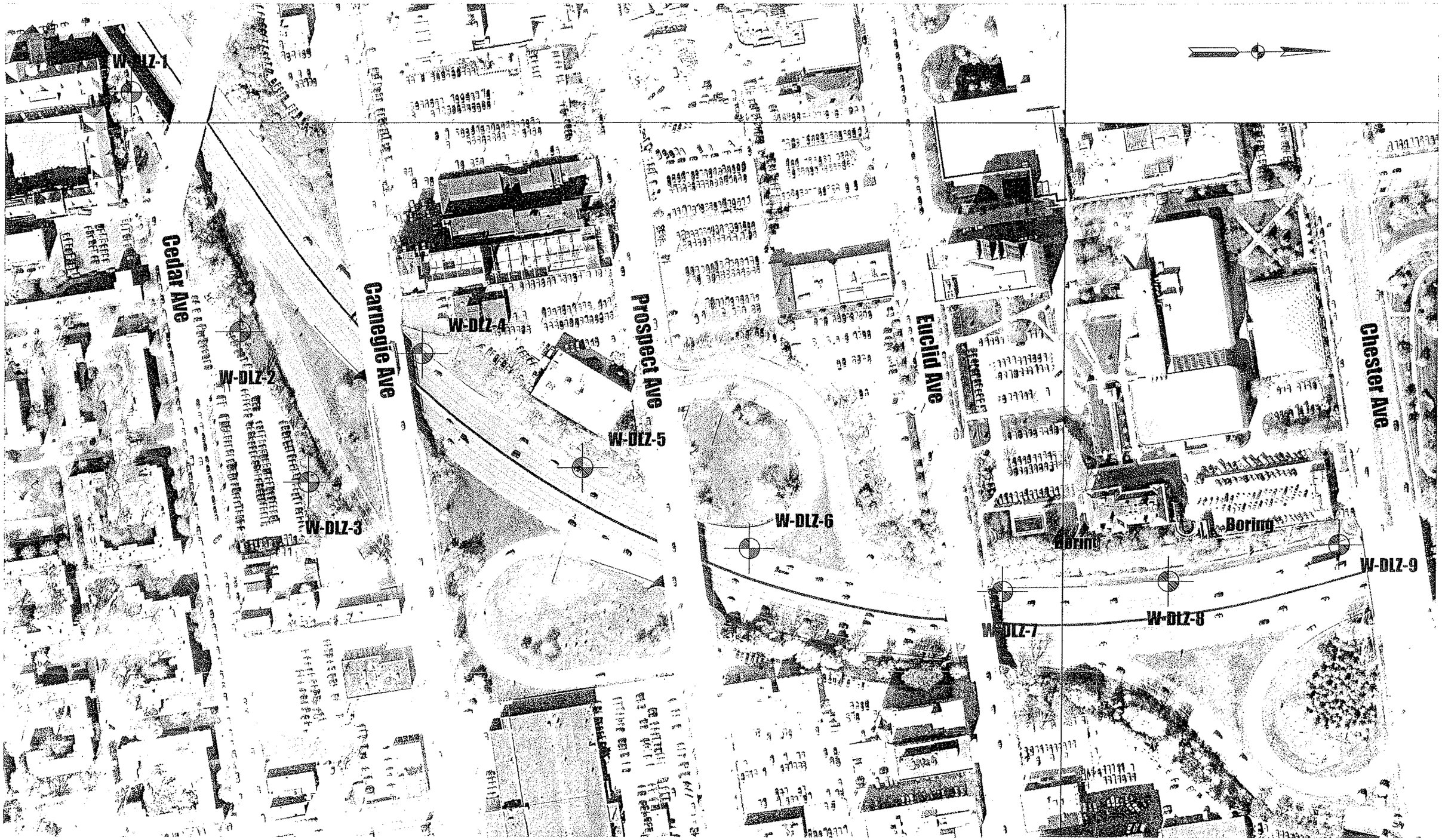


Figure 2 of 5

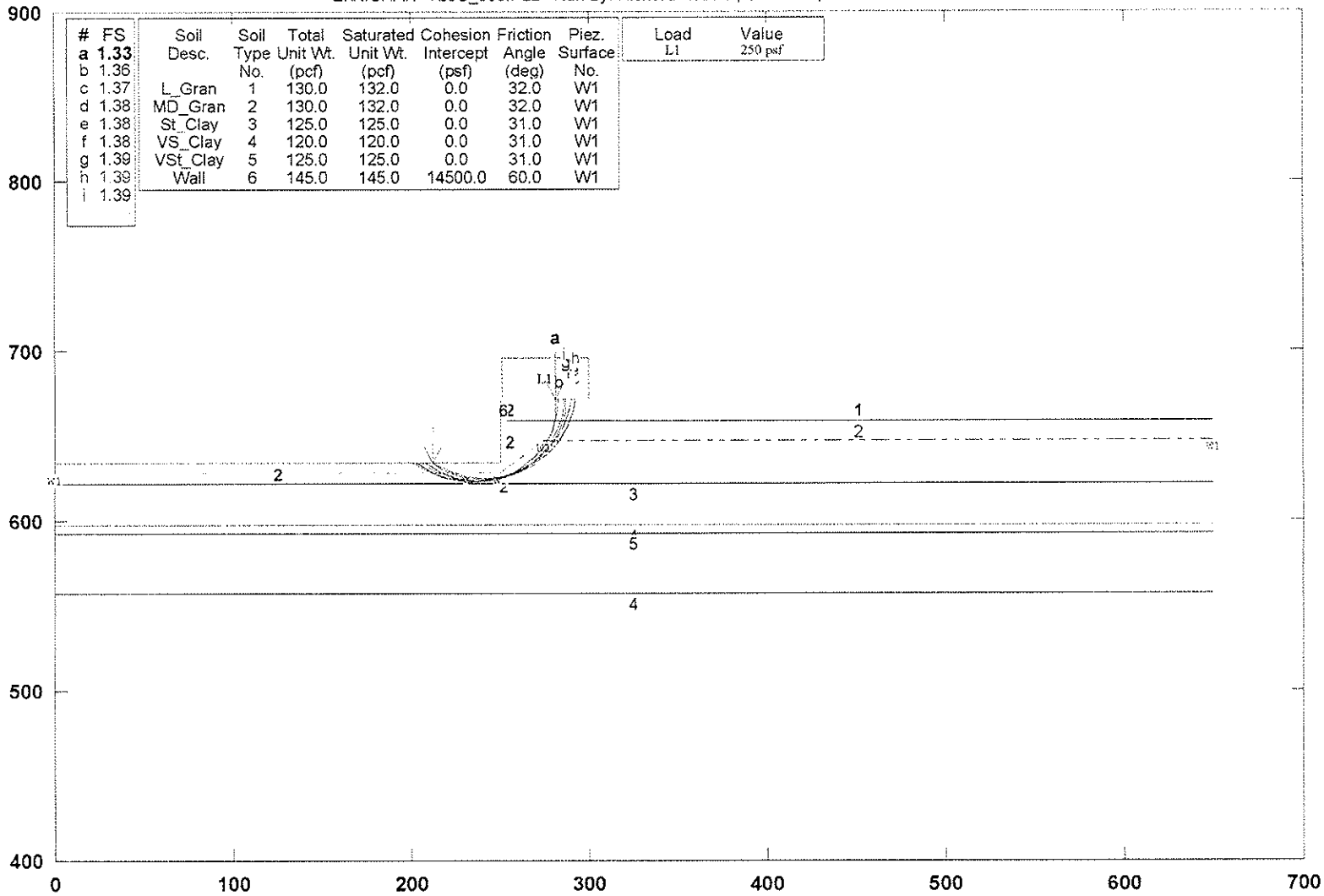
I-90 Innerbelt Trench CCJJC Retaining Wall Drained

E:\RICHAR~1\JJC_830.PL2 Run By: Richard Hessler, DLZ Ohio, Inc. 8/31/2007 10:04AM

#	FS
a	1.33
b	1.36
c	1.37
d	1.38
e	1.38
f	1.38
g	1.39
h	1.39
i	1.39

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
L_Gran	1	130.0	132.0	0.0	32.0	W1
MD_Gran	2	130.0	132.0	0.0	32.0	W1
St_Clay	3	125.0	125.0	0.0	31.0	W1
VS_Clay	4	120.0	120.0	0.0	31.0	W1
VSt_Clay	5	125.0	125.0	0.0	31.0	W1
Wall	6	145.0	145.0	14500.0	60.0	W1

Load	Value
L1	250 psf



GSTABL7 v.2 FSmin=1.33

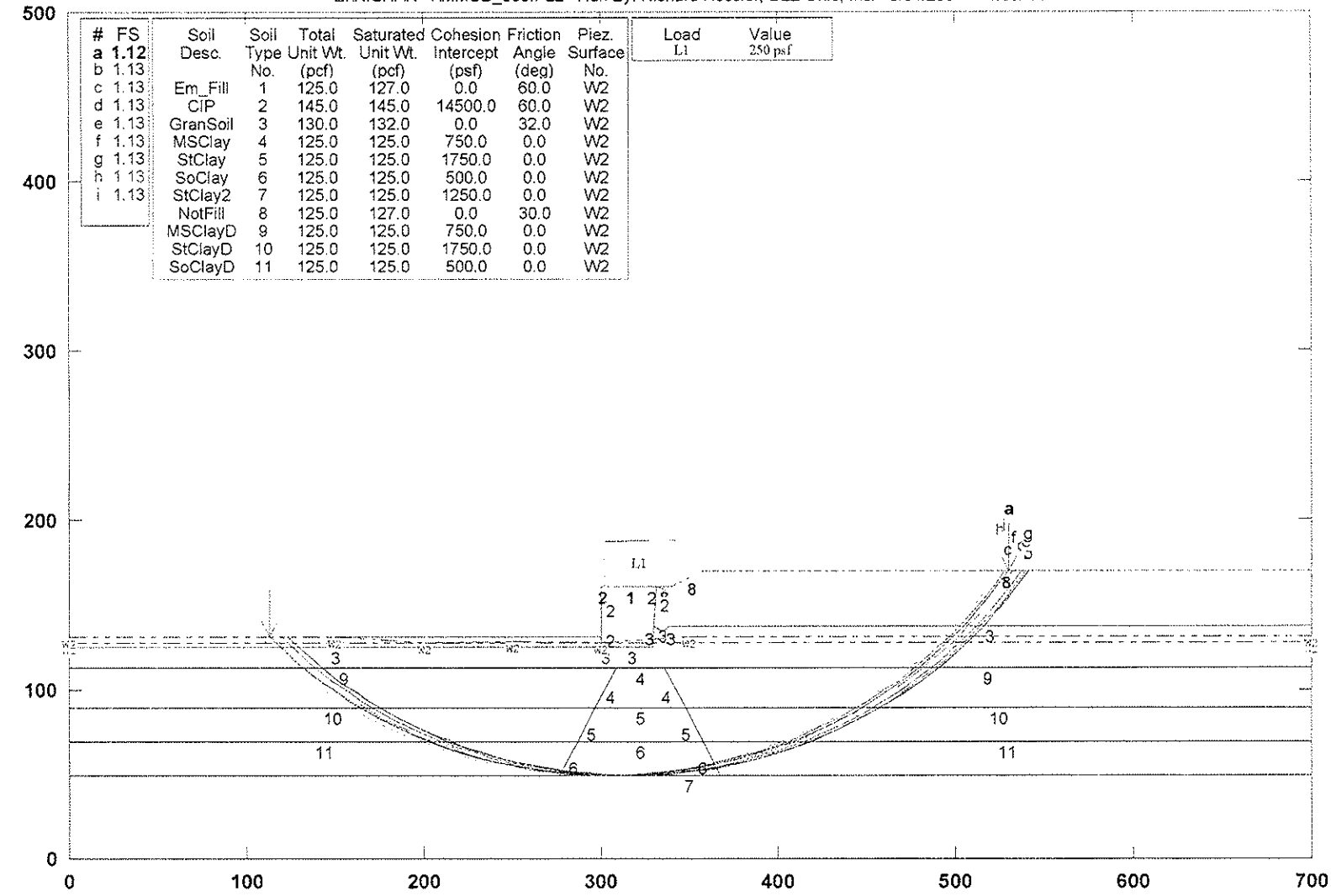
Safety Factors Are Calculated By The Modified Bishop Method

DLZ

Figure 3 of 5

I-90 Innerbelt Trench Mather Mansion Wall (Undrained)

E:\RICHAR~1\MMUD_830.PL2 Run By: Richard Hessler, DLZ Ohio, Inc. 8/31/2007 11:03AM



#	FS
a	1.12
b	1.13
c	1.13
d	1.13
e	1.13
f	1.13
g	1.13
h	1.13
i	1.13

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Em_Fill	1	125.0	127.0	0.0	60.0	W2
CIP	2	145.0	145.0	14500.0	60.0	W2
GranSoil	3	130.0	132.0	0.0	32.0	W2
MSClay	4	125.0	125.0	750.0	0.0	W2
StClay	5	125.0	125.0	1750.0	0.0	W2
SoClay	6	125.0	125.0	500.0	0.0	W2
StClay2	7	125.0	125.0	1250.0	0.0	W2
NotFill	8	125.0	127.0	0.0	30.0	W2
MSClayD	9	125.0	125.0	750.0	0.0	W2
StClayD	10	125.0	125.0	1750.0	0.0	W2
SoClayD	11	125.0	125.0	500.0	0.0	W2

Load	Value
L1	250 psf

GSTABL7 v.2 FSmin=1.12

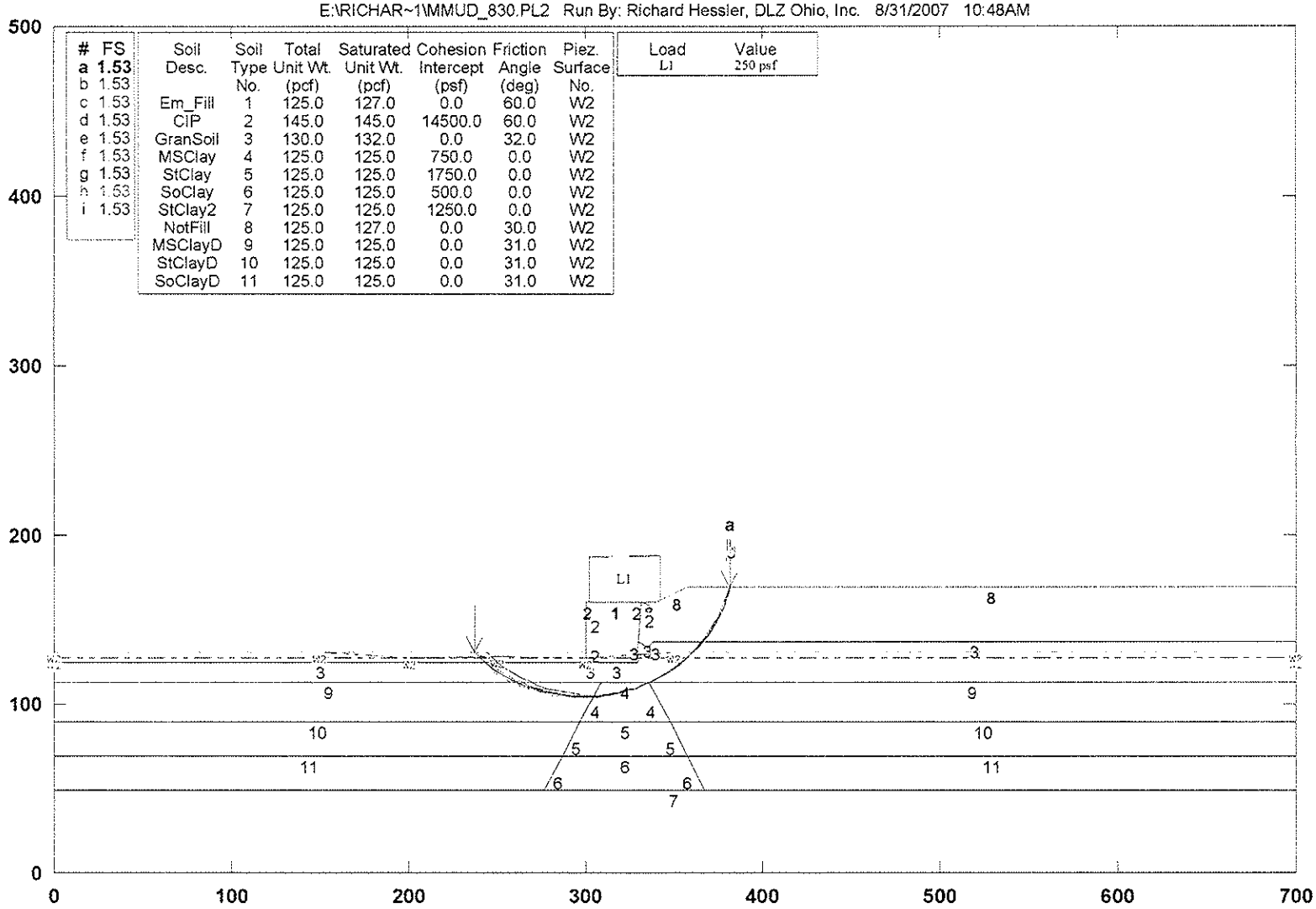
Safety Factors Are Calculated By The Modified Bishop Method

DLZ

Figure 4 of 5

I-90 Innerbelt Trench Mather Mansion Wall (Undrained)

E:\RICHAR~1\MMUD_830.PL2 Run By: Richard Hessler, DLZ Ohio, Inc. 8/31/2007 10:48AM



#	FS	Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
a	1.53							
b	1.53	Em_Fill	1	125.0	127.0	0.0	60.0	W2
c	1.53	CIP	2	145.0	145.0	14500.0	60.0	W2
d	1.53	GranSoil	3	130.0	132.0	0.0	32.0	W2
e	1.53	MSClay	4	125.0	125.0	750.0	0.0	W2
f	1.53	StClay	5	125.0	125.0	1750.0	0.0	W2
g	1.53	SoClay	6	125.0	125.0	500.0	0.0	W2
h	1.53	StClay2	7	125.0	125.0	1250.0	0.0	W2
i	1.53	NotFill	8	125.0	127.0	0.0	30.0	W2
		MSClayD	9	125.0	125.0	0.0	31.0	W2
		StClayD	10	125.0	125.0	0.0	31.0	W2
		SoClayD	11	125.0	125.0	0.0	31.0	W2

Load	Value
L1	250 psf

GSTABL7 v.2 FSmin=1.53

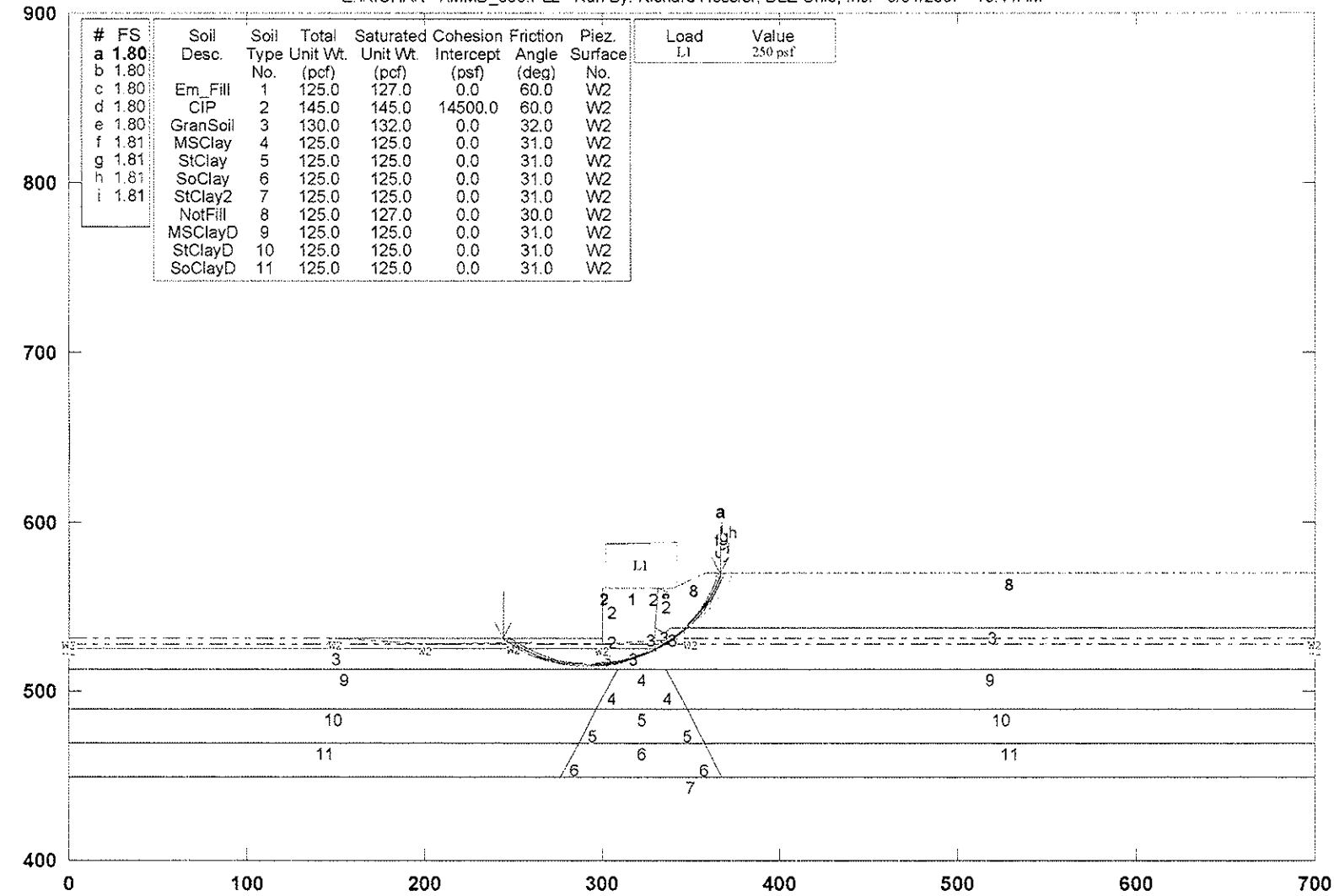
Safety Factors Are Calculated By The Modified Bishop Method

DLZ

Figure 5 of 5

I-90 Innerbelt Trench Mather Mansion Wall (Drained)

E:\RICHAR~1\MMD_830.PL2 Run By: Richard Hessler, DLZ Ohio, Inc. 8/31/2007 10:11AM



GSTABL7 v.2 FSmin=1.80

Safety Factors Are Calculated By The Modified Bishop Method

DLZ

Table No. 1
Summary of Laboratory Test Data

Boring Number	Sample Number	Sample Depth (feet)	ODOT Designation	Type of Test: Gradation: % AGG	% Sand: Coarse	% Sand: Fine	% Fines: Silt	% Fines: Clay	Atterberg Limits: LL	Atterberg Limits: PI	Moisture Content %	Consolidated-undrained: Cohesion, (psf): Total	Consolidated-undrained: Cohesion, (psf): Effective	Consolidated-undrained: Friction Angle, (degrees): Total	Consolidated-undrained: Friction Angle, (degrees): Effective	Unconsolidated-undrained: Cohesion (psf)	Unconsolidated-undrained: Friction Angle (degrees)	Unconfined Compression: Cohesion (psf)
W-DLZ-1	S-5	11.0 - 12.5	A-2-4	6	17	53	24		Non-plastic		10							
W-DLZ-1	S-13	33.5 - 35.0	A-2-4	0	0	88	9	3	Non-plastic		28							
W-DLZ-1	S-19	68.5 - 70.0	A-6b	0	0	1	51	48	32	17	30							
W-DLZ-1	P-2	88.0 - 90.0	A-4a	0	0	2	62	36	25	7	24	530	416	21	31.2			
W-DLZ-1	S-27	113.5 - 115.0	A-6b	1	1	1	32	65	39	17	28							
W-DLZ-2	S-10	23.5 - 25.0	A-3	0	1	94	5		Non-plastic		6							
W-DLZ-2	P-1	68.0 - 70.0	A-6a	0	0	1	62	37	28	12	20					1302	6.8	
W-DLZ-2	S-20	73.5 - 75.0	A-6a	0	0	1	45	54	33	14	27							
W-DLZ-2	S-26	103.5 - 105.0	A-6a	1	3	8	48	40	29	12	24							
W-DLZ-3	S-3	6.0 - 7.5	A-2-4	10	22	53	15		Non-plastic		7							
W-DLZ-3	S-13	33.5 - 35.0	A-2-4	0	0	67	33		Non-plastic		27							
W-DLZ-3	P-1	53.5 - 55.5	A-4b	0	0	0	70	30	28	10	19							3708
W-DLZ-3	P-1	53.5 - 55.5	A-4b	0	0	0	70	30	28	10	19							3019
W-DLZ-3	S-17	58.5 - 60.0	A-4b	0	0	4	66	30	28	9	18							
W-DLZ-3	S-21	78.5 - 80.0	A-4b	0	0	0	65	35	29	10	21							
W-DLZ-3	S-29	118.5 - 120.0	A-6b	4	1	2	30	63	39	19	27							
W-DLZ-4	P-1	33.0 - 35.0	A-4b	0	0	2	86	12	22	2	24	874	172	25	31.3			
W-DLZ-4	P-2	73.0 - 75.0	A-6a	0	0	1	61	38	28	11	23							1331
W-DLZ-4	P-2	73.0 - 75.0	A-6a	0	0	1	61	38	28	11	23							973
W-DLZ-5	S-1	1.5 - 3.0	A-2-4	2	12	54	32		Non-plastic		8							
W-DLZ-5	S-9	21.0 - 22.5	A-4b	0	0	20	70	10	Non-plastic		20							
W-DLZ-5	S-13	33.5 - 35.0	A-6a	0	0	2	66	32	29	11	24							
W-DLZ-5	P-1	40.0 - 42.0	A-6b	0	0	0	45	55	38	19	31					560	5.7	
W-DLZ-5	S-19	63.5 - 65.0	A-6a	0	0	0	58	42	31	12	27							
W-DLZ-5	S-25	93.5 - 95.0	A-7-6	0	1	2	24	73	44	23	30							
W-DLZ-6	S-6	13.5 - 15.0	A-4b	0	0	36	59	5	Non-plastic		28							
W-DLZ-6	S-10	23.5 - 25.0	A-4a	0	1	58	32	9	Non-plastic		27							
W-DLZ-6	S-14	38.5 - 40.0	A-6a	0	0	0	55	45	34	15	27							
W-DLZ-6	P-1	48.0 - 50.0	A-4b	0	0	1	64	35	29	10	20					464	4.3	
W-DLZ-6	S-29	73.5 - 75.0	A-6b	1	2	6	38	53	35	18	25							
W-DLZ-7	S-1	11.0 - 12.5	A-4a	0	0	34	66		Non-plastic		25							
W-DLZ-7	S-7	16.0 - 17.5	A-4a	0	0	58	35	7	Non-plastic		19							
W-DLZ-7	S-11	26.0 - 27.5	A-6a	0	0	2	50	48	32	14	30							

Table No. 1
Summary of Laboratory Test Data

Boring Number	Sample Number	Sample Depth (feet)	ODOT Designation	Type of Test															
				Gradation					Atterberg Limits		Moisture Content %	Consolidated-undrained				Unconsolidated-undrained		Unconfined Compression
					% Sand		% Fines					Cohesion, (psf)		Friction Angle, (degrees)		Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)
				% AGG	Coarse	Fine	Silt	Clay	LL	PI		Total	Effective	Total	Effective			
W-DLZ-7	P-1	38.0 - 40.0	A-6a	0	0	1	56	43	31	13	21					2240	0	
W-DLZ-7	S-15	48.5 - 50.0	A-6a	0	0	1	44	55	33	15	30							
W-DLZ-7	P-2	63.0 - 65.0	A-4b	0	0	0	74	26	25	5	25							1577
W-DLZ-7	P-2	63.0 - 65.0	A-4b	0	0	0	74	26	25	5	25							1522
W-DLZ-7	S-21	83.5 - 85.0	A-7-6	0	1	1	21	77	48	24	31							
W-DLZ-8	S-6	13.5 - 15.0	A-4a	0	1	58	38	3	Non-plastic		29							
W-DLZ-8	S-10	23.5 - 25.0	A-6a	0	0	3	59	38	29	11	27							
W-DLZ-8	P-1	38.0 - 40.0	A-6a	0	0	1	47	52	35	15	26	410	30	20.1	33.1			
W-DLZ-8	S-16	53.5 - 55.0	A-6a	0	0	0	57	43	30	11	24							
W-DLZ-8	S-20	73.5 - 75.0	A-6b	1	2	2	29	66	39	17	31							
W-DLZ-8	P-2	78.0 - 80.0	A-7-6	0	0	1	22	77	42	20	30							241
W-DLZ-8	P-2	78.0 - 80.0	A-7-6	0	0	1	22	77	42	20	30							564
W-DLZ-8	S-24	98.5 - 100.0	A-6a	0	0	1	52	47	33	14	25							
W-DLZ-9	S-3	6.0 - 7.5	A-4a	0	1	53	46		Non-plastic		24							
W-DLZ-9	S-7	16.0 - 17.5	A-4b	0	0	16	73	11	Non-plastic		26							
W-DLZ-9	S-9	21.0 - 22.5	A-4b	0	1	12	51	36	26	9	25							
W-DLZ-9	S-13	33.5 - 35.0	A-6a	0	0	1	54	45	32	13	26							
W-DLZ-9	P-1	48.0 - 50.0	A-6a	0	0	0	48	52	33	13	26							423
W-DLZ-9	P-1	48.0 - 50.0	A-6a	0	0	0	48	52	33	13	26							1885
W-DLZ-9	S-17	58.5 - 60.0	A-6a	0	0	0	53	47	31	13	26							
W-DLZ-9	S-21	78.5 - 80.0	A-6b	0	1	1	35	63	37	17	29							

Table No. 2
Summary of Surface Material Thickness

Boring	Topsoil (in)	Asphalt Concrete Thickness (in)	Portland Cement Concrete (in)
W-DLZ-1	6	-	-
W-DLZ-2	-	4	-
W-DLZ-3	-	3.5	-
W-DLZ-4	-	6	9
W-DLZ-5	-	2	12
W-DLZ-6	-	2	11
W-DLZ-7	-	7	10
W-DLZ-8	-	10	-
W-DLZ-9	-	5	-

DLZ

SUBJECT	Pile analysis for Mather Mansion retaining wall	JOB NUMBER	0422-1007.00
		SHEET NO.	OF 3
		COMP. BY	RJH DATE 12/6/2006
		CHECKED BY	DATE

Pile Capacity Calculations

FHWA Method (methods by Meyerhof, Nordlund and Thurman)

Location: Mather Mansion
Retaining Wall (W-DLZ-7)

Pile type & size: 94 ton 16" dia. CIP

Pile Diameter 1.333 ft 16.0 in
Perimeter, Cd: 4.19 ft
Tip Area, Ap: 1.396 ft^2

Pile Length: 72.0 ft 236 ft

$Q_{ult} = Q_s + Q_p$

Sand: $Q_s = .02\ N'\ D\ Cd$;(N'<=50) $Q_p = Ap\ \alpha\ Pd\ N'_q$

Clay: $Q_s = Ca\ Cd\ D$ $Q_p = 9\ Cu\ Ap$

NOTE: Maximum effective stress reached at 20 x pile width and exclude top 5 ft of soil from calculation.

Soil	Unit Wt pcf	Bottom of layer ft	N (for sand)	N' (for sand)	D ft	Ca (for clay) psf	Q_s tons	α (for sand)	Eff. stress, Pd psf	N'_q (for sand)	Cu (for clay) psf	Q_p tons	Q_{ult} tons
Ground Surface		637.0		---	---	---	---	---	0	---	---	---	---
Top of Pile	120	625.0		---	---	---	---	---	1,440	---	---	---	---
Sand	68	614.0	20	19	11.0		17.5	0.55	2,188	8		6.7	
Clay	120	605.2			8.8	490	9.0		3,244		500	3.1	
Clay	120	590.2			15.0	730	22.9		4,068		1,000	6.3	
Clay	120	565.2			25.0	490	25.7		4,068		500	3.1	
Clay	120	555.3			9.9	730	15.1		4,068		750	4.7	
Clay	120	540.3			2.3	490	2.4		4,068		250	1.6	94.2
Clay	120	537.0				730					1,000		

Ultimate Load 94 tons

Allowable Load **47 tons** Pile Tip 553.0 ft

Factor of Safety = 2.0

DLZ

SUBJECT	Pile analysis for Mather Mansion retaining wall	JOB NUMBER	0422-1007.00
		SHEET NO.	OF 3
		COMP. BY	RJH DATE 12/6/2006
		CHECKED BY	DATE

Pile Capacity Calculations

FHWA Method (methods by Meyerhof, Nordlund and Thurman)

Location: Mather Mansion
Retaining Wall (W-DLZ-8)

Pile type & size: 94 ton 16" dia. CIP

Pile Diameter 1.333 ft 16.0 in
Perimeter, Cd: 4.19 ft
Tip Area, Ap: 1.396 ft^2

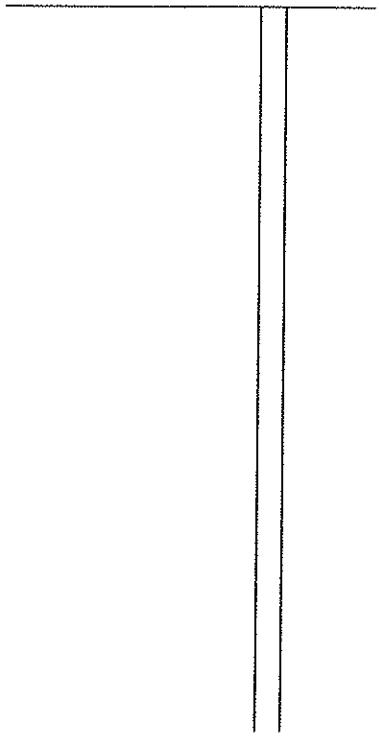
Pile Length: 77.0 ft 253 ft

$Q_{ull} = Q_s + Q_p$

Sand: $Q_s = .02\ N'\ D\ Cd$;(N'<=50) $Q_p = Ap\ \alpha\ Pd\ N'_q$

Clay: $Q_s = Ca\ Cd\ D$ $Q_p = 9\ Cu\ Ap$

NOTE: Maximum effective stress reached at 20 x pile width and exclude top 5 ft of soil from calculation.



Soil	Unit Wt pcf	Bottom of layer ft	N (for sand)	N' (for sand)	D ft	Ca (for clay) psf	Q_s tons	α (for sand)	Eff. stress, Pd psf	N'_q (for sand)	Cu (for clay) psf	Q_p tons	Q_{ult} tons
Ground Surface		635.0		---	---	---	---	---	0	---	---	---	---
Top of Pile	120	625.0		---	---	---	---	---	1,200	---	---	---	---
Sand	68	612.0	15	15	13.0		16.3	0.55	2,084	8		6.4	
Clay	58	598.2			13.8	730	21.1		2,877		1,000	6.3	
Clay	58	588.2			10.0	490	10.3		2,877		500	3.1	
Clay	58	568.3			19.9	795	33.1		2,877		1,500	9.4	
Clay	58	548.3			20.0	263	11.0		2,877		250	1.6	
Clay	58	535.0			0.3	750	0.5		2,877		1,250	7.9	100.2

Ultimate Load 100 tons

Allowable Load **50 tons** Pile Tip 548.0 ft

Factor of Safety = 2.0

DLZ

SUBJECT	Pile analysis for Mather Mansion retaining wall	JOB NUMBER	0422-1007.00
		SHEET NO.	OF 3
		COMP. BY	RJH DATE 12/6/2006
		CHECKED BY	DATE

Pile Capacity Calculations

FHWA Method (methods by Meyerhof, Nordlund and Thurman)

Location: Mather Mansion
Retaining Wall (W-DLZ-9)

Pile type & size: 94 ton 16" dia. CIP

Pile Diameter 1.333 ft 16.0 in
Perimeter, Cd: 4.19 ft
Tip Area, Ap: 1.396 ft^2

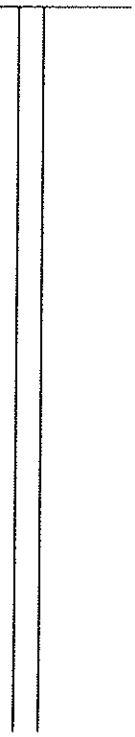
Pile Length: 90.0 ft 295 ft

$Q_{ult} = Q_s + Q_p$

Sand: $Q_p = Ap \alpha Pd N'_q$

Clay: $Q_s = Ca Cd D$ $Q_p = 9 Cu Ap$

NOTE: Maximum effective stress reached at 20 x pile width and exclude top 5 ft of soil from calculation.



Soil	Unit Wt pcf	Bottom of layer ft	N (for sand)	N' (for sand)	D ft	Ca (for clay) psf	Q_s tons	α (for sand)	Eff. stress, Pd psf	N'_q (for sand)	Cu (for clay) psf	Q_p tons	Q_{ult} tons
Ground Surface		635.0		---	---	---	---	---	0	---	---	---	---
Top of Pile	120	625.0		---	---	---	---	---	1,200	---	---	---	---
Sand	68	614.5	15	16	10.5		14.1	0.55	1,914	8		5.9	
Clay	120	598.2			16.3	490	16.7		3,854		500	3.1	
Clay	120	588.2			10.0	795	16.7		3,854		1,500	9.4	
Clay	120	573.2			15.0	490	15.4		3,854		500	3.1	
Clay	120	568.3			4.9	795	8.2		3,854		1,500	9.4	
Clay	120	535.0			33.3	260	18.1		3,854		250	1.6	90.7

Ultimate Load 91 tons

Allowable Load **45 tons** Pile Tip 535.0 ft

Factor of Safety = 2.0

APPENDIX I

General Information - Drilling Procedures and Logs of Borings

Legend - Boring Log Terminology

Boring Logs W-DLZ-1 to W-DLZ-9

GENERAL INFORMATION
DRILLING PROCEDURES AND LOGS OF BORINGS

Drilling and sampling were conducted in accordance with procedures generally recognized and accepted as standardized methods of investigation of subsurface conditions concerning geotechnical engineering considerations. Borings were drilled with either a truck-mounted or ATV-mounted drill rig.

Drive split-barrel sampling was performed in 1.5 foot increments at intervals not exceeding 5 feet. In the event the sampler encountered resistance to penetration of 6 inches or less after 50 blows of the drop hammer, the sampling increment was discontinued. Standard penetration data were recorded and one or more representative samples were preserved from each sampling increment.

In borings where rock was cored, NXM or NQ size diamond coring tools were used.

In the laboratory all samples were visually classified by a soils engineer. Moisture contents of representative fine-grained soil samples were determined. A limited number of samples, considered representative of foundation materials present, were selected for performance of grain-size analyses and plasticity characteristics tests. The results of these tests are shown on the boring logs.

The boring logs included in the Appendix have been prepared on the basis of the field record of drilling and sampling, and the results of the laboratory examination and testing of samples. Stratification lines on the boring logs indicating changes in soil stratigraphy represent depths of changes approximated by the driller, by sampling effort and recovery, and by laboratory test results. Actual depths to changes may differ somewhat from the estimated depths, or transitions may occur gradually and not be sharply defined. The boring logs presented in this report therefore contain both factual and interpretative information and are not an exact copy of the field log.

Although it is considered that the borings have disclosed information generally representative of site conditions, it should be expected that between borings conditions may occur which are not precisely represented by any one of the borings. Soil deposition processes and natural geologic forces are such that soil and rock types and conditions may change in short vertical intervals and horizontal distances.

Soil/rock samples will be stored at our laboratory for a period of six months. After this period of time, they will be discarded, unless notified to the contrary by the client.

LEGEND - BORING LOG TERMINOLOGY

Explanation of each column, progressing from left to right

1. Depth (in feet) - refers to distance below the ground surface.

2. Elevation (in feet) - is referenced to mean sea level, unless otherwise noted.

3. Standard Penetration (N) - the number of blows required to drive a 2-inch O.D., 1-3/8 inch I.D., split-barrel sampler, using a 140-pound hammer with a 30-inch free fall. The blows are recorded in 6-inch drive increments. Standard penetration resistance is determined from the total number of blows required for one foot of penetration by summing the second and third 6-inch increments of an 18-inch drive.

   50/n - indicates number of blows (50) to drive a split-barrel sampler a certain number of inches (n) other than the normal 6-inch increment.

4. The length of the sampler drive is indicated graphically by horizontal lines across the "Standard Penetration" and "Recovery" columns.

5. Sample recovery from each drive is indicated numerically in the column headed "Recovery".

6. The drive sample location is designated by the heavy vertical bar in the "Sample No., Drive" column.

7. The length of hydraulically pressed "Undisturbed" samples is indicated graphically by horizontal lines across the "Press" column.

8. Sample numbers are designated consecutively, increasing in depth.

9. Soil Description

   a. The following terms are used to describe the relative compactness and consistency of soils:

Granular Soils - Compactness

Terms	Blows/Foot Standard Penetration
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	over 50

Cohesive Soils - Consistency

Term	Unconfined Compression tons/sq.ft.	Blows/Foot Standard Penetration	Hand Manipulation
Very Soft	less than 0.25	below 2	Easily penetrated by fist
Soft	0.25 - 0.50	2 - 4	Easily penetrated by thumb
Medium Stiff	0.50 - 1.00	4 - 8	Penetrated by thumb w/ moderate effort
Stiff	1.0 - 2.0	8 - 15	Readily indented by thumb but not penetrated
Very Stiff	2.0 - 4.0	15 - 30	Readily indented by thumb nail
Hard	over 4.0	over 30	Indented with difficulty by thumb nail

   b. Color - If a soil is a uniform color throughout, the term is single, modified by such adjective as light and dark. If the predominant color is shaded by a secondary color, the secondary color precedes the primary color. If two major and distinct colors are swirled throughout the soil, the colors are modified by the term "mottled".

   c. Texture is based on the ODOT Classification System. Soil particle size definitions are as follows:

Description	Size	Description	Size
Boulders	Larger than 8"	Sand-Coarse	2.00 mm. to 0.42 mm.
Cobbles	8" to 3"	-Fine	0.42 mm. to 0.074 mm.
Gravel-Coarse	3" to 3/4"	Silt	0.074 mm. to 0.005 mm.
-Fine	3/4" to 2.00" mm.	Clay	Smaller than 0.005 mm.

   d. The main soil component is listed first. The minor components are listed in order of decreasing percentage of particle size.

e. Modifiers to main soil descriptions are indicated as a percentage by weight of particle sizes.

trace	- 0 to 10%
little	- 10 to 20%
some	- 20 to 35%
"and"	- 35 to 50%

f. The moisture content of cohesive soils (silts and clays) is expressed relative to plastic properties.

Term	Relative Moisture or Appearance
Dry	Powdery
Damp	Moisture content slightly below plastic limit
Moist	Moisture content above plastic limit, but below liquid limit
Wet	Moisture content above liquid limit

g. Moisture content of cohesionless soils (sands and gravels) is described as follows:

Term	Relative Moisture or Appearance
Dry	No moisture present
Damp	Internal moisture, but none to little surface moisture
Moist	Free water on surface
Wet	Voids filled with free water

10. Rock hardness and rock quality description.

a. The following terms are used to describe the relative hardness of the bedrock.

Term	Description
Very Soft	Difficult to indent with thumb nails; resembles hard soil but has rock structure
Soft	Resists indentation with thumb nail but can be abraded and pierced to a shallow depth by a pencil point.
Medium Hard	Resists pencil point, but can be scratched with a knife blade.
Hard	Can be deformed or broken by light to moderate hammer blows.
Very Hard	Can be broken only by heavy blows, and in some rocks, by repeated hammer blows.

b. Rock Quality Designation, RQD - This value is expressed in percent and is an indirect measure of rock soundness. It is obtained by summing the total length of all core pieces which are at least four inches long, and then dividing this sum by the total length of the core run.

11. Gradation - when tests are performed, the percentage of each particle size is listed in the appropriate column (defined in Item 9c).

12. When a test is performed to determine the natural moisture content, liquid limit moisture content, or plastic limit moisture content, the moisture content is indicated graphically.

13. The standard penetration (N) value in blows per foot is indicated graphically.

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-1 | Location: As per plan | Date Drilled: 9/26/06

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: 47.0' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	671.0												
0.5	670.5						Topsoil - 6"						
		2 4 4	18	1			FILL: Loose to medium dense brown GRAVEL WITH SAND AND SILT (A-2-4); damp.						
		7 9 7	18	2									
5		4 4 9	16	3			S-3 contains 1" silty clay seam.						
		6 7 7	15	4									
10		9 11 13	18	5				6	17	--	53	24	
		6 11 12	18	6									
15		5 11 14	17	7									
		4 5 6	12	8			S-8 contains piece of wood.						
20		5 8 9	16	9									
		4 4 5	18	10			@ 23.5'; small brick fragments, piece of slag.						
25													
25.5	645.5	4 2 3	18	11			Very loose to loose gray GRAVEL WITH SAND AND SILT (A-2-4); wet.						
							S-12 contains wood fragments, 1" silty clay seam.						
30		1 1 1	12	12									

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Non-Plastic

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-1 | Location: As per plan | Date Drilled: 9/26/06

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: 47.0' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	641.0						Very loose to loose gray GRAVEL WITH SAND AND SILT (A-2-4); wet.							Natural Moisture Content, % - ● PL ⊢ LL; Blows per foot - ○ 10 20 30 40
35		WOH 2 4	18	13				0	0	--	88	9	3	Non-Plastic
40		2 5 11	16	14			S-14 contains wood fragment.							
41.8	629.3						Dense gray SILT (A-4b), little fine sand; wet.							
45		7 18 25	18	15										
46.8	624.3						Stiff to very stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand; moist.							
50		7 8 8	18	16										
55		4 7 7	14	17		2.75								
60					P-1		@ 58.0'; 24" Press Tube - 0" Recovery.							

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-1 | Location: As per plan | Date Drilled: 9/26/06

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: 47.0' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	611.0						Stiff to very stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand; moist.						
65		WOH 3 5	17	18		1.0							
70		WOH 1 2	18	19		0.5		0	0	--	1	51	48
75		2 5 8	16	20									
80		5 10 14	18	21		3.25							
85		4 5 10	18	22		2.75							
86.8	584.3				P-2		Stiff to very stiff gray SANDY SILT (A-4a); moist. @ 88.0'; 24" Press Tube - 24" recovery.	0	0	--	2	62	36
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-1 | Location: As per plan | Date Drilled: 9/26/06

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: 47.0' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	581.0						Stiff to very stiff gray SANDY SILT (A-4a); moist.						
95		2 7 10	18	23		1.75							
96.8	574.3						Stiff gray SILT AND CLAY (A-6a), trace fine sand; moist.						
100		1 6 11	18	24		1.75							
105		WOH 4 4	18	25		0.25	@ 103.5'; very soft to soft, trace fine to coarse sand, trace gravel.						
106.8	564.2						Very soft gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; moist.						
110		WOH WOH 1	18	26		0.0							
115		WOH WOH WOH	18	27		0.0		1	1	--	2	32	65
120		WOH WOH WOH	18	28		0.0							

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: Ohio Department of Transportation - District 12 | *Project:* ODOT Innerbelt - Retaining Walls | *Job No.* 0422-1007.00

LOG OF: Boring W-DLZ-1 | *Location:* As per plan | *Date Drilled:* 9/26/06

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: 47.0' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢——⊣ LL Blows per foot - ○ 10 20 30 40
120	551.0						Very soft gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; moist.							
125		WOH WOH WOH	18	29		0.0								
130.0	541.0	WOH WOH 1	18	30		0.0								
							Bottom of Boring - 130.0'							
135														
140														
145														
150														

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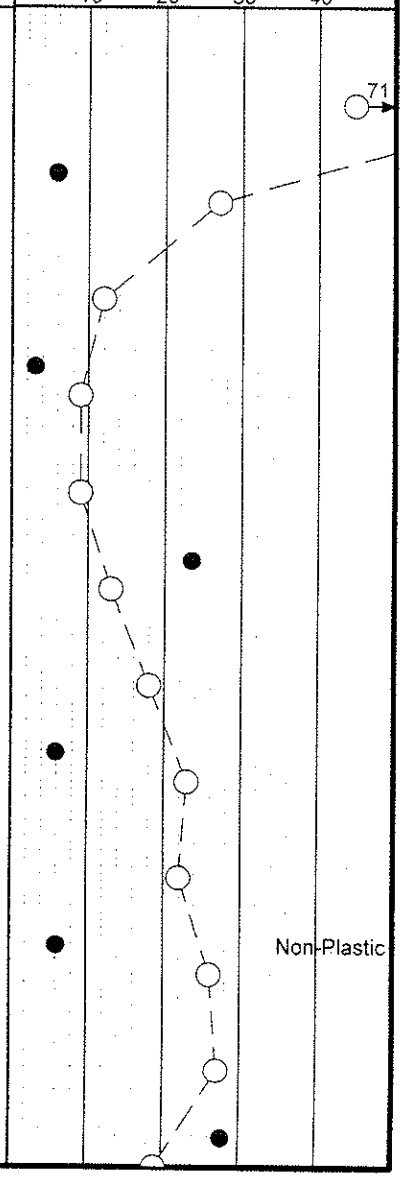
Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-2 | Location: As per plan | Date Drilled: 9/18/06 to 9/19/06

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: ?

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	668.0												
0.3	667.7						Asphalt Concrete - 4"						
		14 26 45	13	1			FILL: Very dense gray GRAVEL (A-1-a); contains brick; damp.						
3.0	665.0												
		7 17 10	8	2			FILL: Medium dense brown COARSE AND FINE SAND (A-3a), little gravel; contains brick, slag, roots; damp.						
5													
5.5	662.5												
		4 6 6	15	3			POSSIBLE FILL: Loose to medium dense light brown FINE SAND (A-3); damp.						
		4 4 5	18	4			@ 8.0'; brown.						
10													
10.5	657.5												
		4 4 5	18	5			Loose to medium dense brown GRAVEL WITH SAND AND SILT (A-2-4); damp.						
15		1 3 10	18	6			@ 14.0'; 10" silty clay seam.						
		3 8 10	16	7			@ 16.0'; peppered.						
		8 11 12	17	8			@ 18.5'; gray.						
20		8 11 11	17	9									
		8 12 14	14	10				0	1	--	94	5	
25		14 14 13	18	11			@ 26.0'; wet.						
		2 8 11	15	12									
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % ●
PL ⊢——⊣ LL
Blows per foot ○
10 20 30 40



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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

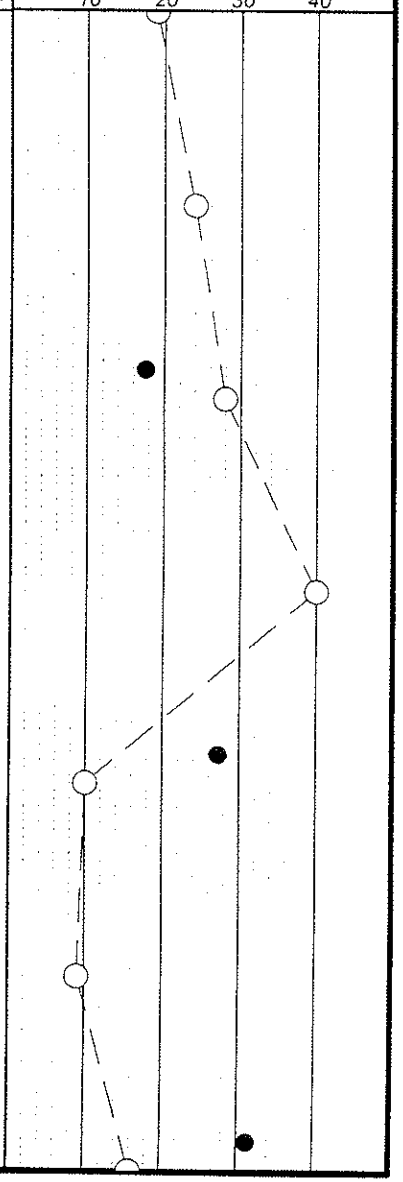
LOG OF: Boring W-DLZ-2 | Location: As per plan | Date Drilled: 9/18/06 to 9/19/06

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: ?

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION
30	638.0						Medium dense gray COARSE AND FINE SAND (A-3a); wet.
		3 9 15	18	13			
35							
		3 12 16	17	14			
40							
41.8	626.3						Dense gray SILT (A-4b), little fine sand, trace clay; wet.
		6 15 25		15			
45							
		4 5 5	18	16		0.75	
49.5	618.5						Medium stiff to stiff gray SANDY SILT (A-4a); moist.
50							
		2 3 6	14	17		1.0	
55							
		4 7 9	18	18		---	@ 58.5'; contains organic material.
60							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-2 | Location: As per plan | Date Drilled: 9/18/06 to 9/19/06

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: ?

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	608.0												
61.8	606.3						Medium stiff to stiff gray SANDY SILT (A-4a); moist.						
							Very stiff gray SILT AND CLAY (A-6a), trace fine sand; moist.						
65		7 9 13	18	19		2.25							
					P-1	2.5 TSF	@ 68.0'; 24" Press Tube - 24" Recovery.	0	0	--	1	62	37
70													
		2 4 6	18	20		2.25	@ 73.5'; trace fine and coarse sand, trace gravel.		0	--	1	45	54
75													
		4 7 10	14	21		1.75							
80													
		3 7 10	18	22		2.0							
85													
		5 7 10	18	23		1.25							
90													

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-2 | Location: As per plan | Date Drilled: 9/18/06 to 9/19/06

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: ?

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90.1	578.0 / 577.9						Very stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; moist.						
95		12 16 15	17	24		2.5							
96.8	571.3						Soft to medium stiff gray SANDY SILT (A-4a), trace gravel; moist.						
100		2 3 7	16	25		0.5							
101.8	566.2						Very soft to soft SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; moist.						
105		WOH WOH 2	18	26		0.0		1	3	--	8	48	40
106.8	561.2						Very soft gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; moist.						
110		WOH WOH WOH	18	27		0.0							
115		WOH WOH WOH	18	28		0.0							
120					29	0.0	@ 118.0'; 24" Press Tube - 0" recovery.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-2 | Location: As per plan | Date Drilled: 9/18/06 to 9/19/06

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: ?

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL — LL Blows per foot - ○ 10 20 30 40
120	548.0						Very soft gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; moist.							
		WOH WOH WOH	18	30		0.0								
125														
		WOH WOH WOH	14	31		0.0								
130.0	538.0						Bottom of Boring - 130.0'							
135														
140														
145														
150														

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

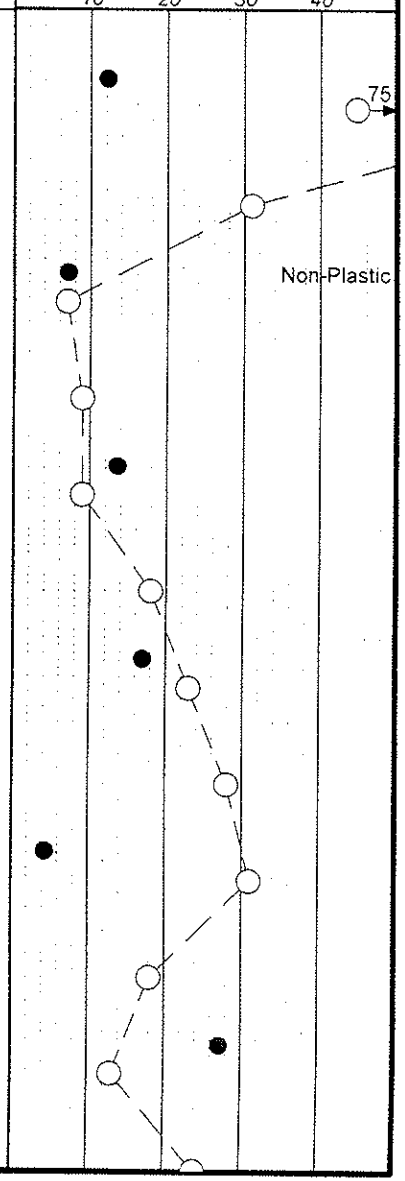
LOG OF: Boring W-DLZ-3 | Location: As per plan | Date Drilled: 9/21/06

WATER OBSERVATIONS: Water seepage at: 23.9' - 49.0'
Water level at completion: 25.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	669.0												
0.3	668.7						Asphalt Concrete - 3.5"						
		23 47 28	18	1			FILL: Very dense gray GRAVEL WITH SAND (A-1-b); damp.						
3.0	666.0												
		6 8 23	12	2			FILL: Dense gray GRAVEL (A-1-a); damp.						
5													
5.5	663.5												
		3 3 4	14	3			Loose brown GRAVEL WITH SAND AND SILT (A-2-4); damp.	10	22	--	53	15	
		3 4 5	16	4									
10													
		3 4 5	18	5			@ 11.0'; little gravel.						
		3 5 13	18	6			@ 13.5'; medium dense. @ 14.0'; 6" clump of clayey silt.						
15													
		8 6 17	18	7			@ 16.7'; 6" clump of clayey silt.						
		3 11 17	18	8			@ 18.5'; trace gravel.						
20													
		7 14 17	16	9			@ 20.5'; dense, peppered.						
		5 7 11	18	10			@ 23.0' - 25.5'; medium dense, brown and gray, contains clumps of clayey silt.						
25													
		4 5 8	18	11			@ 25.5'; gray.						
28.0	641.0												
		9 11 13	18	12			Medium dense gray GRAVEL WITH SAND AND SILT (A-2-4); wet.						
30													

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○



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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-3 | Location: As per plan | Date Drilled: 9/21/06

WATER OBSERVATIONS: Water seepage at: 23.9' - 49.0'
Water level at completion: 25.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / PL — LL / Blows per foot
30	639.0						Medium dense gray GRAVEL WITH SAND AND SILT (A-2-4); wet.							
35		5 8 9	18	13				0	0	–	67	33		Non-Plastic
40		WOH 3 9	18	14										
45		4 14 20	18	15										
46.8	622.3						Stiff gray SILT (A-4b), trace fine to coarse sand; moist.							
50		7 8 11	18	16		1.75								
55						3.5 TSF 3.5 TSF	Lean clay Lean clay @ 53.5'; 24" Press Tube - 24" Recovery.	0 0	0 0	-- --	1 1	69 69	30 30	
60		9 12 14	18	17		4.0	@ 58.5' - 60.0'; very stiff to hard.	0	0	--	4	66	30	

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

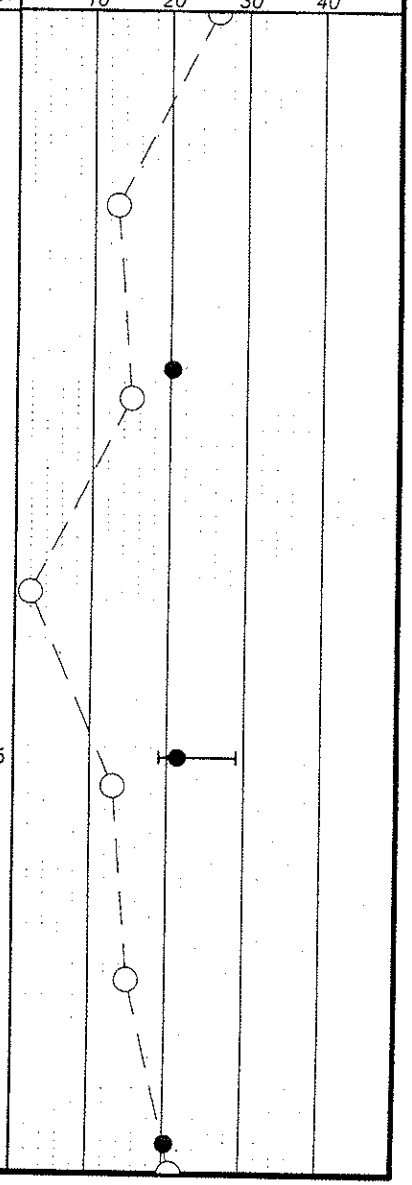
Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-3 | Location: As per plan | Date Drilled: 9/21/06

WATER OBSERVATIONS: Water seepage at: 23.9' - 49.0'
Water level at completion: 25.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	609.0						Medium stiff gray SILT (A-4b), trace fine to coarse sand; moist.						
65		3 5 8	18	18		.75							
70		2 6 9	18	19		2.5	@ 68.5'; very stiff.						
71.8	597.3						Very soft gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; moist.						
75		WOH WOH 2	18	20		0.0							
76.8	592.3						Stiff to very stiff gray SILT (A-4b), trace fine sand; moist.						
80		1 5 8	18	21		2.5		0	0	--	0	65	35
85		1 5 10	18	22		1.5							
90		3 9 12	18	23		2.25							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-3 | Location: As per plan | Date Drilled: 9/21/06

WATER OBSERVATIONS: Water seepage at: 23.9' - 49.0'
Water level at completion: 25.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	579.0						Stiff to very stiff gray SILT (A-4b), trace fine sand; moist.						
		6 10 18	18	24		3.25							
95													
					P-2	1.5	@ 98.0'; 24" Press Tube - 0" recovery.						
100													
		1 5 7	18	26		1.0	@ 103.5' - 105.0'; medium stiff to stiff.						
105													
106.8	562.2						Very stiff gray SANDY SILT (A-4a), trace gravel; moist.						
		6 12 16	18	27		2.75							
110													
111.8	557.2						Very soft gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; moist.						
		WOH WOH WOH	18	28		0.0							
115													
		WOH WOH 3	18	29		0.0		4	1	--	2	30	63
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-3 | Location: As per plan | Date Drilled: 9/21/06

WATER OBSERVATIONS: Water seepage at: 23.9' - 49.0'
Water level at completion: 25.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
120	549.0						Very soft gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; moist.							Natural Moisture Content, % - ● PL — LL; Blows per foot - ○ (10 20 30 40)
125		WOH WOH WOH	18	30		0.0								
130.0	539.0	WOH WOH 1	18	31		0.0								
							Bottom of Boring - 130.0'							
135														
140														
145														
150														

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-4 | Location: As per plan | Date Drilled: 10/2/06

WATER OBSERVATIONS: Water seepage at: 6.0' - 27.0'
Water level at completion: None (inside hollowstem augers)

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	648.0												
1.3	646.7						Asphalt Concrete - 6" Portland Cement Concrete - 9"						
		17 5 6	16	1			POSSIBLE FILL: Medium dense brown COARSE AND FINE SAND (A-3a), trace to little gravel; damp.						
		7 9 9	10	2									
5													
5.5	642.5						Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4); wet.						
		5 5 7	9	3									
		5 7 10	16	4			S-4: gray, contains a petroleum-like odor.						
10													
10.5	637.5						Medium dense to dense gray SILT (A-4b), some to "and" fine sand; wet.						
		3 12 20	18	5									
		3 9 10	16	6									
15													
		6 9 11	17	7									
		5 6 13	18	8									
20													
20.5	627.5						Medium dense gray COARSE AND FINE SAND (A-3a), trace gravel; wet.						
		7 7 7	16	9			S-10A contains a petroleum-like odor.						
24.5	623.5	5 11 13	18	10A 10B									
25							Medium dense gray SILT (A-4b), some fine sand; wet.						
27.0	621.0	12 10 7	18	11A 11B		1.5							
28.0	620.0						Stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand; moist.						
		2 3 4	12	12		1.0	Medium stiff to stiff gray SANDY SILT (A-4a); moist.						
30													

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-4 | Location: As per plan | Date Drilled: 10/2/06

WATER OBSERVATIONS: Water seepage at: 6.0' - 27.0'
Water level at completion: None (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	618.0						Stiff to very stiff gray SANDY SILT (A-4a); moist.						
31.8	616.2						Stiff gray SILT (A-4b), little clay, trace fine sand; moist to wet.						
					P-1	1.5		0	0	--	2	86	12
35													
36.8	611.2						Stiff to very stiff gray SANDY SILT (A-4a); moist.						
		3 6 8	18	13		1.5							
40													
		6 6 6	18	14		2.25							
45													
		3 4 5	18	15		2.0							
50													
51.8	596.3						Stiff to very stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand; moist.						
		1 4 5	18	16		1.5							
55													
		5 10 15	16	17		3.0							
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-4 | Location: As per plan | Date Drilled: 10/2/06

WATER OBSERVATIONS: Water seepage at: 6.0' - 27.0'
Water level at completion: None (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	588.0						Stiff to very stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand; moist.						
65		3 7 8	18	18		2.5							
70		WOH WOH 2	18	19		0.5	@ 68.5' - 70.0'; soft to medium stiff.						
75					P-2	1.5 TSF		0	0	--	1	61	38
					P-2	1.5 TSF		0	0	--	1	61	38
77.0	571.0						Soft to medium stiff gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; moist.						
80		WOH WOH 1	18	20		0.0	@ 78.5'; very soft.						
85		WOH WOH WOH	18	21		0.0							
90		WOH WOH 4	18	22		0.5	@ 88.5'; soft to medium stiff.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-4 | Location: As per plan | Date Drilled: 10/2/06

WATER OBSERVATIONS: Water seepage at: 6.0' - 27.0'
Water level at completion: None (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	558.0						Soft to medium stiff gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; moist.						
95		WOH 2 6	18	23		0.5							
96.8	551.3						Soft to medium stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; damp to moist.						
100.0	548.0	6 11 11	18	24		0.5	Bottom of Boring - 100.0'						
105													
110													
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-5 | Location: As per plan | Date Drilled: 10/2/06

WATER OBSERVATIONS: Water seepage at: - Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
0	649.0						Asphalt Concrete - 2"							
1.2	647.8						Portland Cement Concrete - 12"							
		15 9 8	18	1			FILL: Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4); damp.	2	12	--	54	32		Non-Plastic
3.1	645.9						FILL: Loose gray SILT (A-4b), some fine sand, little clay; contains wood fibers; moist.							
		2 3 3	14	2										
5														
5.5	643.5						Loose to medium dense brown COARSE AND FINE SAND (A-3a); moist.							
		4 4 6	18	3										
8.0	641.0						Loose to medium dense gray COARSE AND FINE SAND (A-3a), trace to little clayey silt; wet.							
		7 7 9	14	4										
10														
		7 7 11	-	5										
13.0	636.0						Loose to medium dense gray SILT (A-4b), little to some fine sand, trace clay; wet.							
15		5 4 5	-	6										
		6 8 7	0	7										
		8 15 16	6	8										
20														
		13 12 13	18	9					0	--	20	70	10	Non-Plastic
		6 7 11	18	10			S-10 contains a seam of coarse and fine sand.							
25														
		8 9 12	15	11			S-11 contains a clayey silt seam.							
28.0	621.0						Soft to medium stiff gray SILT AND CLAY (A-6a), trace fine sand; moist.							
		4 5 7	18	12		0.5								
30														

PL ⊢——⊣ LL

Blows per foot - ○ (10 20 30 40)

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-5 | Location: As per plan | Date Drilled: 10/2/06

WATER OBSERVATIONS: Water seepage at: - Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	619.0						Soft to medium stiff gray SILT AND CLAY (A-6a), trace fine sand; moist.						
35		2 4 5	18	13		0.75		0	0	-	2	66	32
40		2 4 5	18	14	P-1	0.75		0	0	-	0	45	55
45		2 4 6	14	15		0.75							
50		2 5 5	18	16		1.0	@ 48.5' - 50.0'; medium stiff to stiff.						
55		3 3 5	18	17		0.5							
60		4 6 8	17	18		1.5	@ 58.5' - 60.0'; stiff.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-5 | Location: As per plan | Date Drilled: 10/2/06

WATER OBSERVATIONS: Water seepage at: - Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	589.0												
		3 3 5	18	19		0.5	Soft to medium stiff gray SILT AND CLAY (A-6a), trace fine sand; moist.	0	0	--	0	58	42
65													
		3 5 5	18	20		1.5	@ 68.5'; stiff.						
70													
		5 6 7	1	21									
75													
76.8	572.3						Soft to medium stiff gray CLAY (A-7-6), trace fine to coarse sand, trace gravel; moist.						
		3 5 5	18	22		0.5							
80					P-2								
		1 3 4	18	23		0.25	@ 83.5'; very soft to soft.						
85													
		2 3 5	18	24		0.0							
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-5 | Location: As per plan | Date Drilled: 10/2/06

WATER OBSERVATIONS: Water seepage at: - Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	559.0						Very soft gray CLAY (A-7-6), trace fine to coarse sand, trace gravel; moist.						
95		1 3 5	18	25		0.0		0	1	--	2	24	73
		2 4 5	18	26		0.0							
100.0	549.0						Bottom of Boring - 100.0'						
105													
110													
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-6 | Location: As per plan | Date Drilled: 10/3/06

WATER OBSERVATIONS: Water seepage at: - Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / PL — LL / Blows per foot
0	645.0													
1.1	643.9	15 7 5	13	1			Asphalt Concrete - 2" / Portland Cement Concrete - 11" / FILL: Loose to medium dense brown COARSE AND FINE SAND (A-3a), trace clayey silt; damp.							
5		2 3 2	18	2										
		2 2 12	7	3										
8.0	637.0													
		3 8 8	16	4			Medium dense gray SILT (A-4b), some to "and" fine sand; wet.							
10		6 8 9	15	5										
15		6 8 9	14	6				0	0	--	36	59	5	Non-Plastic
		6 7 8	8	7										
20		6 10 12	10	8										
		10 18 18	18	9			@ 21.0' - 22.5'; dense.							
23.0	622.0													
		7 9 12	18	10			Medium dense SANDY SILT (A-4a); wet.	0	1	--	58	32	9	Non-Plastic
25														
25.5	619.5	10 9 7	18	11		0.5	Soft to medium stiff gray SANDY SILT (A-4a); moist.							
30		1 3 3	18	12		1.0	@ 28.5'; medium stiff to stiff.							

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-6 | Location: As per plan | Date Drilled: 10/3/06

WATER OBSERVATIONS: Water seepage at: - Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	615.0						Medium stiff to stiff gray SANDY SILT (A-4a); moist.						
31.8	613.3						Very soft gray SILT AND CLAY (A-6a), trace fine to coarse sand; moist.						
35		1 2 3	18	13		0.0							
40		1 3 3	18	14		0.75	@ 38.5'; medium stiff to stiff.	0	0	--	0	55	45
45		1 3 6	18	15		1.5							
46.5	598.5						Stiff gray SILT (A-4b), some to "and" clay, trace fine sand; moist.						
50					P-1	1.0 TSF		0	0	--	1	64	35
55		3 5 6	1	16		---							
60		1 4 5	18	17		1.5							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

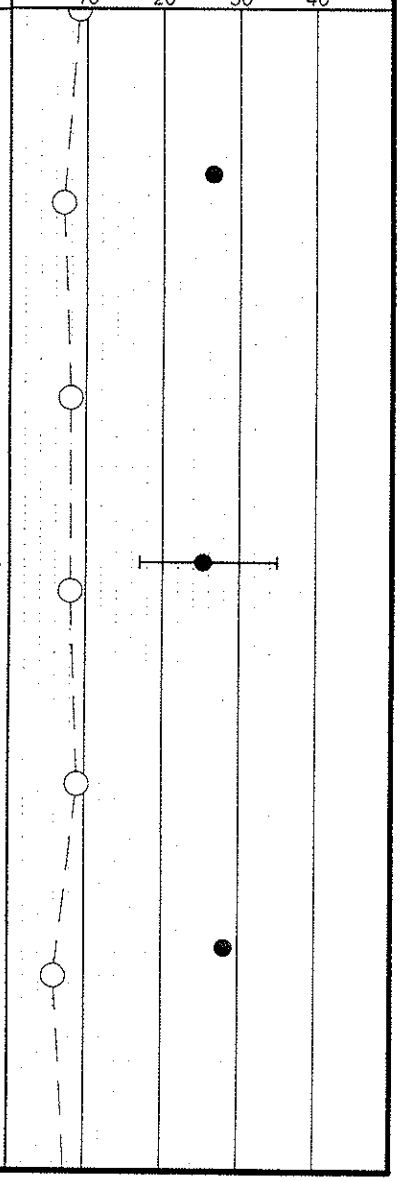
LOG OF: Boring W-DLZ-6 | Location: As per plan | Date Drilled: 10/3/06

WATER OBSERVATIONS: Water seepage at: - Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	585.0						Stiff gray SILT (A-4b), some to "and" clay, trace fine sand; moist.						
61.8	583.3						Medium stiff to stiff gray SILTY CLAY (A-6b), trace fine to coarse sand; moist.						
65		1 3 4	18	18		0.75							
70		2 4 4	18	19		0.0	@ 68.5' - 70.0', 83.5' - 85.0'; very soft.						
75		2 4 4	18	20		0.5		1	2	--	6	38	53
80		2 4 5	18	21		1.0							
85		WOH 2 4	-	22		0.0							
90					2								

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40



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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-6 | Location: As per plan | Date Drilled: 10/3/06

WATER OBSERVATIONS: Water seepage at: - Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	555.0						Soft to medium stiff gray SILTY CLAY (A-6b), trace fine to coarse sand; moist.						
95		2 4 5	18	23		---							
		2 4 10	18	24		0.5							
100.0	545.0						Bottom of Boring - 100.0'						
105													
110													
115													
120													

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-7 | Location: As per plan | Date Drilled: 10/3/06

WATER OBSERVATIONS: Water seepage at: 6.0' - 22.5'
Water level at completion: None (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	637.0													
1.4	635.6	5 9 11	16	1			Asphalt Concrete - 7" Portland Cement Concrete - 10" FILL: Loose to medium dense brown COARSE AND FINE SAND (A-3a), trace to little clayey silt; damp.							
5		10 11 11	14	2										
		1 3 3	12	3			@ 6.0'; wet. S-3 contains 1/2" brick chunk.							
8.0	629.0													
		1 7 11	10	4			Dense gray SANDY SILT (A-4a); wet.							
10		7 10 15	18	5				0	0	--	34	66		Non-Plastic
13.0	624.0													
		10 16 24	18	6			Dense gray SILT (A-4b), some to "and" fine sand; wet.							
15		14 18 19	18	7				0	0	--	58	35	7	Non-Plastic
		12 15 20	18	8										
20														
20.5	616.5	6 5 11	18	9			Medium dense gray GRAVEL WITH SAND AND SILT (A-2-4); contains wood fibers, organic material; wet.							
23.0	614.0													
		1 4 4	18	10		0.5	Soft to medium stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand; moist.							
25		2 3 3	18	11		0.25		0	0	--	2	50	48	
		WOH 3 4	18	12		0.5								
30														

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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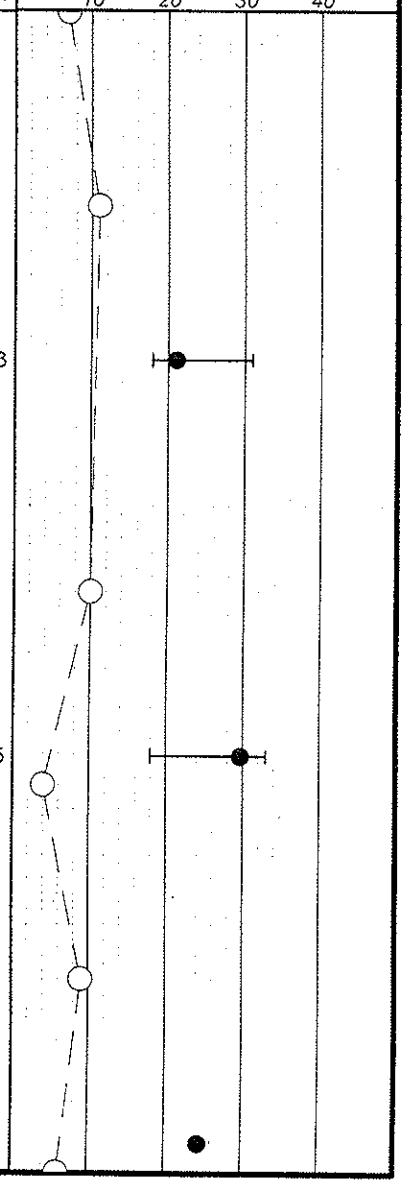
Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-7 | Location: As per plan | Date Drilled: 10/3/06

WATER OBSERVATIONS: Water seepage at: 6.0' - 22.5'
Water level at completion: None (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	607.0						Medium stiff to stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand; moist.						
35		3 5 6	18	13		1.0							
40					P-1	3.0 TSF		0	0	--	1	56	43
45		WOH 4 6	16	14		1.0							
50		WOH WOH 4	18	15		0.25		0	0	--	1	44	55
55		1 4 5	18	16		0.75	@ 53.5' - 55.0'; medium stiff.						
60		WOH WOH 6	18	17		0.25							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



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Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-7 | Location: As per plan | Date Drilled: 10/3/06

WATER OBSERVATIONS: Water seepage at: 6.0' - 22.5'
Water level at completion: None (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	577.0												
61.8	575.3						Very soft to soft gray SILT AND CLAY (A-6a), trace fine to coarse sand; moist.						
							Stiff gray SILT (A-4b), some clay; moist.						
					P-2	1.75 TSF		0	0	--	0	74	26
65					P-2	1.75 TSF		0	0	--	0	74	26
67.0	570.0												
		WOH WOH 1	18	18		0.25	Very soft to soft gray SILT AND CLAY (A-6a), trace fine to coarse sand; moist.						
70													
		WOH WOH 5	18	19		1.0	@ 73.5'; medium stiff to stiff.						
75													
		WOH 3 4	18	20		0.75							
80													
81.8	555.3						Very soft gray CLAY (A-7-6), trace fine to coarse sand, trace gravel; moist.						
		WOR WOR WOH	18	21		0.25	@ 83.5'; very soft to soft.	0	1	--	1	21	77
85													
		WOR WOH WOH	18	22		0.0							
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-7 | Location: As per plan | Date Drilled: 10/3/06

WATER OBSERVATIONS: Water seepage at: 6.0' - 22.5'
Water level at completion: None (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	547.0						Very soft gray CLAY (A-7-6), trace fine to coarse sand, trace gravel; moist.						
		WOR WOR WOH	18	23		0.0							
95													
96.8	540.3						Stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand; damp to moist.						
		3 8 11	18	24		1.5							
100.0	537.0						Bottom of Boring - 100.0'						
105													
110													
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: Ohio Department of Transportation - District 12	Project: ODOT Innerbelt - Retaining Walls	Job No. 0422-1007.00
LOG OF: Boring W-DLZ-8	Location: As per plan	Date Drilled: 10/4/06

WATER OBSERVATIONS: Water seepage at: - Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / PL — LL / Blows per foot
0	635.0													
0.8	634.2						Asphalt Concrete - 10"							
		13 7 5	10	1			FILL: Loose to medium dense brown GRAVEL WITH SAND (A-1-b); moist.							
		2 4 6	11	2										
5		7 6 8	0	3										
8.0	627.0													
		2 6 9	12	4			Medium dense gray GRAVEL WITH SAND AND SILT (A-2-4); wet.							
10														
10.5	624.5													
		11 15 13	16	5			Loose to medium dense gray SANDY SILT (A-4a); wet.							
		2 2 3	14	6				0	1	--	58	38	3	Non-Plastic
15		14 16 13	18	7										
18.0	617.0													
		4 6 7	18	8		---	Stiff gray SANDY SILT (A-4a); damp to moist.							
20														
20.5	614.5													
		10 12 13	18	9			Medium dense gray SILT (A-4b), some fine sand, little clay; wet.							
23.0	612.0													
		6 6 5	18	10		1.25	Medium stiff to stiff gray SILT AND CLAY (A-6a); moist.	0	0	--	3	59	38	
25														
		1 1 3	18	11		0.75								
		2 2 4	18	12		1.5								
30														

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

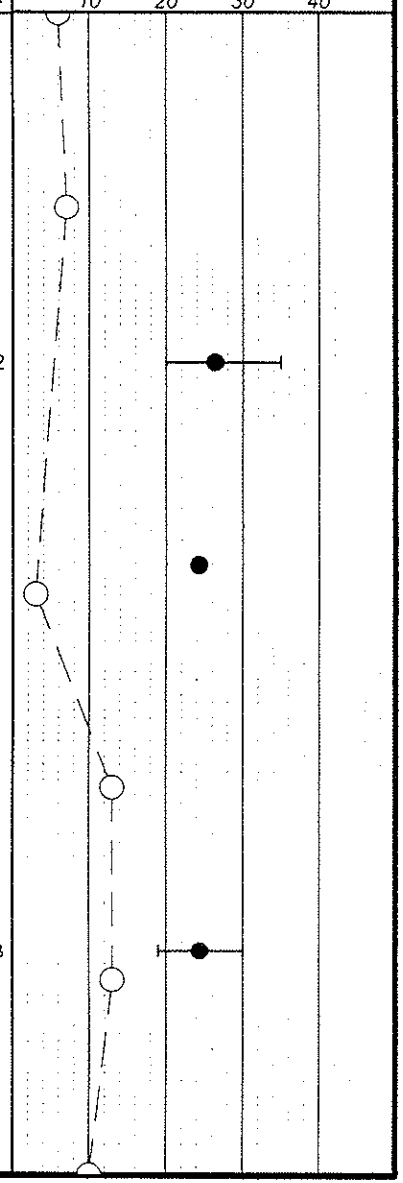
Client: Ohio Department of Transportation - District 12 | *Project:* ODOT Innerbelt - Retaining Walls | *Job No.* 0422-1007.00

LOG OF: Boring W-DLZ-8 | *Location:* As per plan | *Date Drilled:* 10/4/06

WATER OBSERVATIONS: Water seepage at: -
Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	605.0						Medium stiff to stiff gray SILT AND CLAY (A-6a); moist.						
35		2 3 4	-	13		0.75							
40					P-1	0.5 TSF		0	0	--	1	47	52
45		1 1 2	18	14		0.5							
50		4 7 6	18	15		1.5	@ 48.5'; stiff.						
55		3 6 7	18	16		1.5		0	0	--	0	57	43
60		5 6 4	?	17		3.25	@ 56.8' - 61.8'; seam of plastic (A-4b).						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40



DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-8 | Location: As per plan | Date Drilled: 10/4/06

WATER OBSERVATIONS: Water seepage at: - Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	575.0												
		3 5 8	18	18		1.75	Soft to medium stiff gray SILT AND CLAY (A-6a), trace fine sand; moist.						
65													
66.8	568.3												
		2 2 4	-	19		0.25	Very soft to soft gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; moist.						
70													
		2 3 3	18	20		0.0		1	2	--	2	29	66
75													
76.5	558.5												
					P-2	0.25 TSF	Very soft to soft gray CLAY (A-7-6); moist.	0	0	--	1	22	77
80					P-2	0.25 TSF		0	0	--	1	22	77
		2 4 5	18	21		0.0							
85													
86.8	548.3												
		2 4 6	18	22		1.5	Stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; moist.						
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-8 | Location: As per plan | Date Drilled: 10/4/06

WATER OBSERVATIONS: Water seepage at: - Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	545.0						Medium stiff to stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; moist.						
95		5 8 9	18	23		1.0							
100.0	535.0	6 9 10	13	24		1.25		0	0	--	1	52	47
							Bottom of Boring - 100.0'						
105													
110													
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % -
PL — LL
Blows per foot -
10 20 30 40

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: Ohio Department of Transportation - District 12 | *Project:* ODOT Innerbelt - Retaining Walls | *Job No.* 0422-1007.00

LOG OF: Boring W-DLZ-9 | *Location:* As per plan | *Date Drilled:* 10/5/06

WATER OBSERVATIONS: Water seepage at: - Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
0	635.0													
0.7	634.3	12 9 6	18	1			Asphalt Concrete - 5" FILL: Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4); damp.							
5		6 7 6	7	2			@ 3.5'; brick fragments; wet.							
5.5	629.5	4 8 7	14	3			Medium dense brownish gray SANDY SILT (A-4a); wet.	0	1	--	53	46	Non-Plastic	
10		4 8 8	0	4										
10.5	624.5	8 13 13	18	5			Medium dense gray SILT (A-4b), some to "and" fine sand, trace clay; contains occasional clayey silt seam; wet.							
15		5 9 7	14	6										
		5 6 13	18	7				0	0	--	16	73	11	Non-Plastic
		5 9 13	2	8										
20														
20.5	614.5	8 7 7	18	9		1.0	Medium stiff to stiff gray SILT (A-4b), little fine to coarse sand; moist.	0	1	--	12	51	36	
		1 1 2	18	10		0.25	@ 23.5'; very soft to soft.							
25		WOH WOH 3	0	11		---								
		WOH WOH 3	18	12		0.75	@ 28.5'; medium stiff.							
30														

STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢—⊣ LL / Blows per foot - ○ (10 20 30 40)

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: Ohio Department of Transportation - District 12 | Project: ODOT Innerbelt - Retaining Walls | Job No. 0422-1007.00

LOG OF: Boring W-DLZ-9 | Location: As per plan | Date Drilled: 10/5/06

WATER OBSERVATIONS: Water seepage at: - Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	575.0						Stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; moist.						
65		1 5 6	18	18		1.5							
66.8	568.3						Very soft to soft gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; moist.						
70		2 4 5	18	19		0.0							
75		1 4 4	10	20		0.25							
80		2 4 5	18	21		0.0		0	1	--	1	35	63
85		WOH 2 4	18	22		0.0							
90					P-2								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: Ohio Department of Transportation - District 12 | *Project:* ODOT Innerbelt - Retaining Walls | *Job No.* 0422-1007.00

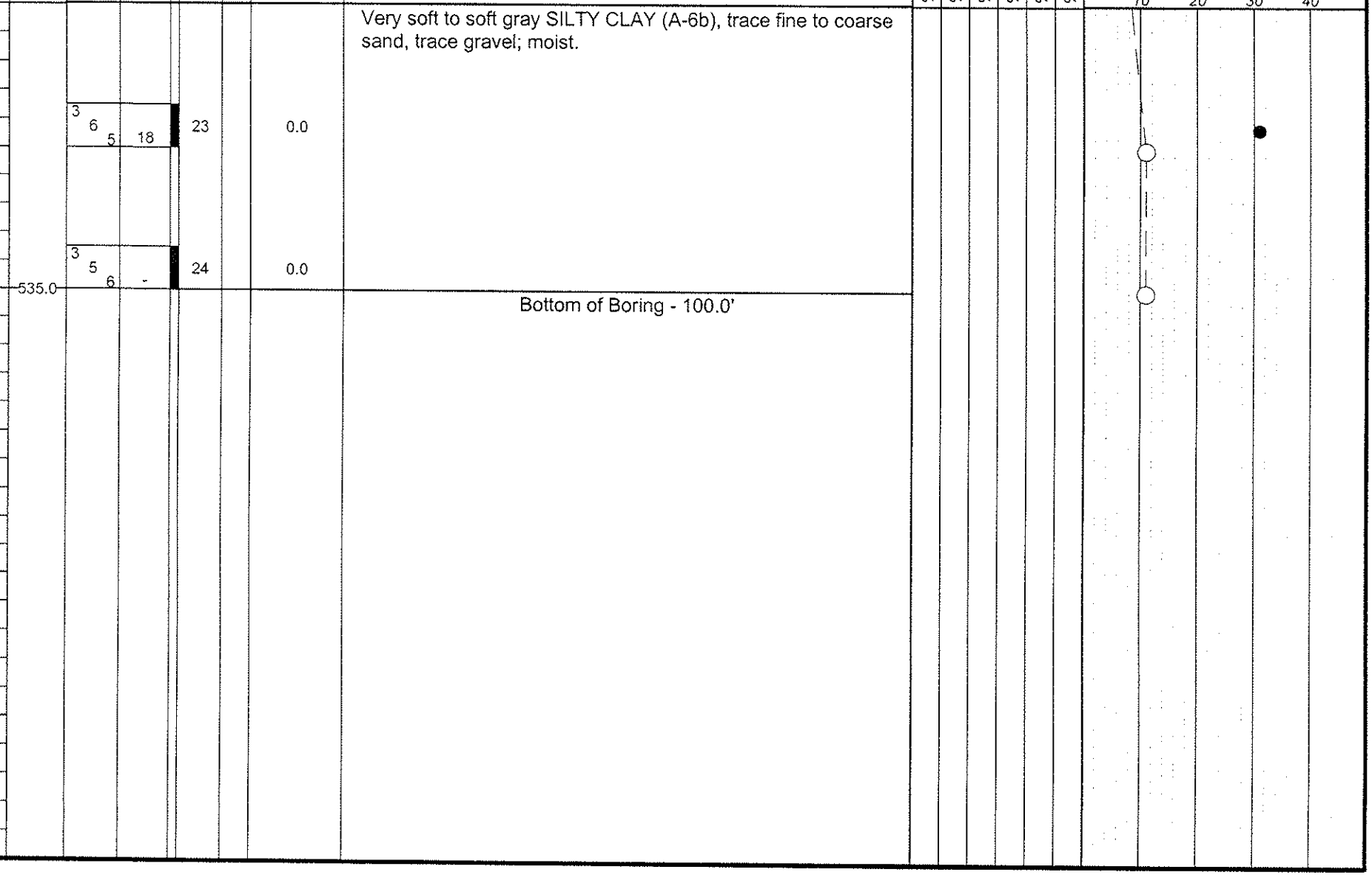
LOG OF: Boring W-DLZ-9 | *Location:* As per plan | *Date Drilled:* 10/5/06

WATER OBSERVATIONS: Water seepage at: - Water level at completion: -

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	545.0						Very soft to soft gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; moist.						
95		3 6 5	18	23		0.0							
		3 5 6	-	24		0.0							
100.0	535.0						Bottom of Boring - 100.0'						
105													
110													
115													
120													

GRADATION

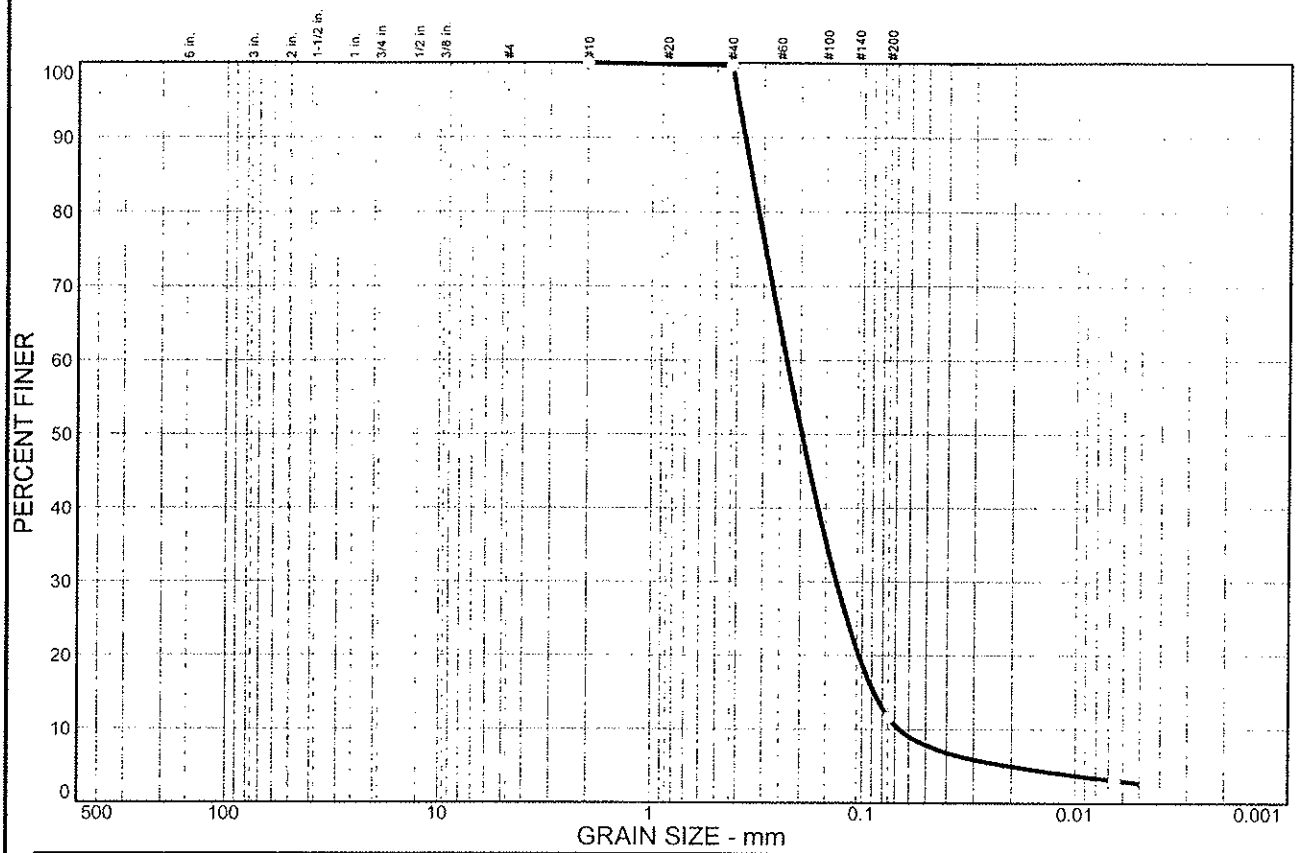
STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



APPENDIX II

Laboratory Test Results

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.3	88.1	8.9	2.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.7		
#200	11.6		

* (no specification provided)

Soil Description

Poorly graded sand with silt

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 0.342 D_{60}= 0.232 D_{50}= 0.196
D_{30}= 0.133 D_{15}= 0.0879 D_{10}= 0.0669
C_u= 3.47 C_c= 1.15

Classification

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

Remarks

Moisture Content= 27.6%

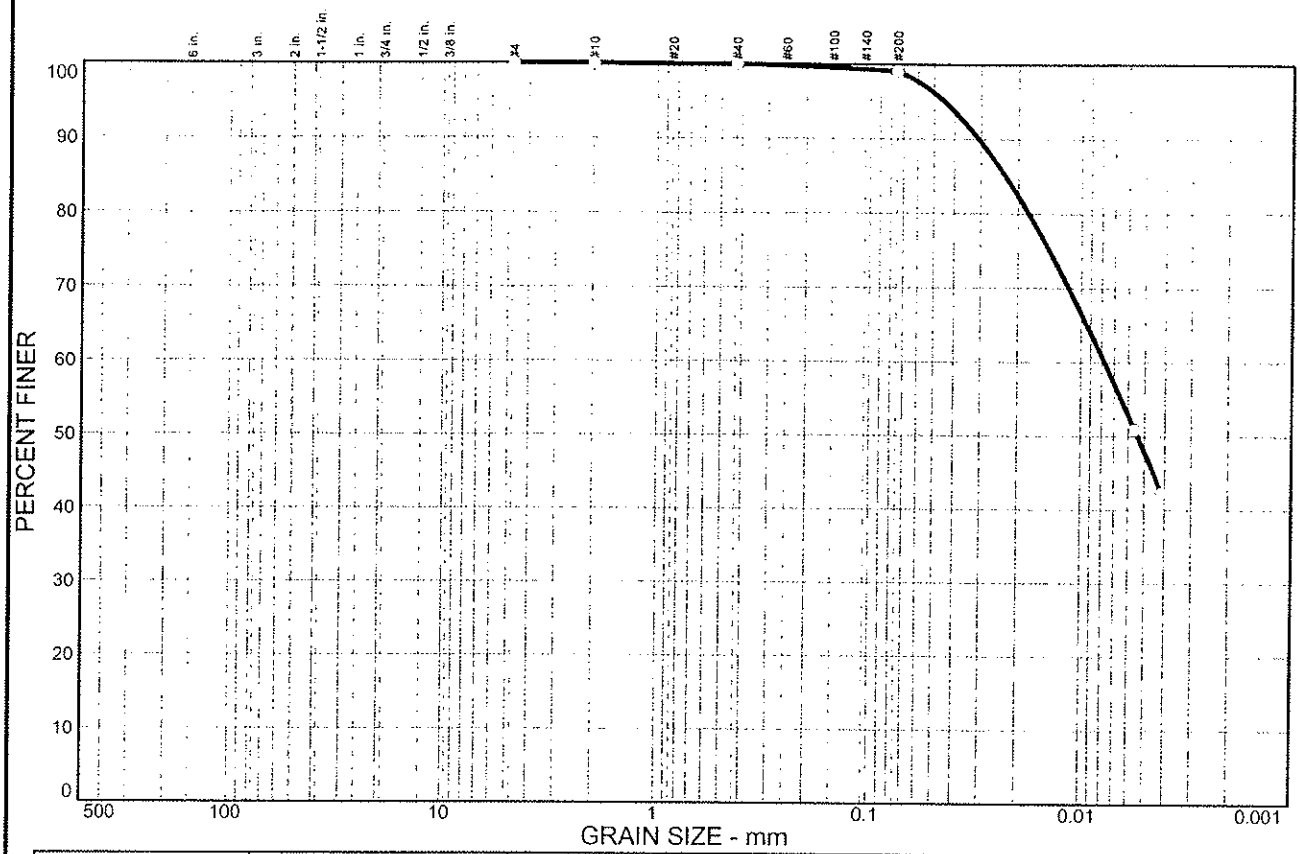
Sample No.: 13 **Source of Sample:** W-DLZ-1 **Date:** 10/30/06
Location: **Elev./Depth:** 33 5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.1	0.8	51.2	47.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#40	99.9		
#200	99.1		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 20 LL= 32 PI= 12

Coefficients

D_{85}= 0.0229 D_{60}= 0.0078 D_{50}= 0.0054
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(12)

Remarks

Moisture Content= 29.5%

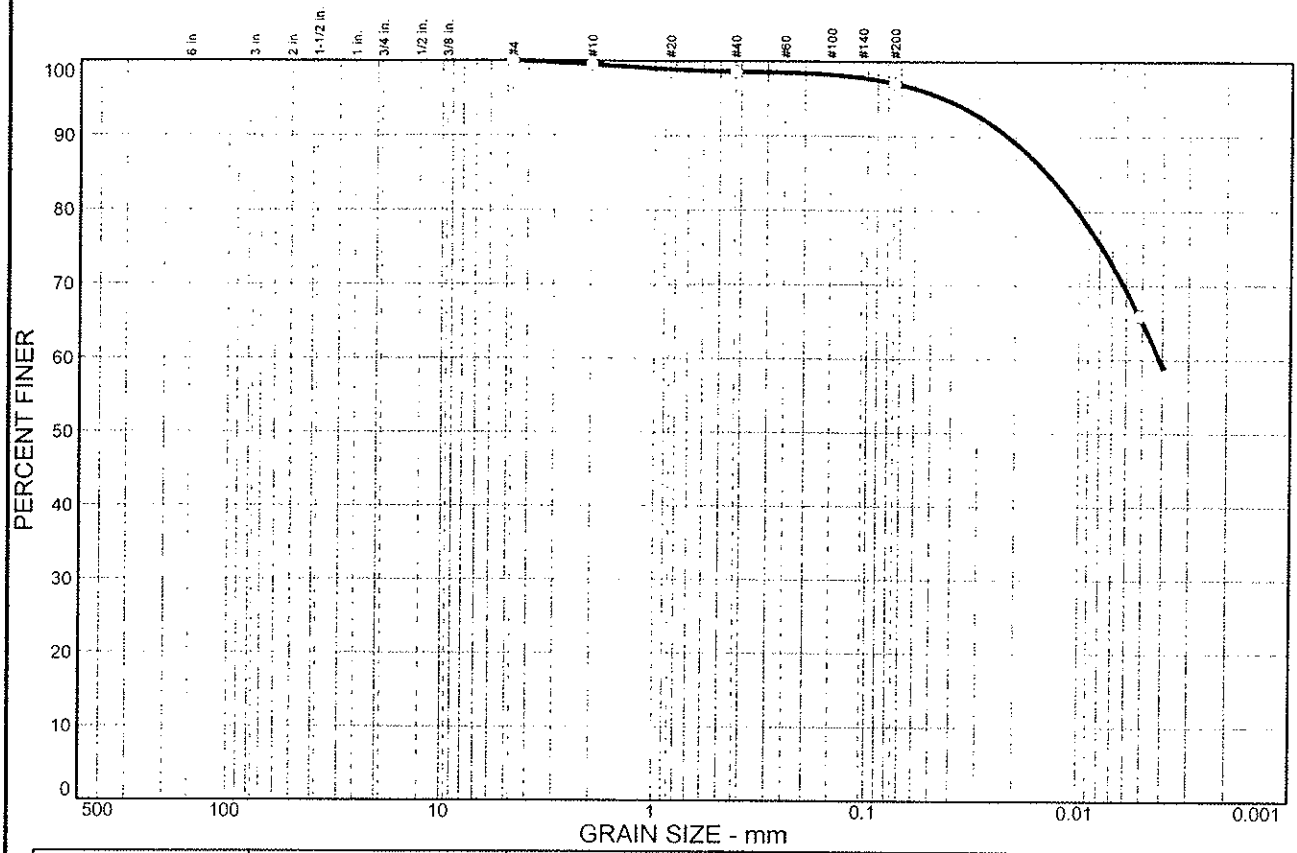
Sample No.: 19 **Source of Sample:** W-DLZ-1 **Date:** 10/30/06
Location: **Elev./Depth:** 68.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.5	0.9	1.5	32.1	65.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.5		
#40	98.6		
#200	97.1		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 22 LL= 39 PI= 17

Coefficients

D_{85}= 0.0142 D_{60}= 0.0041 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(18)

Remarks

Moisture Content= 27.6%

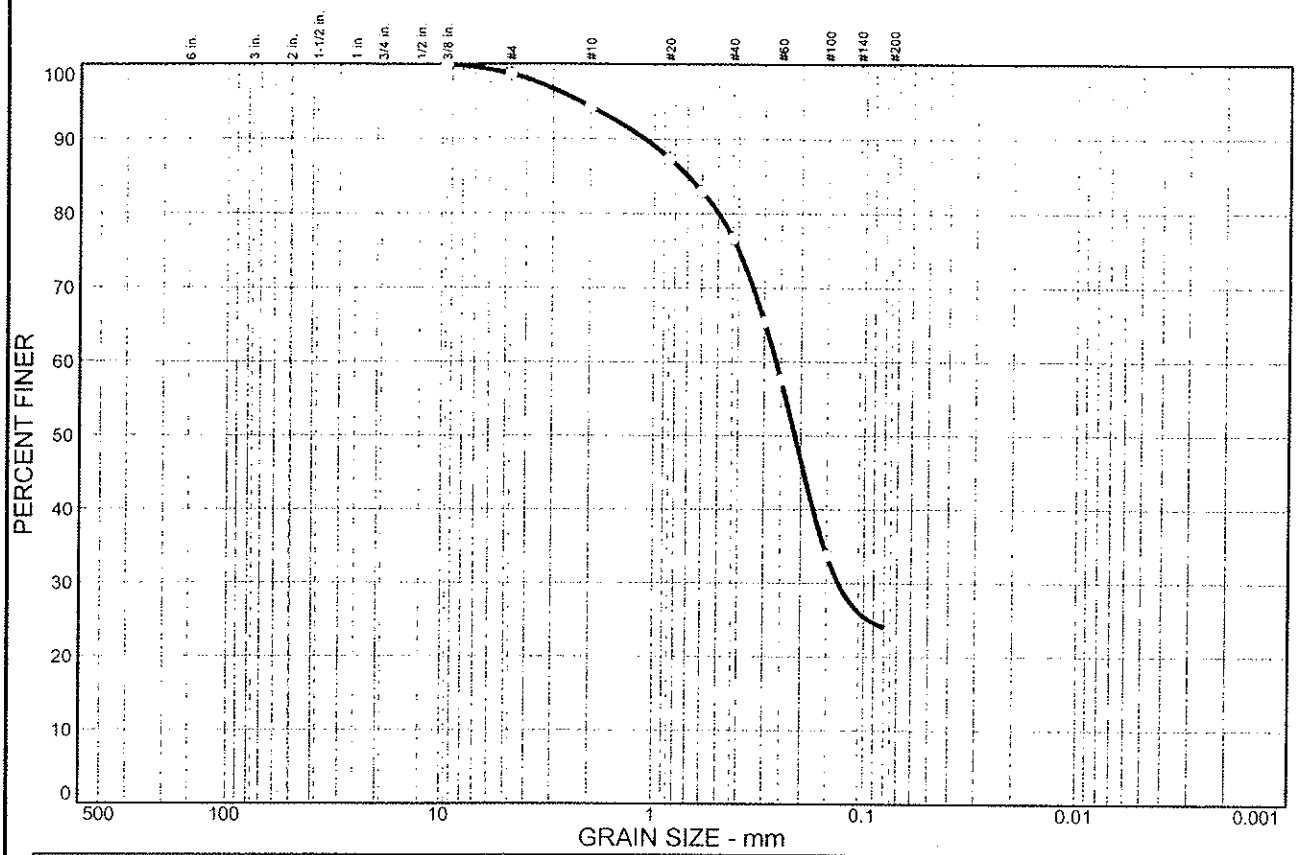
Sample No.: 27 **Source of Sample:** W-DLZ-1 **Date:** 10/30/06
Location: **Elev./Depth:** 113.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	1.3	4.4	17.6	52.9	23.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375 in.	100.0		
#4	98.7		
#10	94.3		
#20	87.4		
#30	83.0		
#40	76.7		
#50	65.4		
#60	57.6		
#100	33.8		
#200	23.8		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 0.695 D_{60}= 0.264 D_{50}= 0.214
D_{30}= 0.132 D_{15}= D_{10}=
C_u= C_c=

Classification

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

Remarks

Moisture Content= 9.8%

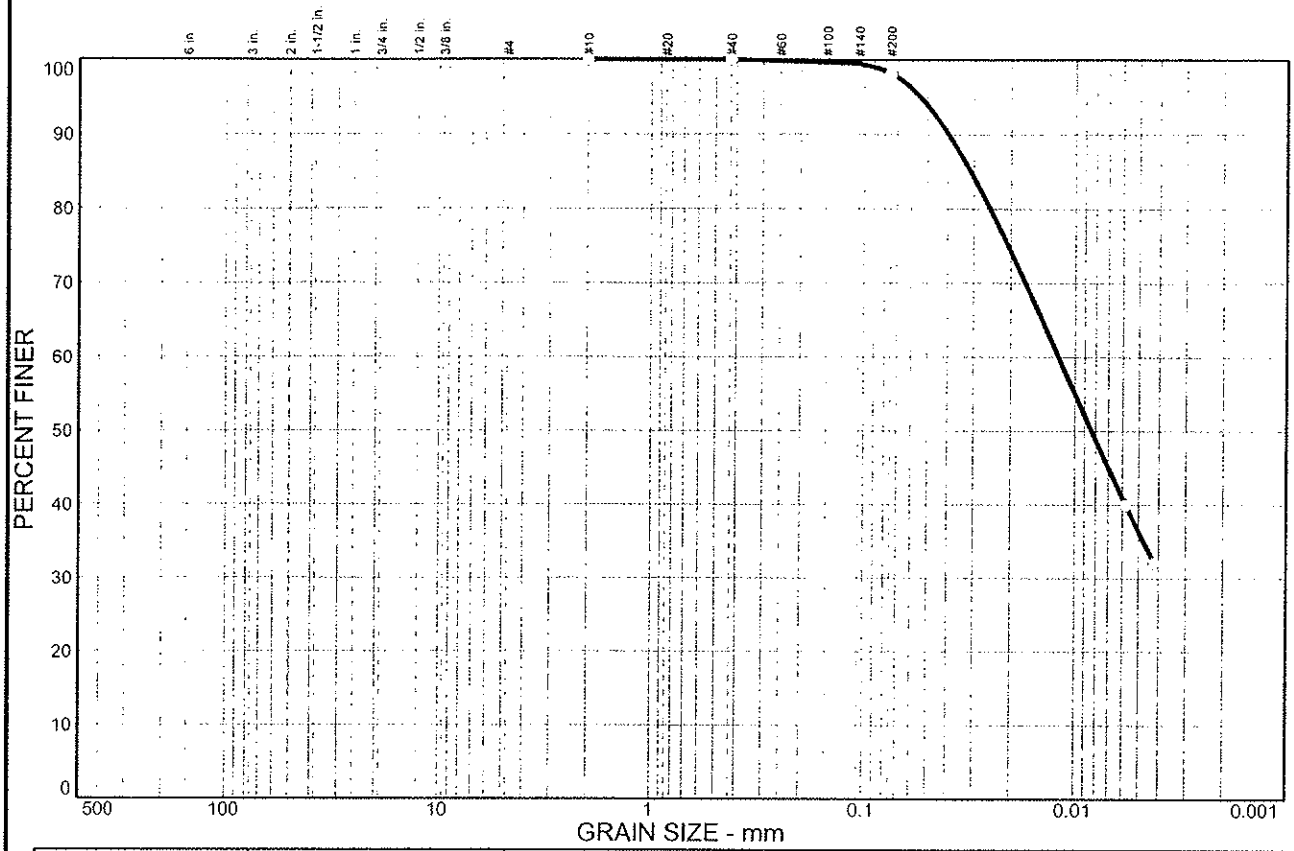
Sample No.: 5 **Source of Sample:** W-DLZ-1 **Date:** 10/30/06
Location: **Elev./Depth:** 11

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.0	1.8	61.9	36.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	98.2		

* (no specification provided)

Soil Description

Silty clay

Atterberg Limits

PL= 18 LL= 25 PI= 7

Coefficients

D_{85}= 0.0311 D_{60}= 0.0119 D_{50}= 0.0084
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL-ML AASHTO= A-4(5)

Remarks

Moisture Content= 23.7%

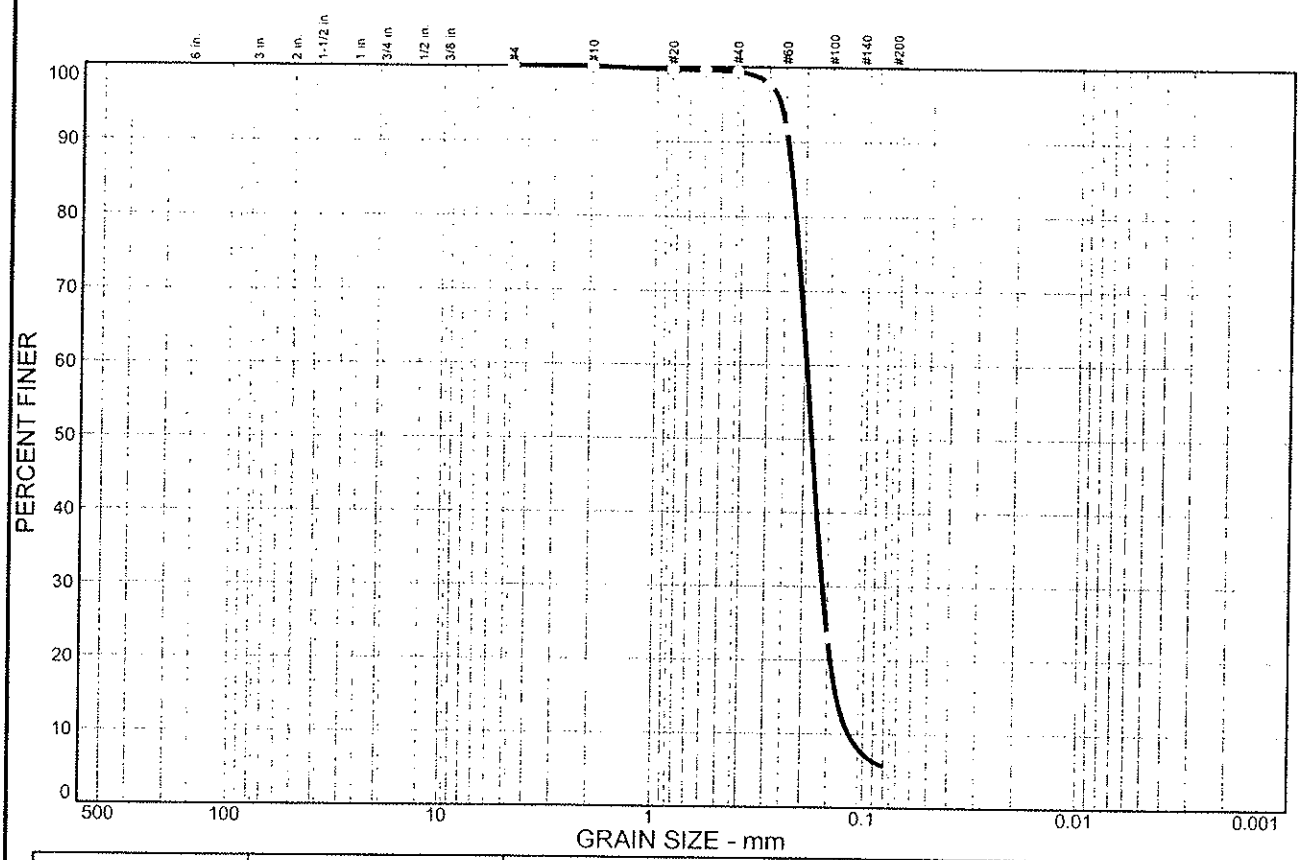
Sample No.: P-2 **Source of Sample:** W-DLZ-1 **Date:** 11/09/06
Location: **Elev./Depth:** 88

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.6	94.0	5.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	99.7		
#30	99.6		
#40	99.4		
#50	97.7		
#60	91.8		
#100	23.1		
#200	5.4		

* (no specification provided)

Soil Description

Poorly graded sand with silt

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 0.232 D_{60}= 0.195 D_{50}= 0.183
D_{30}= 0.159 D_{15}= 0.135 D_{10}= 0.118
C_u= 1.66 C_c= 1.11

Classification

USCS= SP-SM AASHTO= A-3

Remarks

Moisture Content= 6.1%

Sample No.: 10 **Source of Sample:** W-DLZ-2 **Date:** 10/30/06

Location: **Elev./Depth:** 23 5

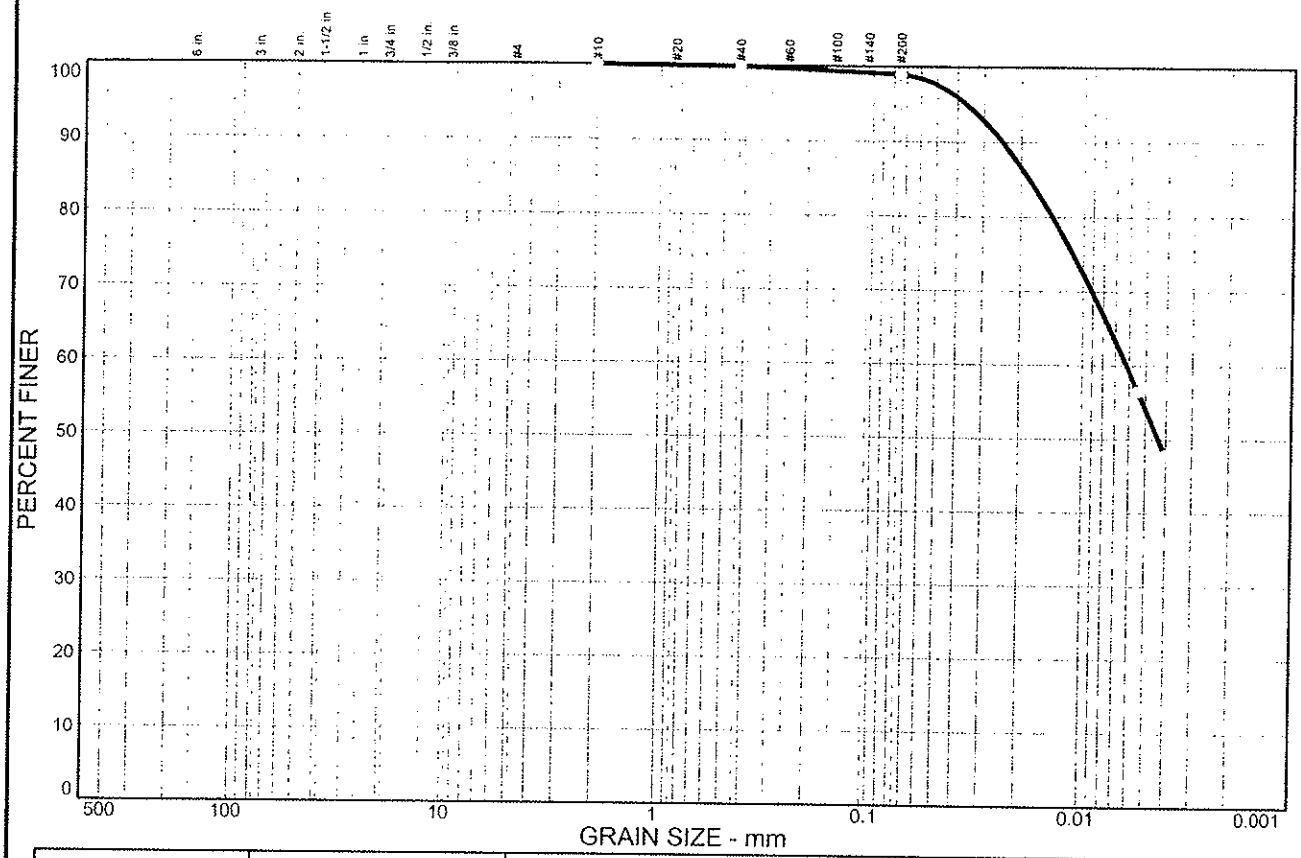
DLZ

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.1	0.9	44.9	54.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.9		
#200	99.0		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 19 LL= 33 PI= 14

Coefficients

D_{85}= 0.0182 D_{60}= 0.0062 D_{50}= 0.0043
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(14)

Remarks

Moisture Content= 26.9%

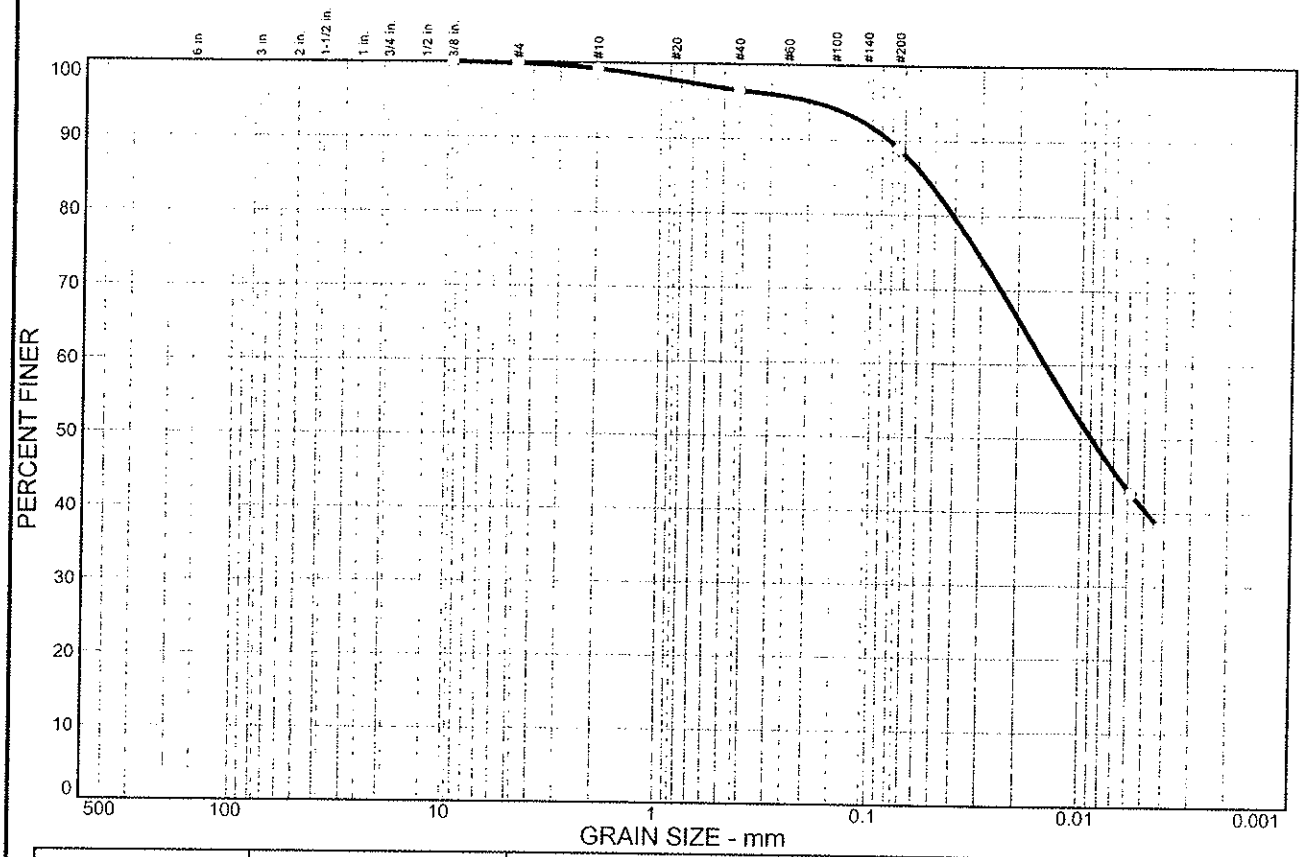
Sample No.: 20 **Source of Sample:** W-DLZ-2 **Date:** 10/30/06
Location: **Elev./Depth:** 73.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.2	0.6	2.7	7.6	48.4	40.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375 in.	100.0		
#4	99.8		
#10	99.2		
#40	96.5		
#200	88.9		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 17 LL= 29 PI= 12

Coefficients

D_{85}= 0.0557 D_{60}= 0.0148 D_{50}= 0.0089
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(9)

Remarks

Moisture Content= 24.3%

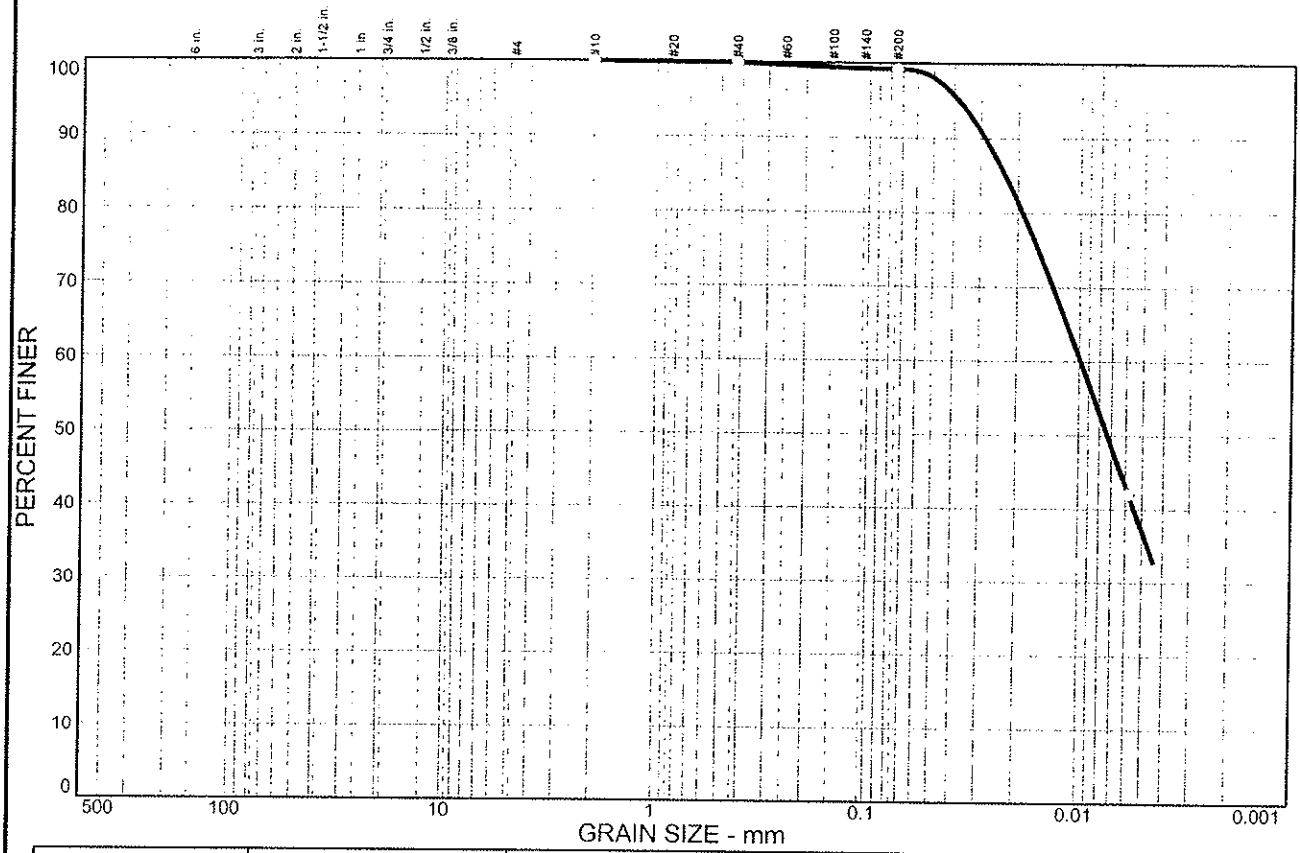
Sample No.: 26 **Source of Sample:** W-DLZ-2 **Date:** 10/30/06
Location: **Elev./Depth:** 103.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.1	0.7	62.1	37.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.9		
#200	99.2		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 16 LL= 28 PI= 12

Coefficients

D_{85}= 0.0229 D_{60}= 0.0099 D_{50}= 0.0073
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(11)

Remarks

Moisture Content= 19.7%

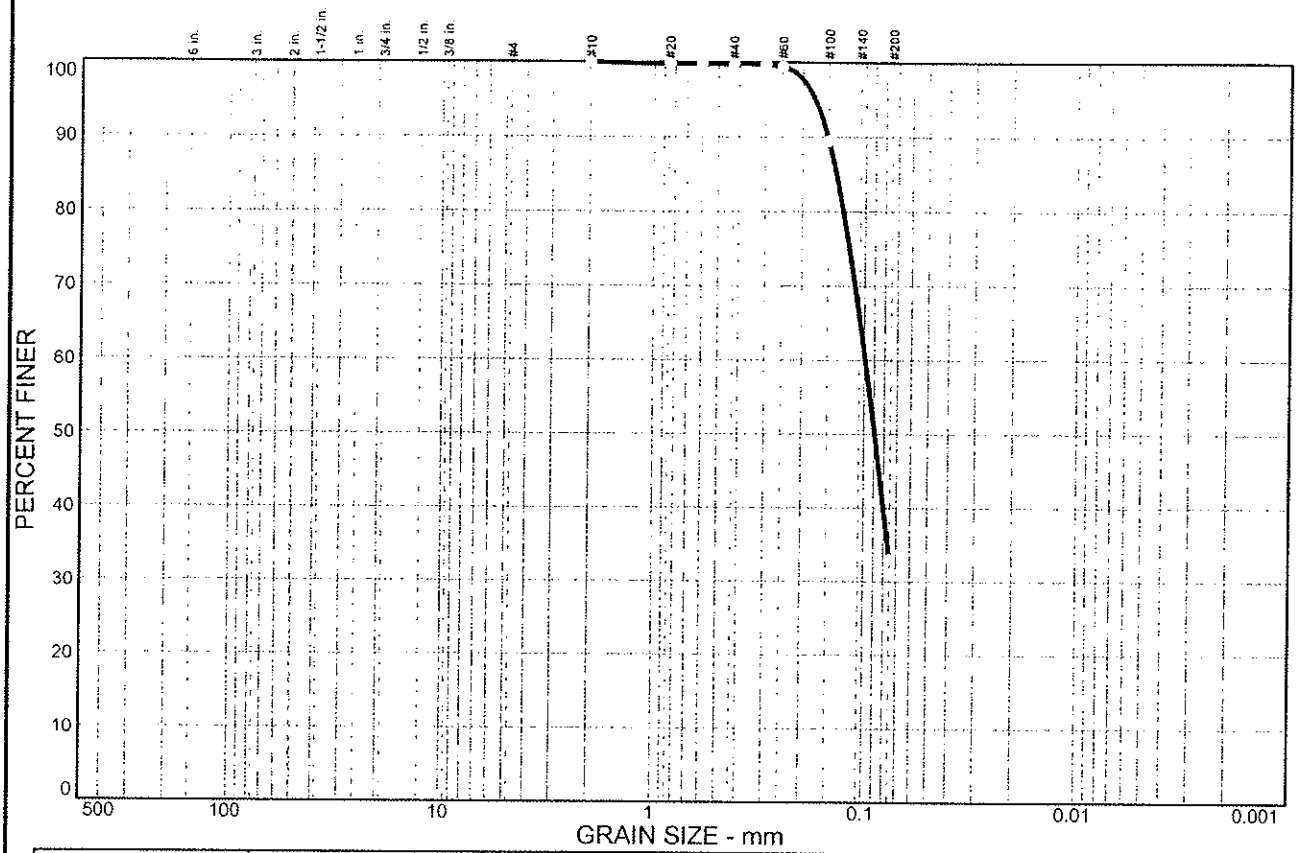
Sample No.: P-1 **Source of Sample:** W-DLZ-2 **Date:** 11/09/06
Location: **Elev./Depth:** 68.0

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.2	66.8	33.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.8		
#30	99.8		
#40	99.8		
#50	99.7		
#60	99.4		
#100	89.5		
#200	33.0		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 0.138 D_{60}= 0.0994 D_{50}= 0.0892
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

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

Remarks

Moisture Content= 27.4%

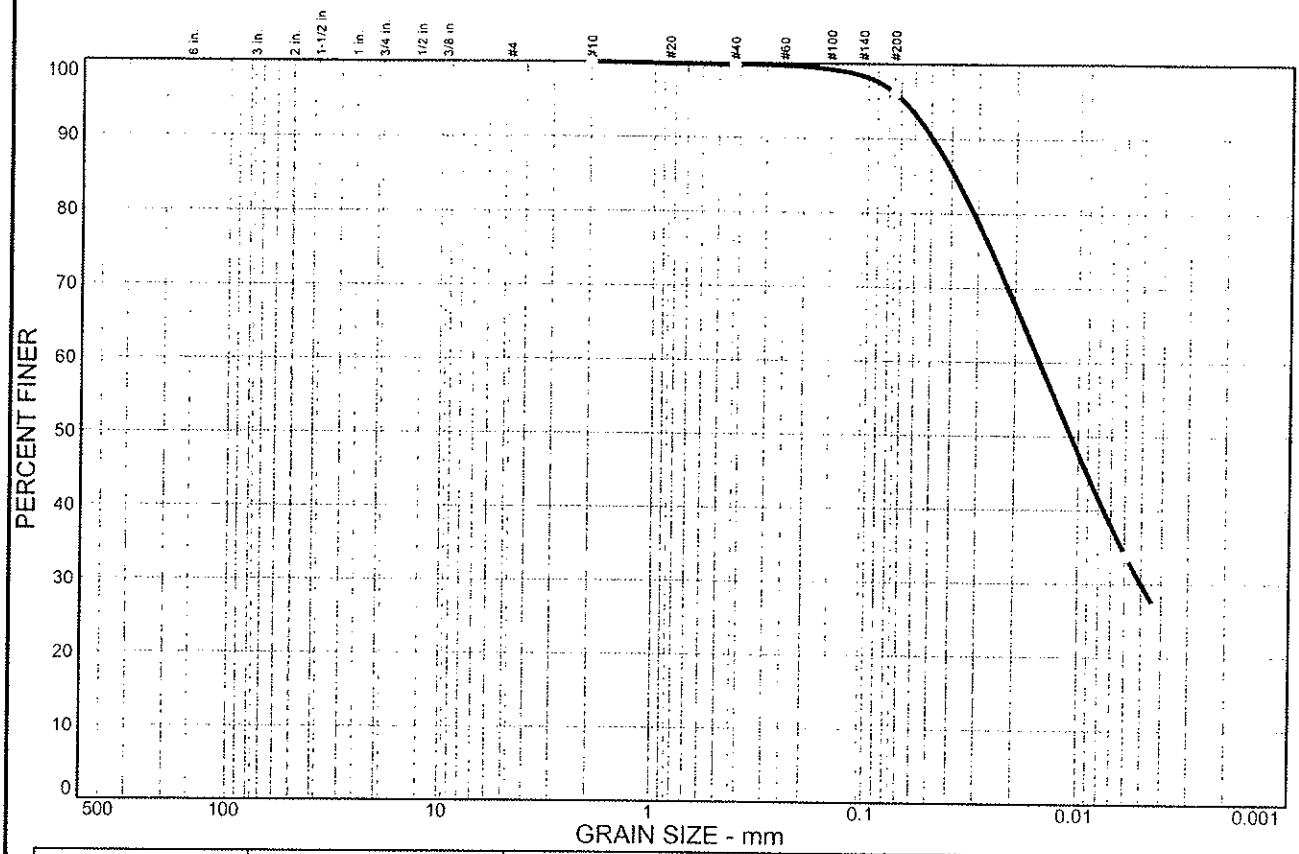
Sample No.: 13 **Source of Sample:** W-DLZ-3 **Date:** 10/30/06
Location: **Elev./Depth:** 33.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.2	3.7	66.1	30.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.8		
#200	96.1		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 19 LL= 29 PI= 9

Coefficients

D_{85}= 0.0387 D_{60}= 0.0153 D_{50}= 0.0109
D_{30}= 0.0050 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(9)

Remarks

Moisture Content= 18.4%

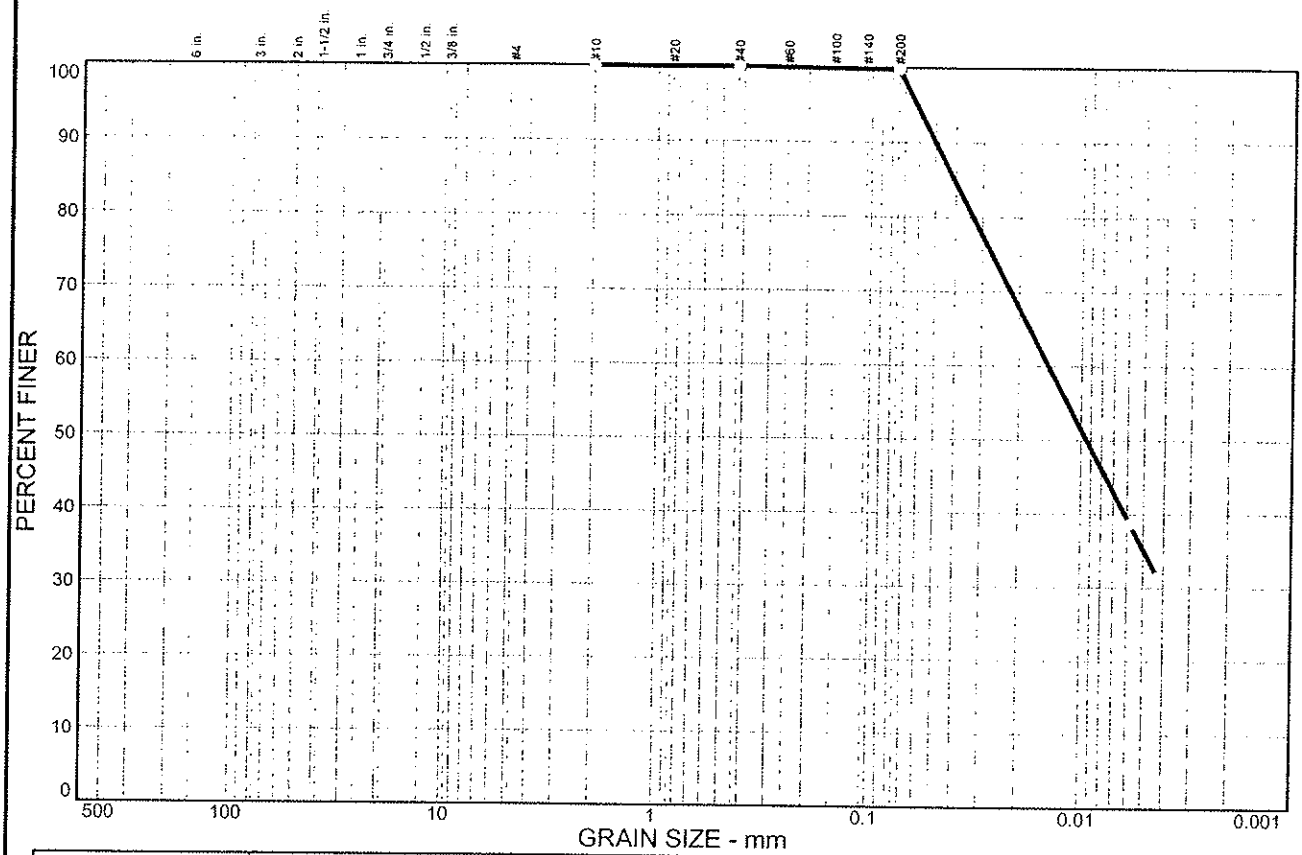
Sample No.: 17 **Source of Sample:** W-DLZ-3 **Date:** 10/30/06
Location: **Elev./Depth:** 58 5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.0	0.2	64.6	35.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	99.8		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 19 LL= 29 PI= 10

Coefficients

D_{85}= 0.0407 D_{60}= 0.0144 D_{50}= 0.0094
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(9)

Remarks

Moisture Content= 21.4%

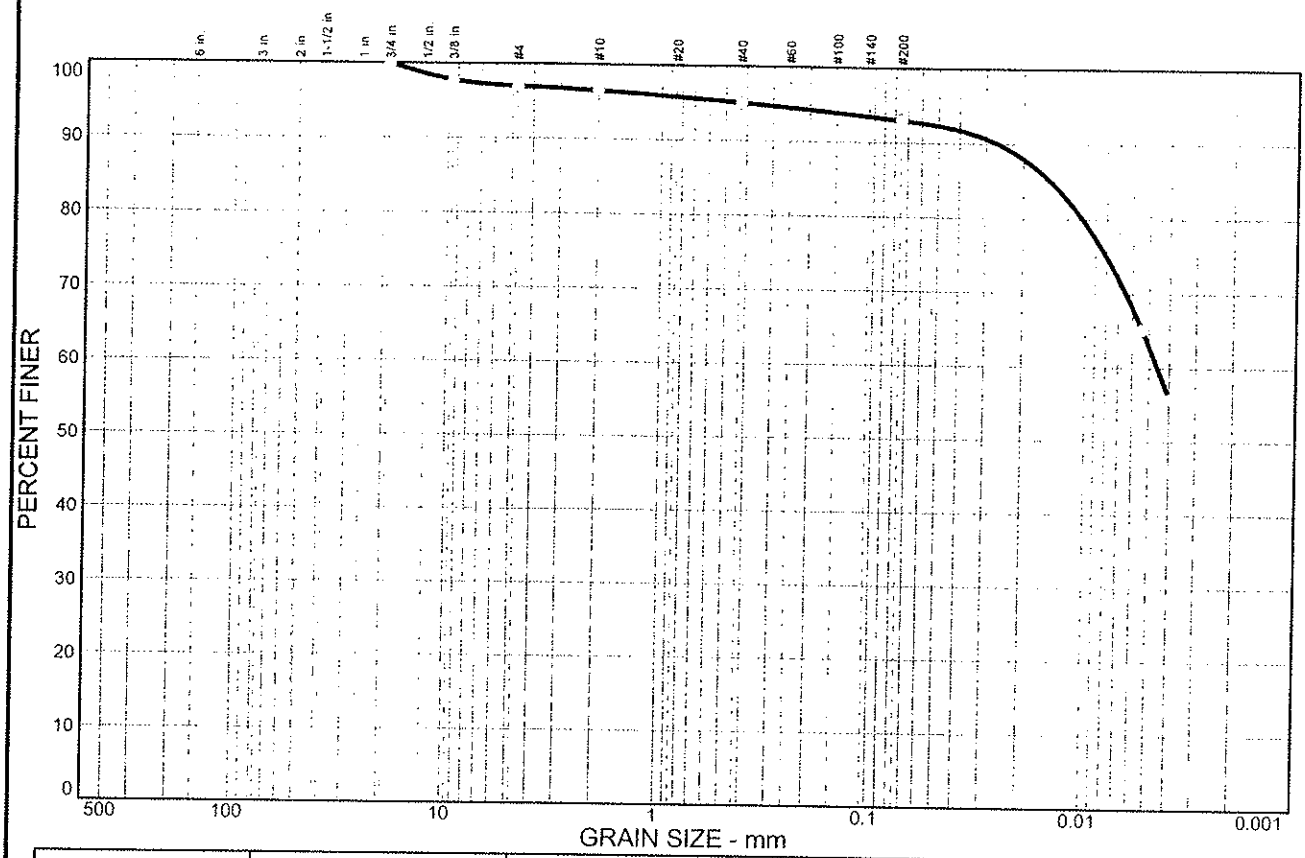
Sample No.: 21 **Source of Sample:** W-DLZ-3 **Date:** 10/30/06
Location: **Elev./Depth:** 78 5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	3.0	0.5	1.4	2.1	30.1	62.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.75 in.	100.0		
0.375 in.	97.8		
#4	97.0		
#10	96.5		
#40	95.1		
#200	93.0		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 20 LL= 39 PI= 19

Coefficients

D_{85}= 0.0148 D_{60}= 0.0045 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(18)

Remarks

Moisture Content= 26.7%

Sample No.: 29 **Source of Sample:** W-DLZ-3 **Date:** 10/30/06

Location: **Elev./Depth:** 118.5

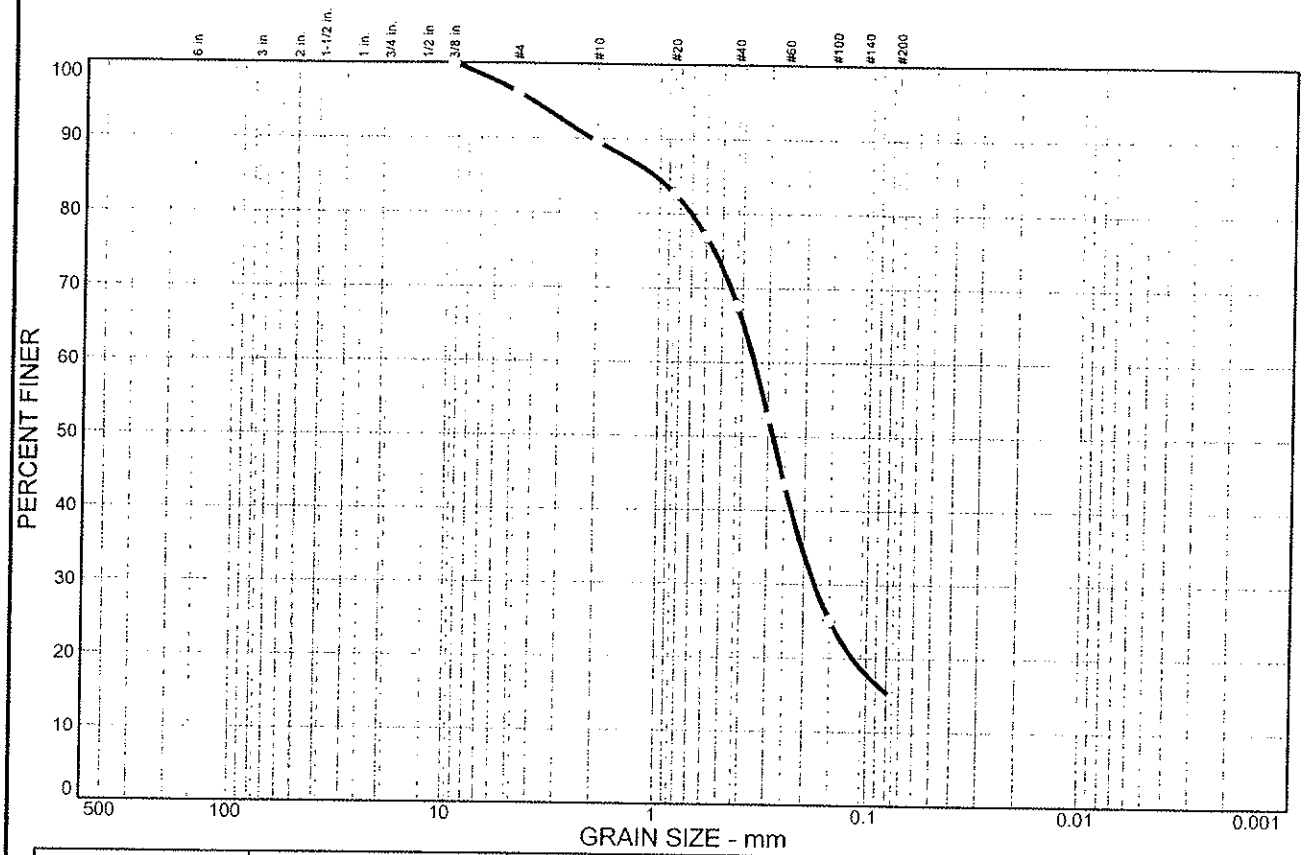
DLZ

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 Figure

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	3.9	6.5	21.9	53.0	14.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375 in.	100.0		
#4	96.1		
#10	89.6		
#20	82.7		
#30	77.0		
#40	67.7		
#50	52.6		
#60	43.6		
#100	25.2		
#200	14.7		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 1.05 D_{60}= 0.351 D_{50}= 0.285
D_{30}= 0.177 D_{15}= 0.0772 D_{10}=
C_u= C_c=

Classification

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

Remarks

Moisture Content= 7.1%

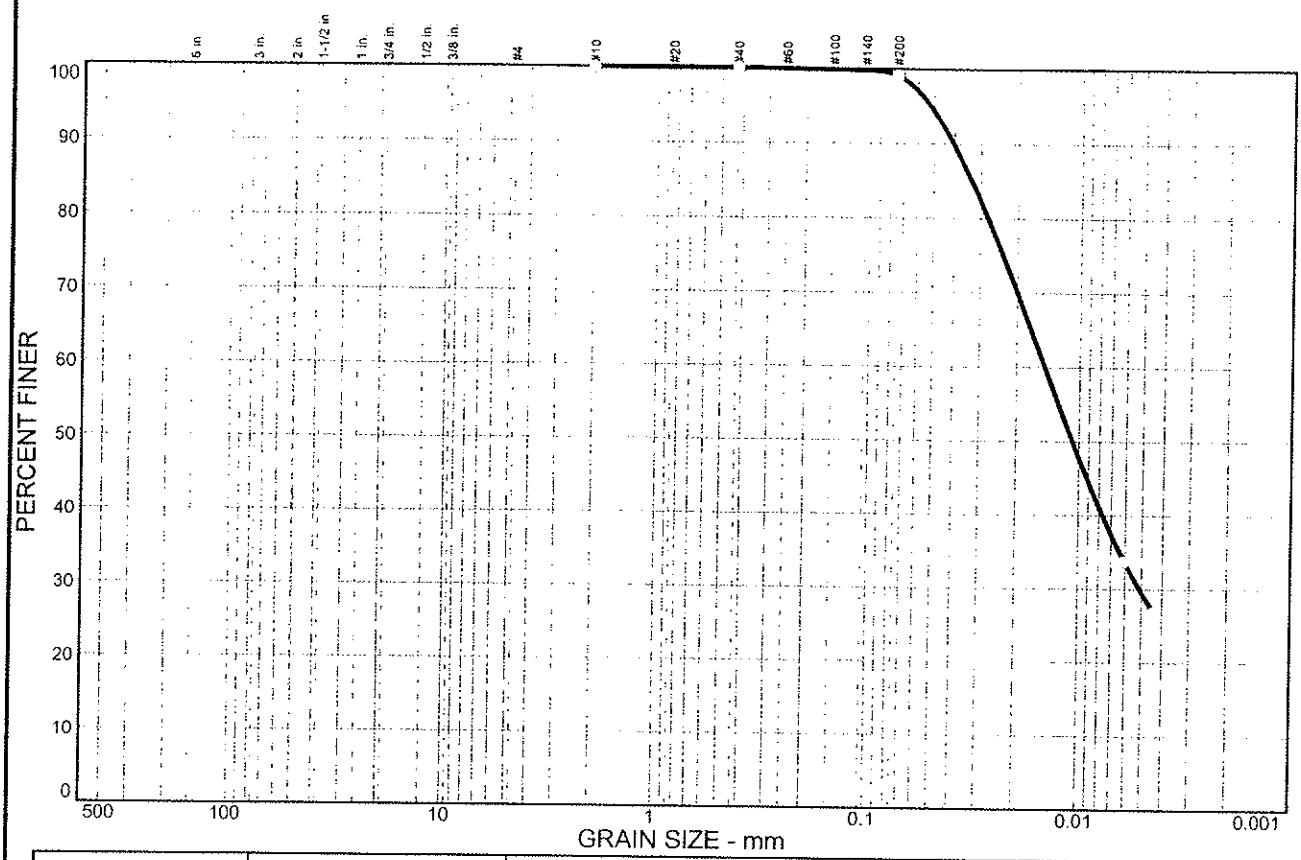
Sample No.: 3 **Source of Sample:** W-DLZ-3 **Date:** 10/30/06
Location: **Elev./Depth:** 6

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.0	0.9	69.5	29.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	99.1		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 18 LL= 28 PI= 10

Coefficients

D_{85}= 0.0330 D_{60}= 0.0147 D_{50}= 0.0108
D_{30}= 0.0051 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(9)

Remarks

Moisture Content= 19.0%

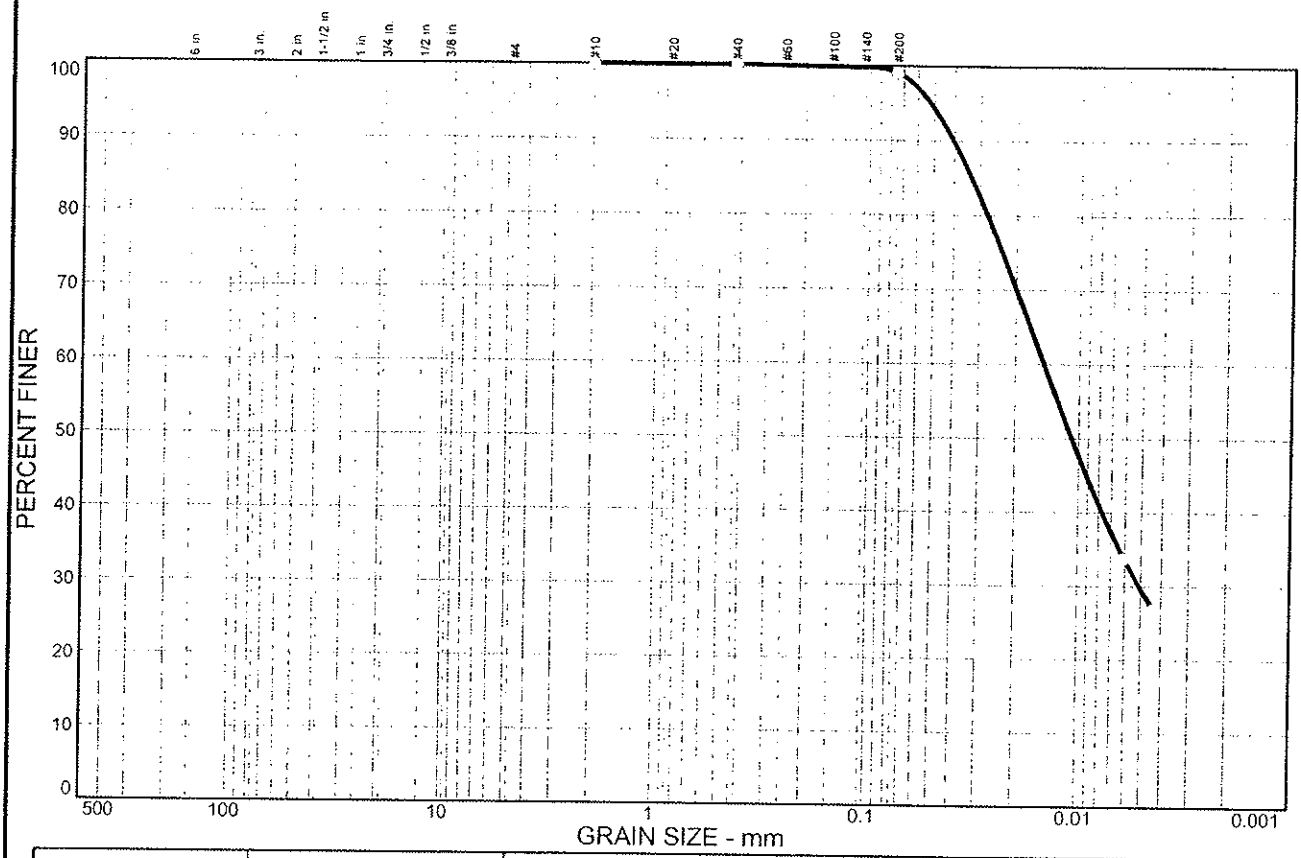
Sample No.: P-1 **Source of Sample:** W-DLZ-3 **Date:** 11/09/06
Location: **Elev./Depth:** 53.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.0	0.9	69.5	29.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	99.1		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 18 LL= 28 PI= 10

Coefficients

D_{85}= 0.0330 D_{60}= 0.0147 D_{50}= 0.0108
D_{30}= 0.0051 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(9)

Remarks

Moisture Content= 19.0%

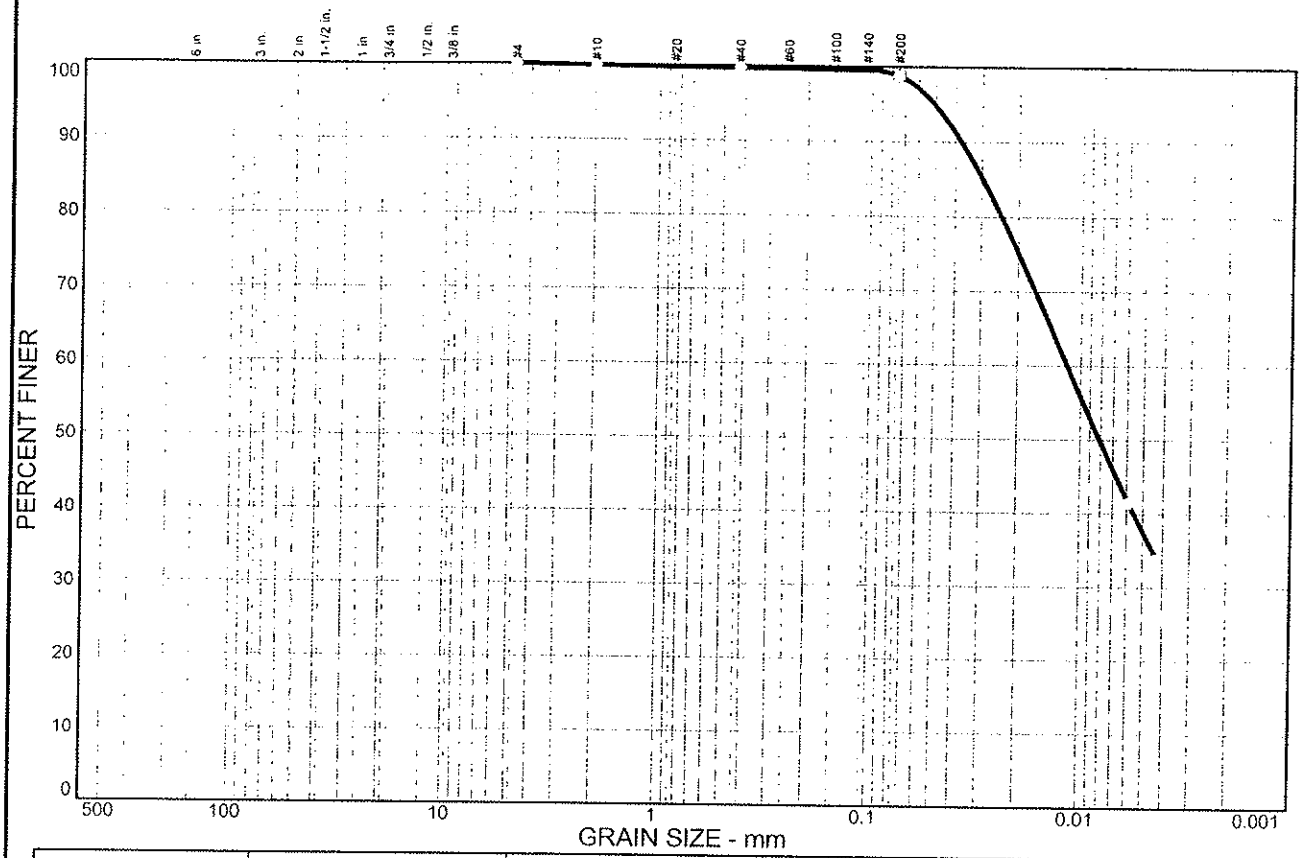
Sample No.: P-1 **Source of Sample:** W-DLZ-3 **Date:** 11/09/06
Location: **Elev./Depth:** 53.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.1	0.2	0.9	61.3	37.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#40	99.7		
#200	98.8		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 17 LL= 28 PI= 11

Coefficients

D_{85}= 0.0297 D_{60}= 0.0116 D_{50}= 0.0081
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(10)

Remarks

Moisture Content= 23.2%

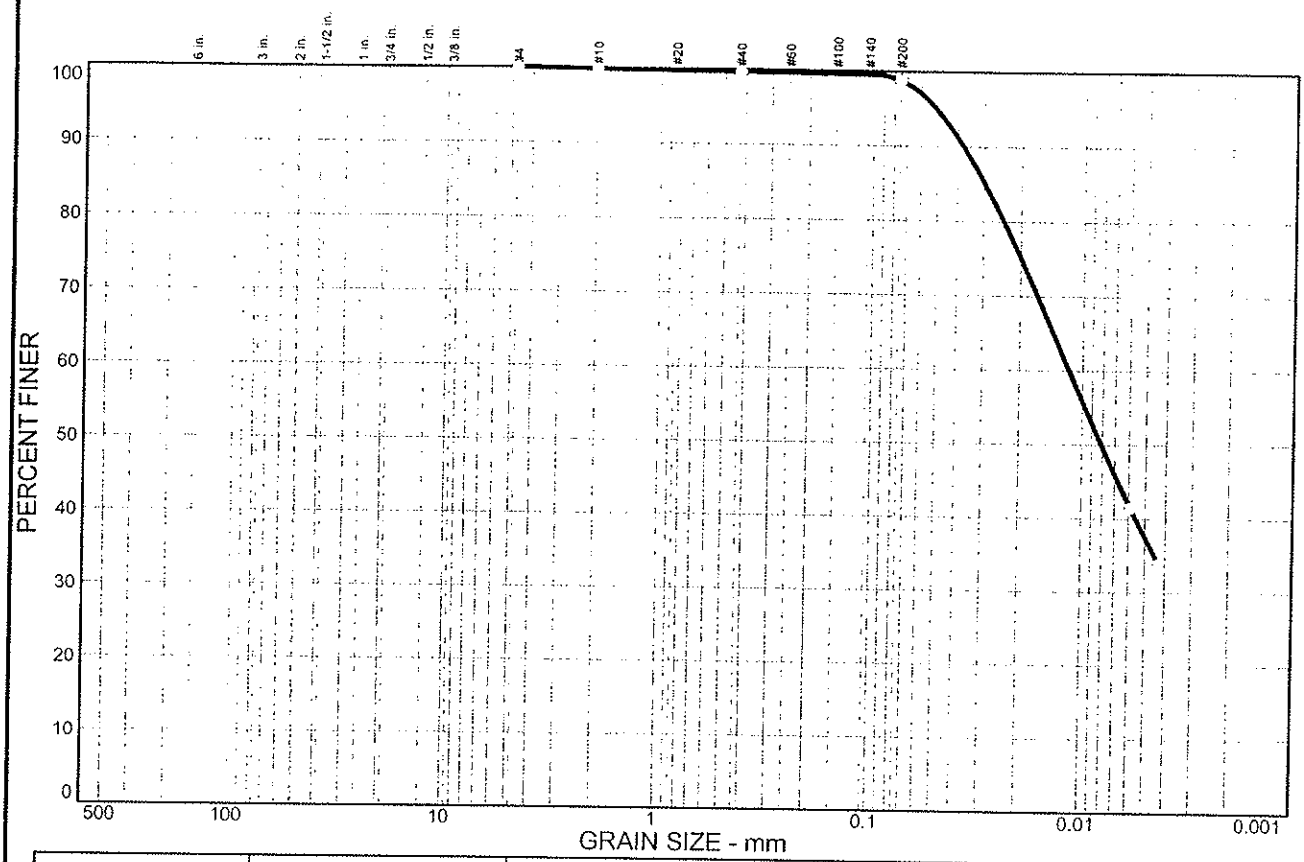
Sample No.: P-2 **Source of Sample:** W-DLZ-4 **Date:** 11/09/06
Location: **Elev./Depth:** 73

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.1	0.2	0.9	61.3	37.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#40	99.7		
#200	98.8		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 17 LL= 28 PI= 11

Coefficients

D_{85}= 0.0297 D_{60}= 0.0116 D_{50}= 0.0081
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(10)

Remarks

Moisture Content= 23.2%

Sample No.: P-2 **Source of Sample:** W-DLZ-4 **Date:** 11/09/06

Location: **Elev./Depth:** 74

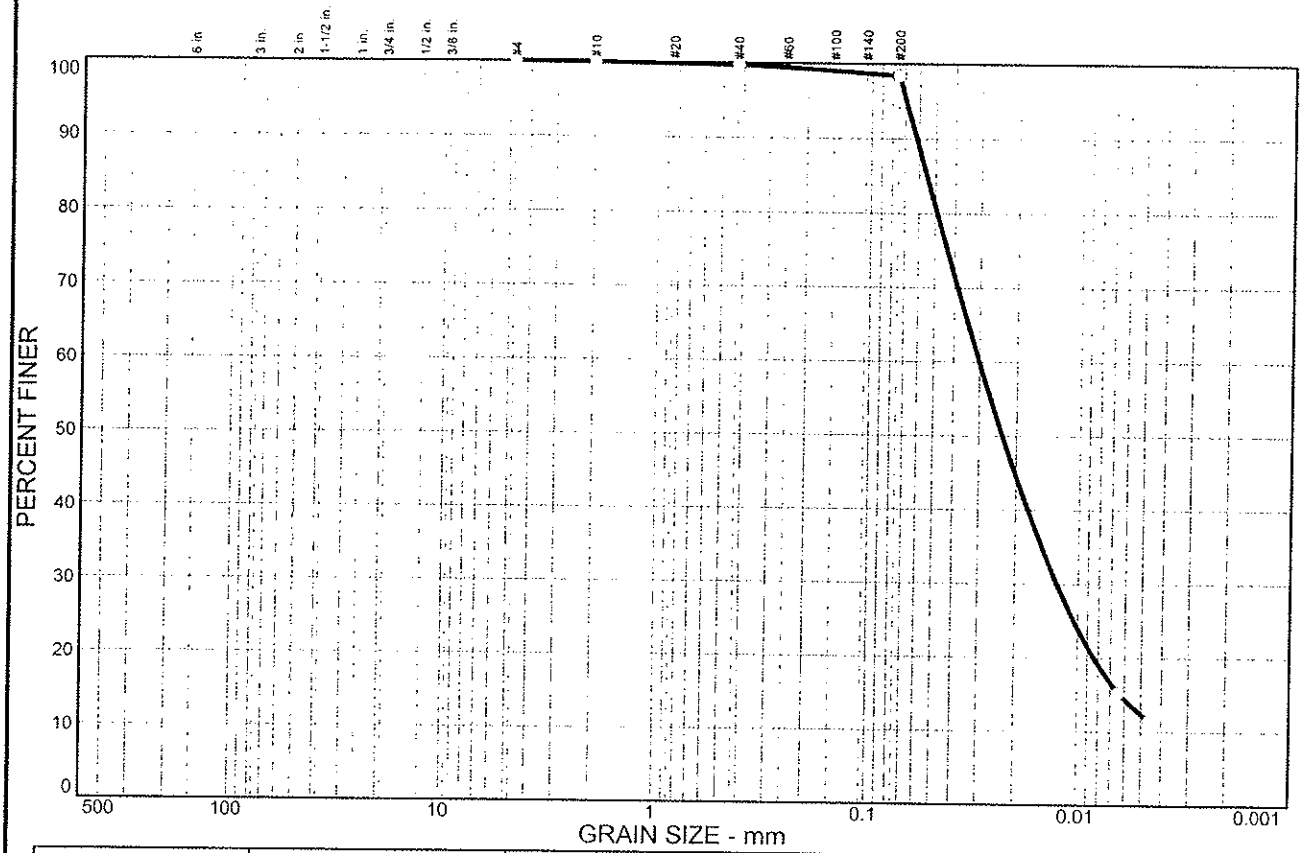
DLZ

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.3	1.3	86.1	12.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#40	99.7		
#200	98.4		

* (no specification provided)

Soil Description

Silt

Atterberg Limits

PL= 20 LL= 22 PI= 2

Coefficients

D_{85}= 0.0414 D_{60}= 0.0223 D_{50}= 0.0178
D_{30}= 0.0109 D_{15}= 0.0063 D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Moisture Content= 24.2%
Specific Gravity= 2.72

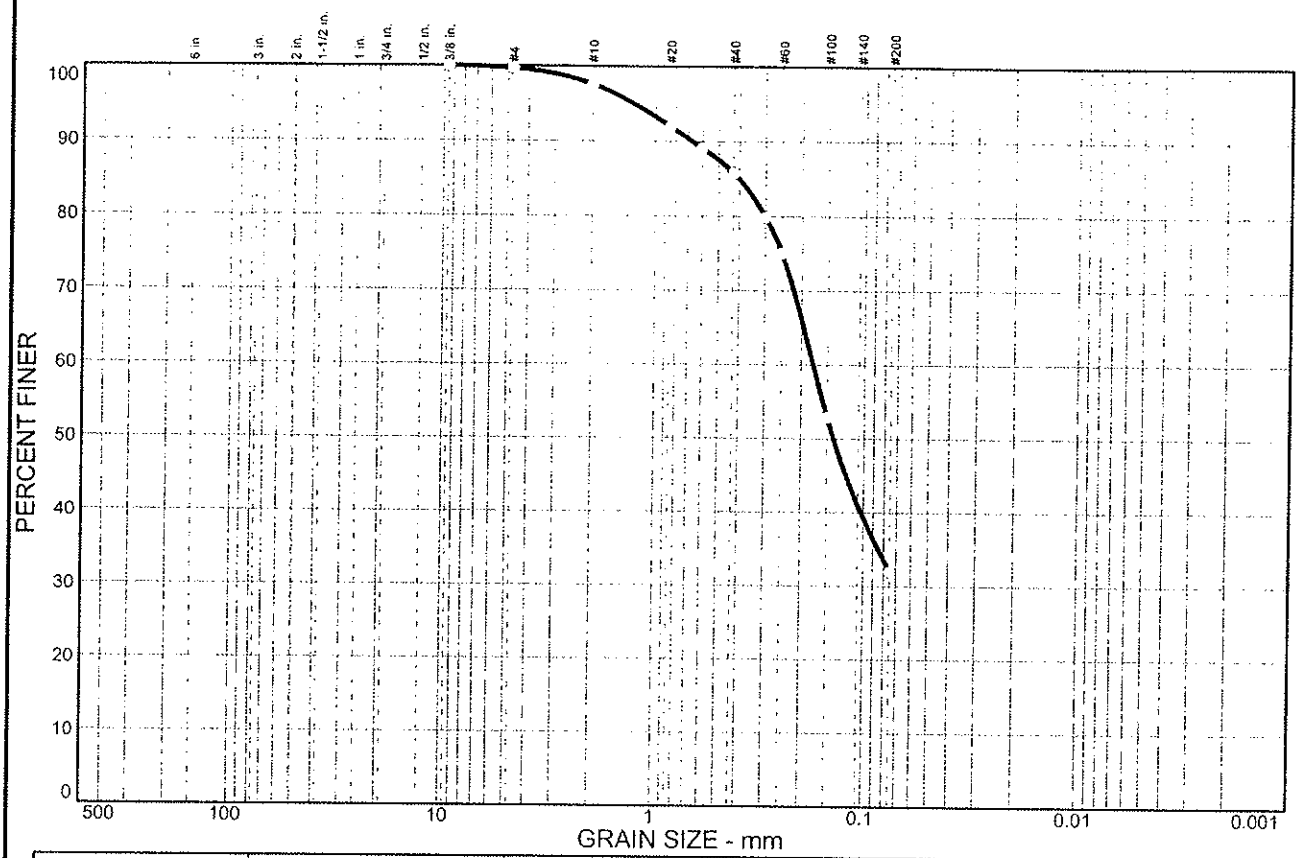
Sample No.: P-1 **Source of Sample:** W-DLZ-4 **Date:** 11/09/06
Location: **Elev./Depth:** 33.0

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.3	2.1	11.8	53.8	32.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375 in.	100.0		
#4	99.7		
#10	97.6		
#20	92.0		
#30	89.1		
#40	85.8		
#50	79.9		
#60	75.1		
#100	52.9		
#200	32.0		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 0.400 D_{60}= 0.176 D_{50}= 0.140
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

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

Remarks

Moisture Content= 7.7%

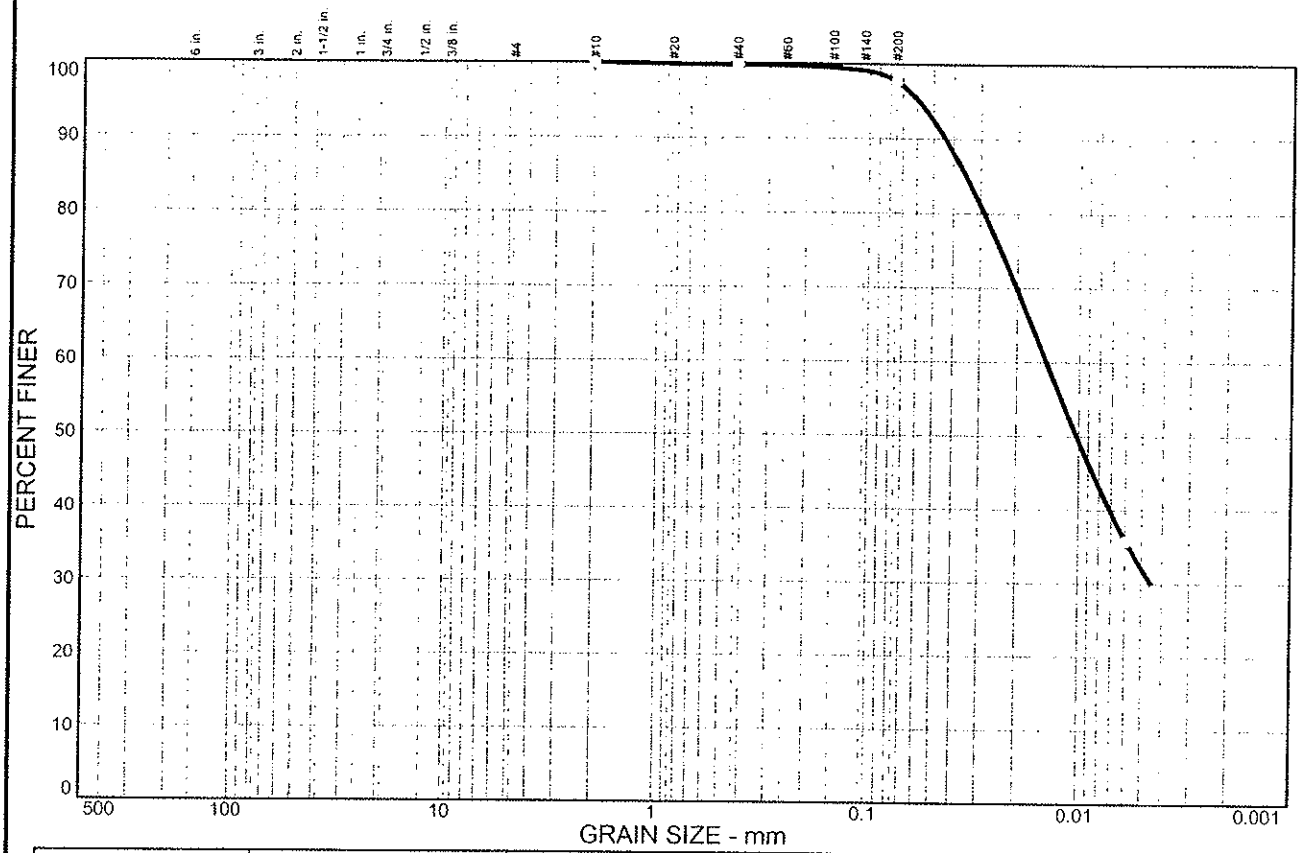
Sample No.: 1 **Source of Sample:** W-DLZ-5 **Date:** 10/30/06
Location: **Elev./Depth:** 1.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.2	2.1	65.6	32.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.8		
#200	97.7		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 18 LL= 29 PI= 11

Coefficients

D_{85}= 0.0350 D_{60}= 0.0144 D_{50}= 0.0103
D_{30}= 0.0045 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(10)

Remarks

Moisture Content= 23.9%

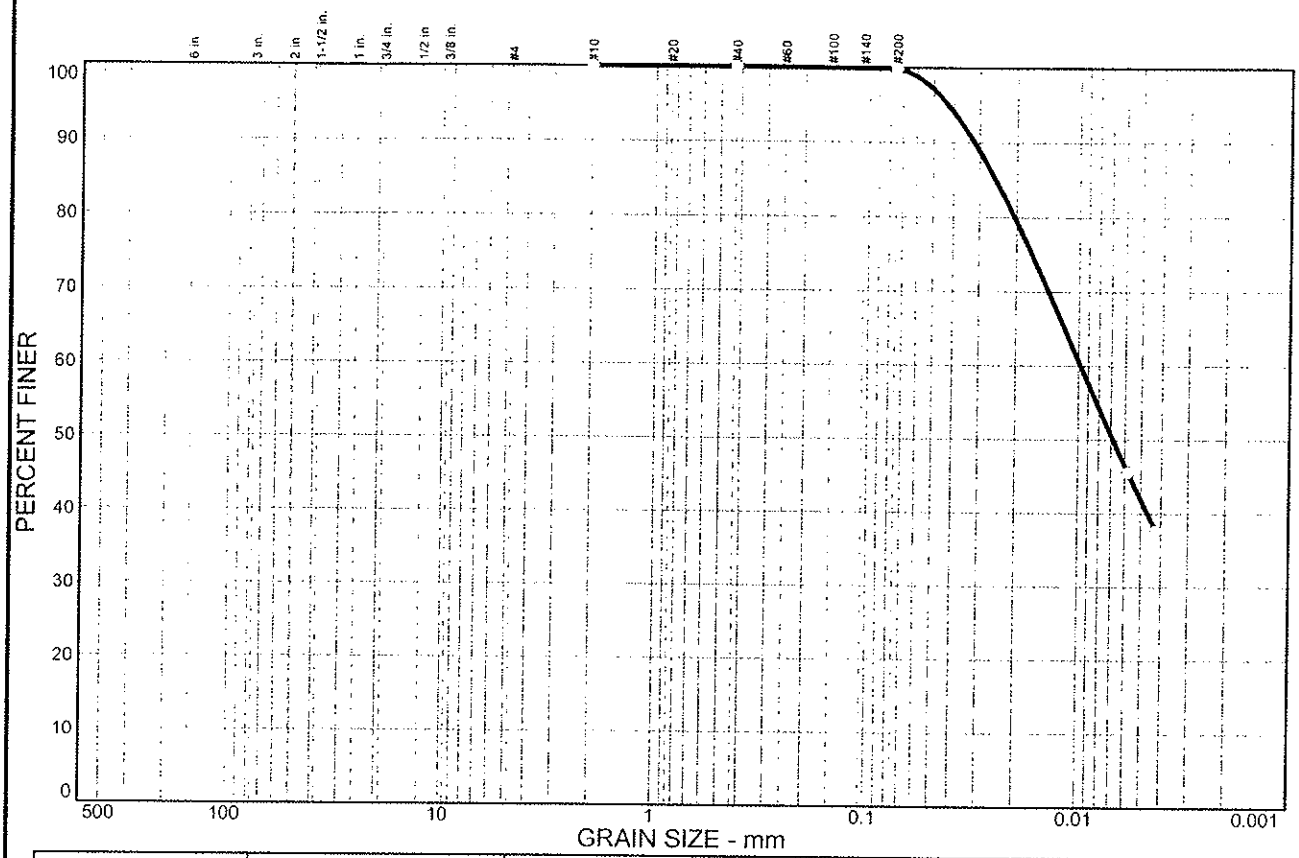
Sample No.: 13 **Source of Sample:** W-DLZ-5 **Date:** 10/31/06
Location: **Elev./Depth:** 33.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.0	0.1	58.1	41.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	99.9		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 19 LL= 31 PI= 12

Coefficients

D_{85}= 0.0251 D_{60}= 0.0098 D_{50}= 0.0068
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(12)

Remarks

Moisture Content= 27.4%

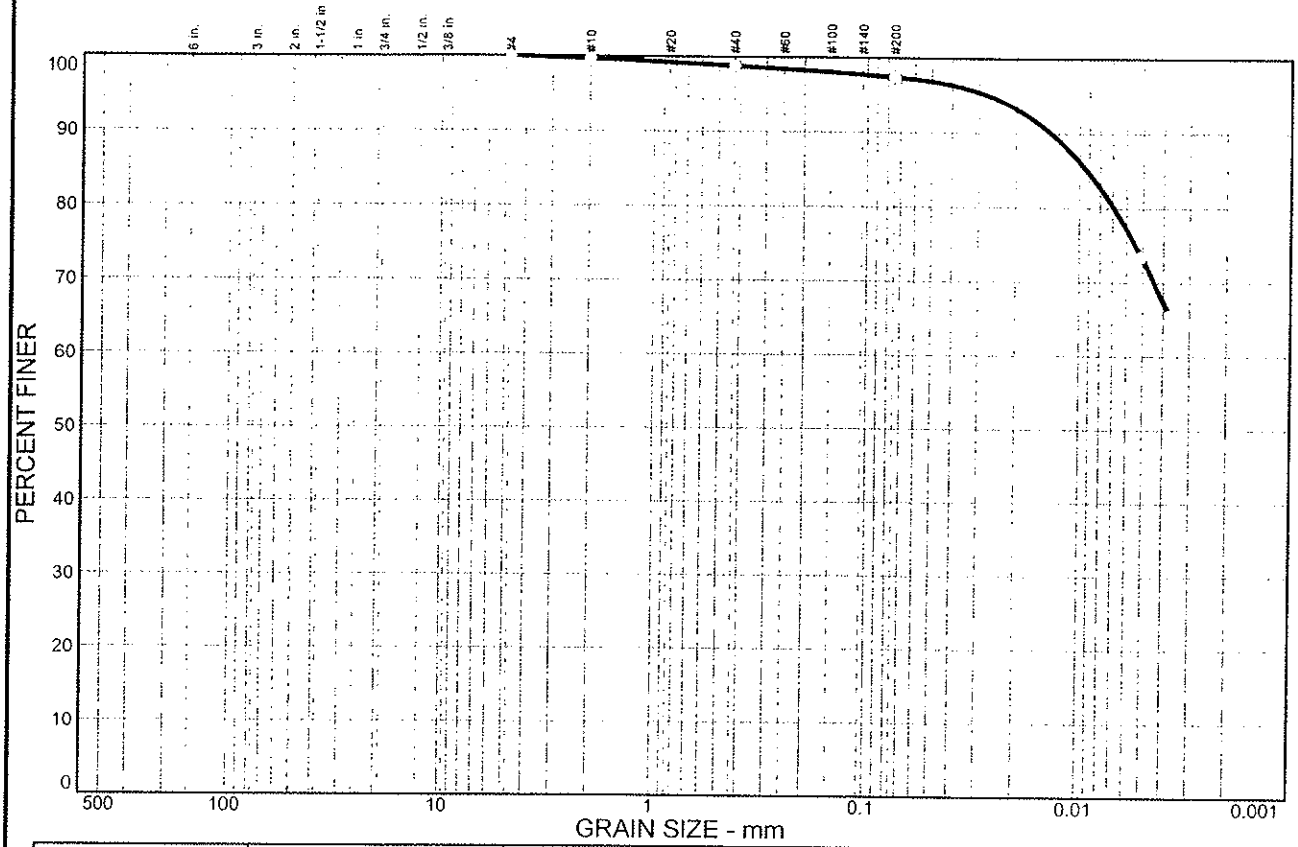
Sample No.: 19 **Source of Sample:** W-DLZ-5 **Date:** 10/31/06
Location: **Elev./Depth:** 63.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.3	0.9	1.4	24.3	73.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.7		
#40	98.8		
#200	97.4		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 21 LL= 44 PI= 23

Coefficients

D_{85}= 0.0092 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(24)

Remarks

Moisture Content= 29.9%

Sample No.: 25 **Source of Sample:** W-DLZ-5 **Date:** 10/31/06

Location: **Elev./Depth:** 93.5

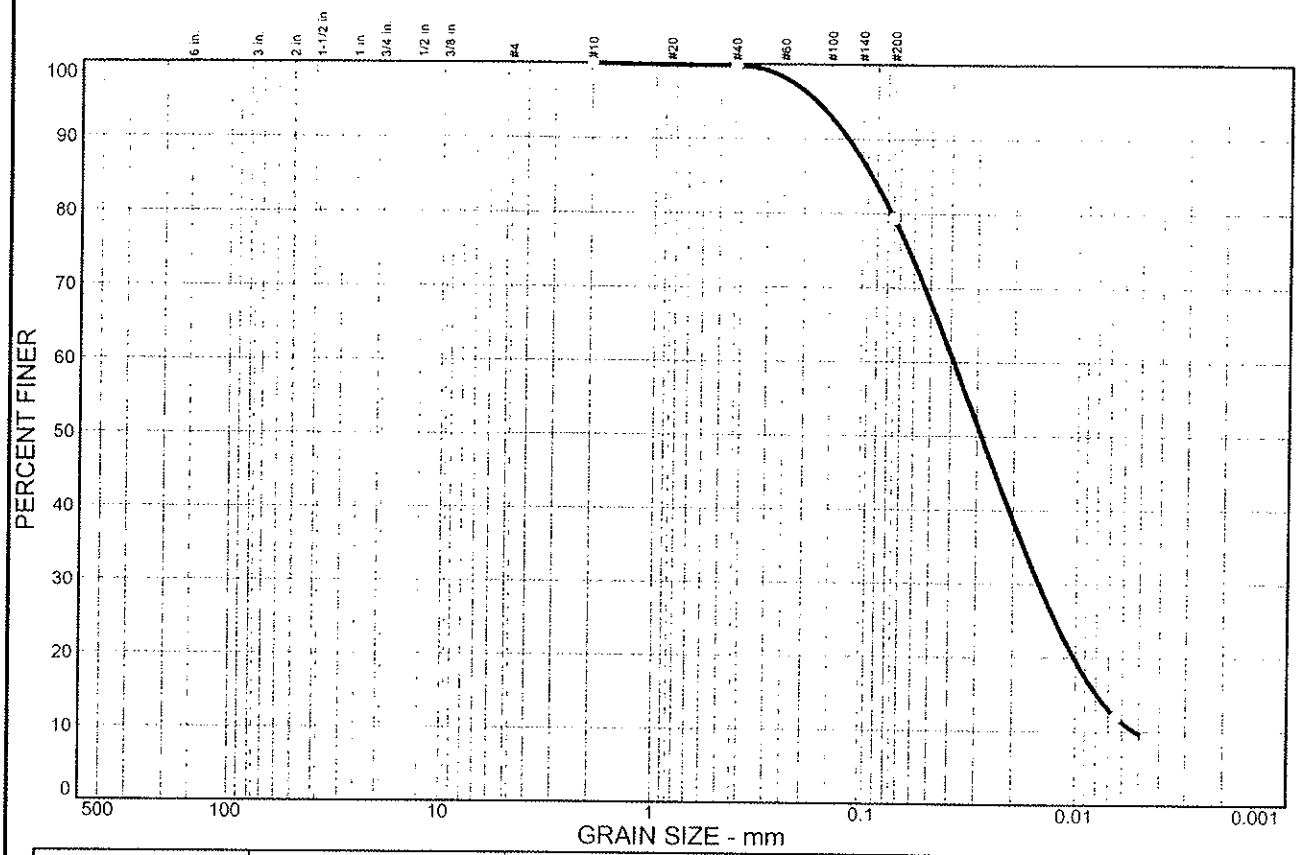
DLZ

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.2	20.4	69.7	9.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.8		
#200	79.4		

* (no specification provided)

Soil Description

Silt with sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 0.0955 D_{60}= 0.0387 D_{50}= 0.0285
D_{30}= 0.0151 D_{15}= 0.0079 D_{10}= 0.0052
C_u= 7.41 C_c= 1.12

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Moisture Content= 19.9%

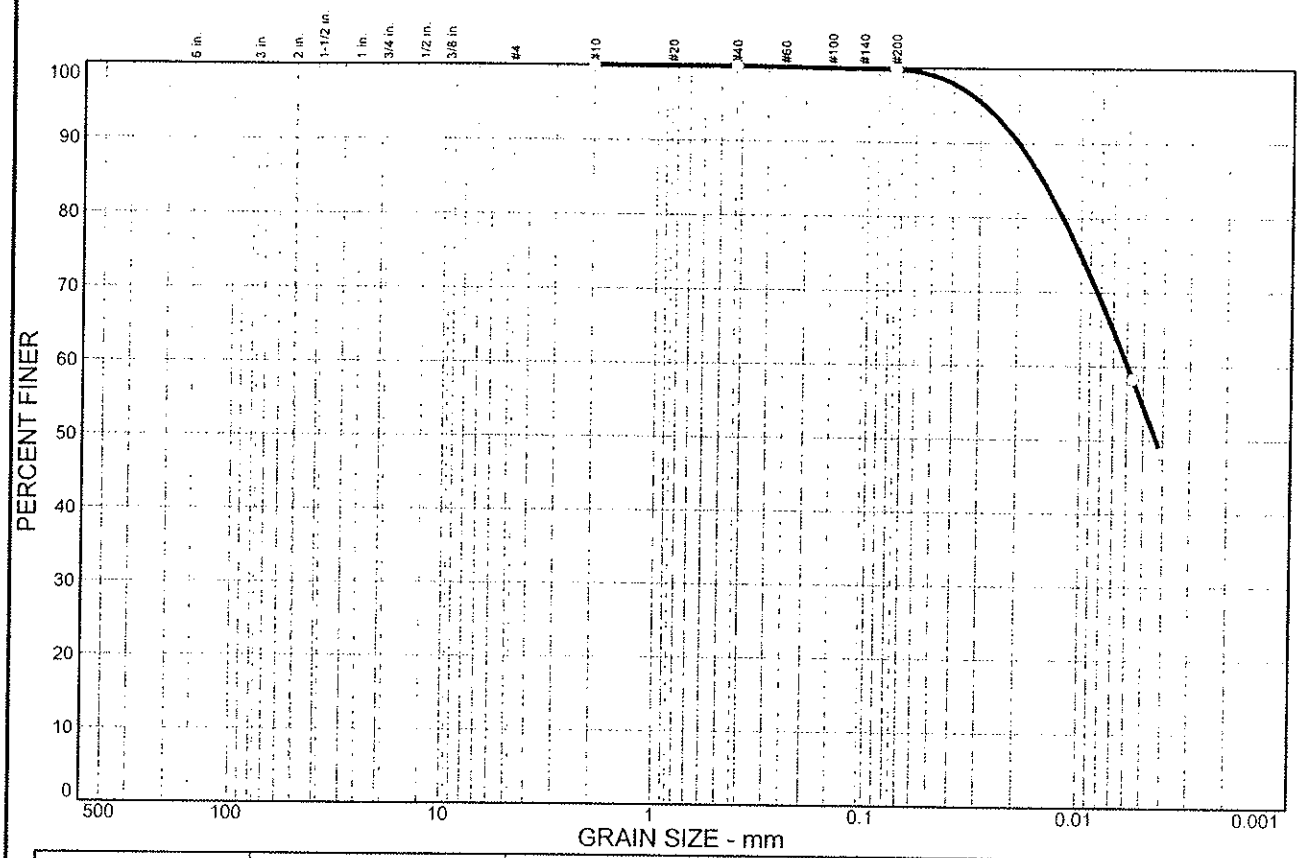
Sample No.: 9 **Source of Sample:** W-DLZ-5 **Date:** 10/30/06
Location: **Elev./Depth:** 21

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.0	0.2	45.3	54.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	99.8		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 19 LL= 38 PI= 19

Coefficients

D_{85}= 0.0152 D_{60}= 0.0060 D_{50}= 0.0043
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(20)

Remarks

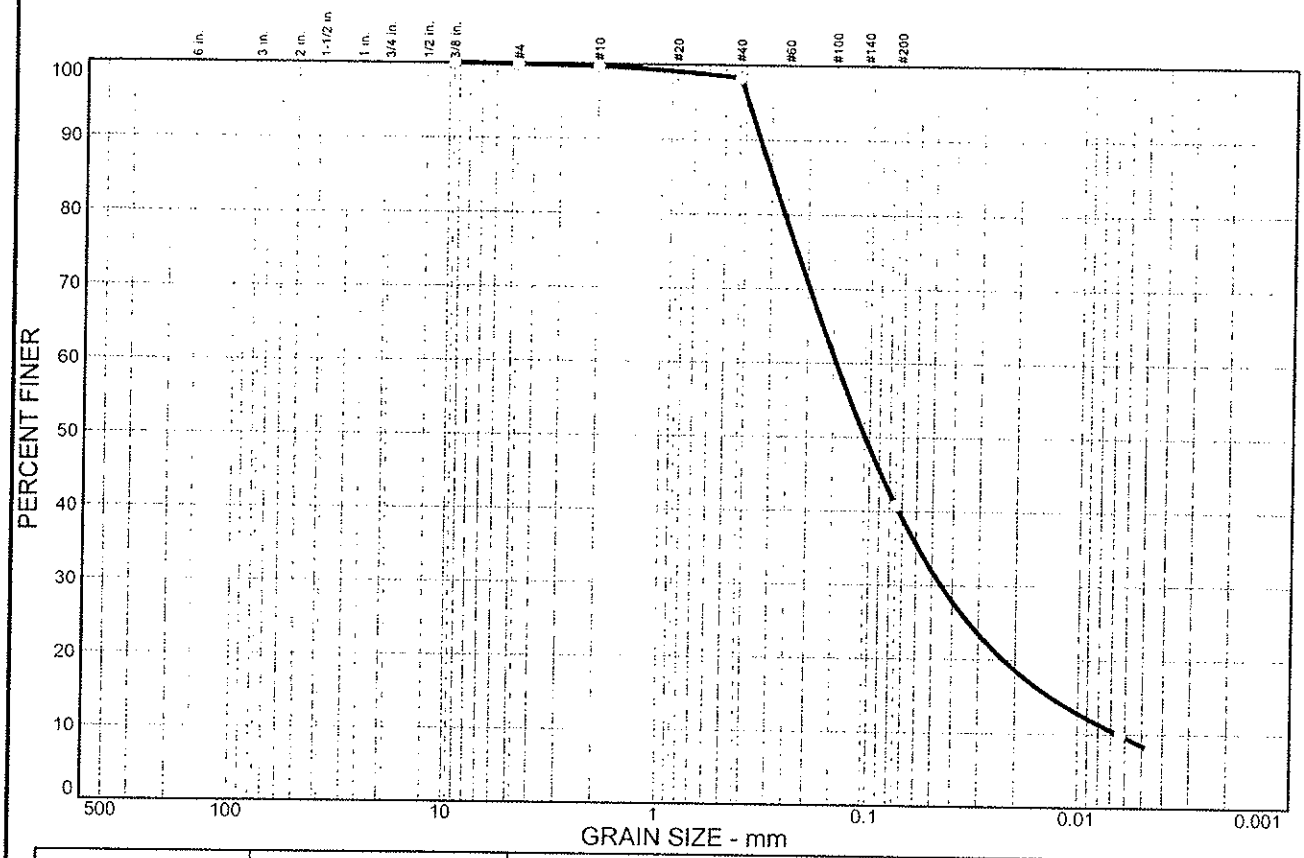
Moisture Content= 31.0%

Sample No.: P-1 **Source of Sample:** W-DLZ-5 **Date:** 11/09/06
Location: **Elev./Depth:** 40

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls
Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.1	0.2	1.4	57.5	32.3	8.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375 in.	100.0		
#4	99.9		
#10	99.7		
#40	98.3		
#200	40.8		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 0.297 D_{60}= 0.145 D_{50}= 0.105
D_{30}= 0.0452 D_{15}= 0.0135 D_{10}= 0.0065
C_u= 22.52 C_c= 2.18

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Moisture Content= 27.2%

Sample No.: 10 **Source of Sample:** W-DLZ-6 **Date:** 10/31/06

Location: **Elev./Depth:** 23.5

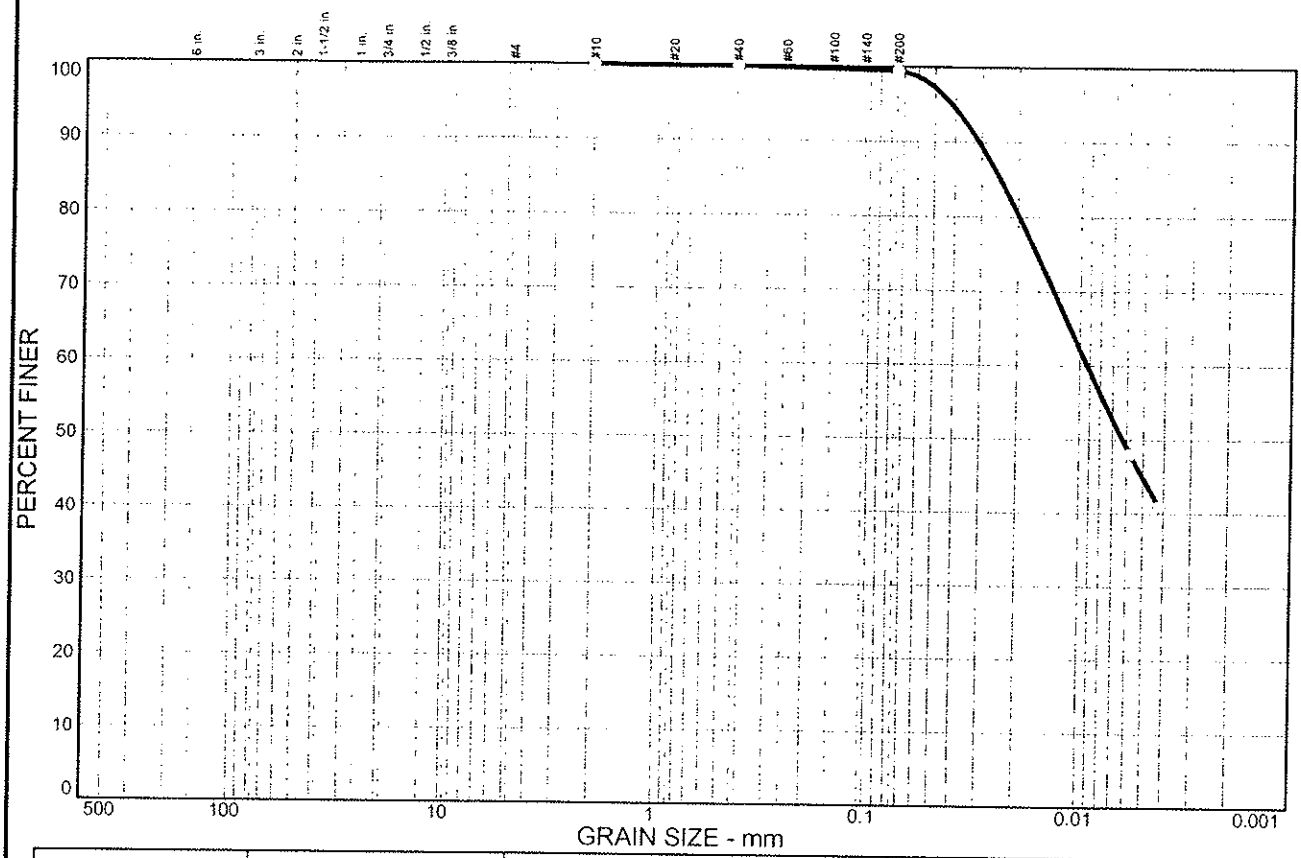
DLZ

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.1	0.4	54.7	44.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.9		
#200	99.5		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 19 LL= 34 PI= 15

Coefficients

D_{85}= 0.0244 D_{60}= 0.0093 D_{50}= 0.0063
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(15)

Remarks

Moisture Content= 26.6%

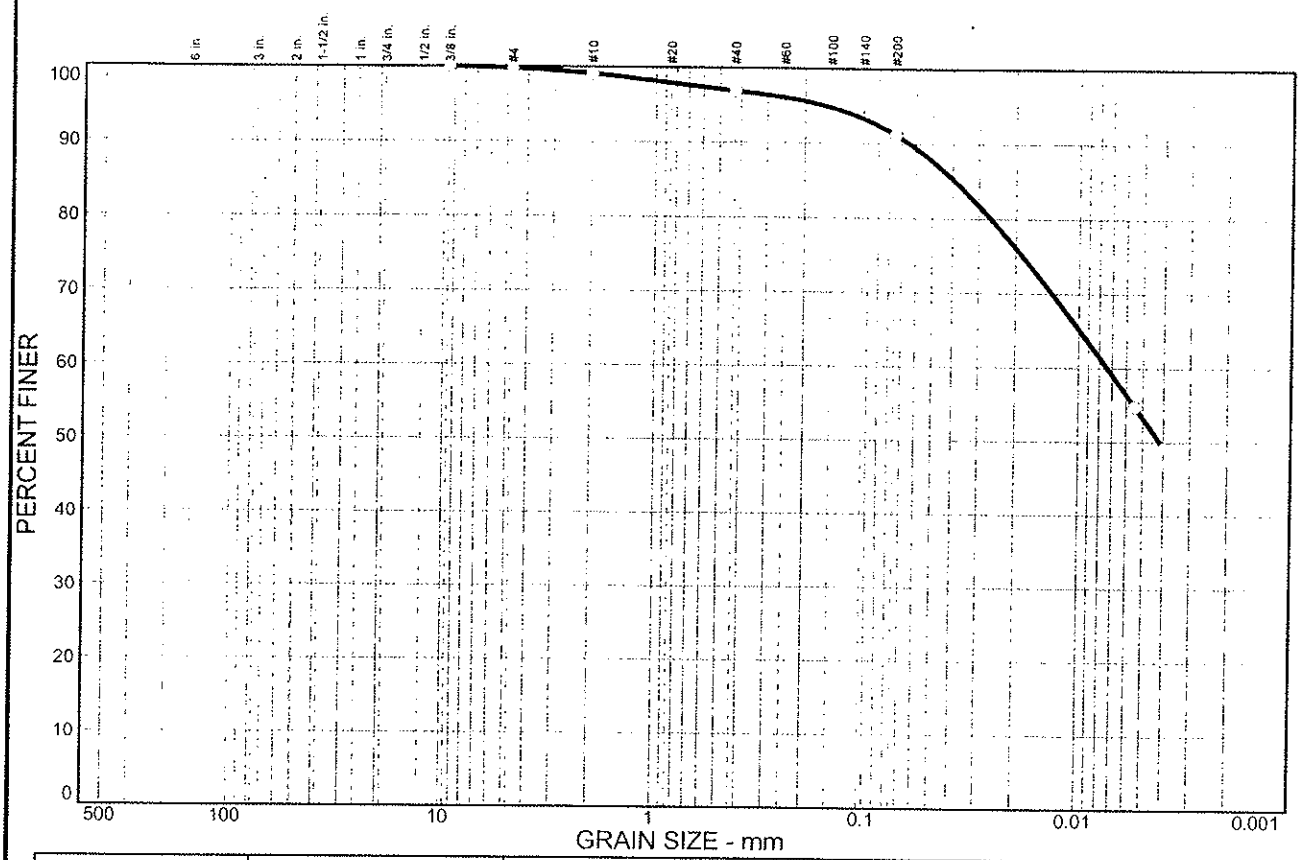
Sample No.: 14 **Source of Sample:** W-DLZ-6 **Date:** 10/31/06
Location: **Elev./Depth:** 38.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.2	0.7	2.2	5.7	37.9	53.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375 in.	100.0		
#4	99.8		
#10	99.1		
#40	96.9		
#200	91.2		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 17 LL= 35 PI= 18

Coefficients

D_{85}= 0.0391 D_{60}= 0.0074 D_{50}= 0.0041
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(16)

Remarks

Moisture Content= 25.3%

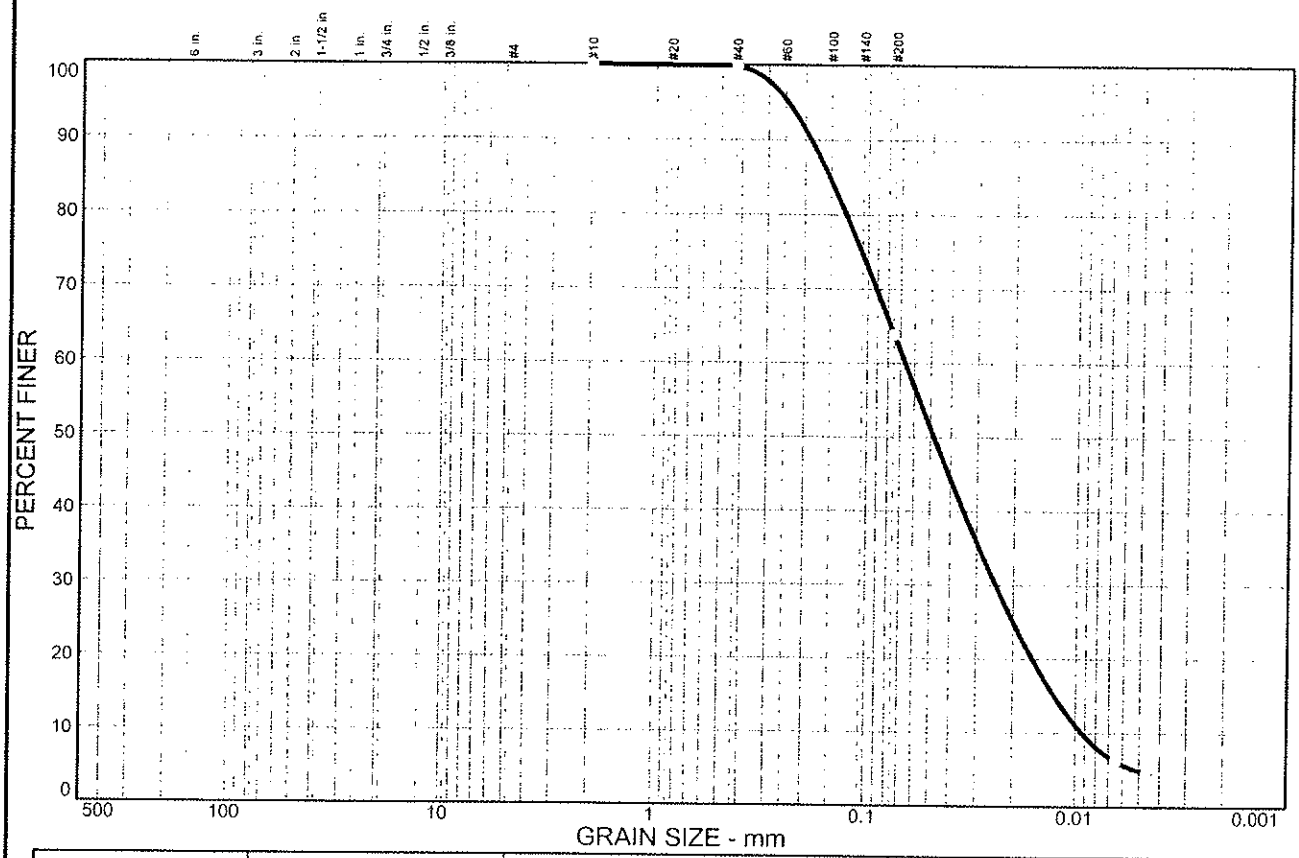
Sample No.: 20 **Source of Sample:** W-DLZ-6 **Date:** 10/31/06
Location: **Elev./Depth:** 73.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.1	36.0	59.0	4.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.9		
#200	63.9		

* (no specification provided)

Soil Description

Sandy silt

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 0.153 D_{60}= 0.0663 D_{50}= 0.0482
D_{30}= 0.0243 D_{15}= 0.0127 D_{10}= 0.0093
C_u= 7.11 C_c= 0.95

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Moisture Content= 27.5%

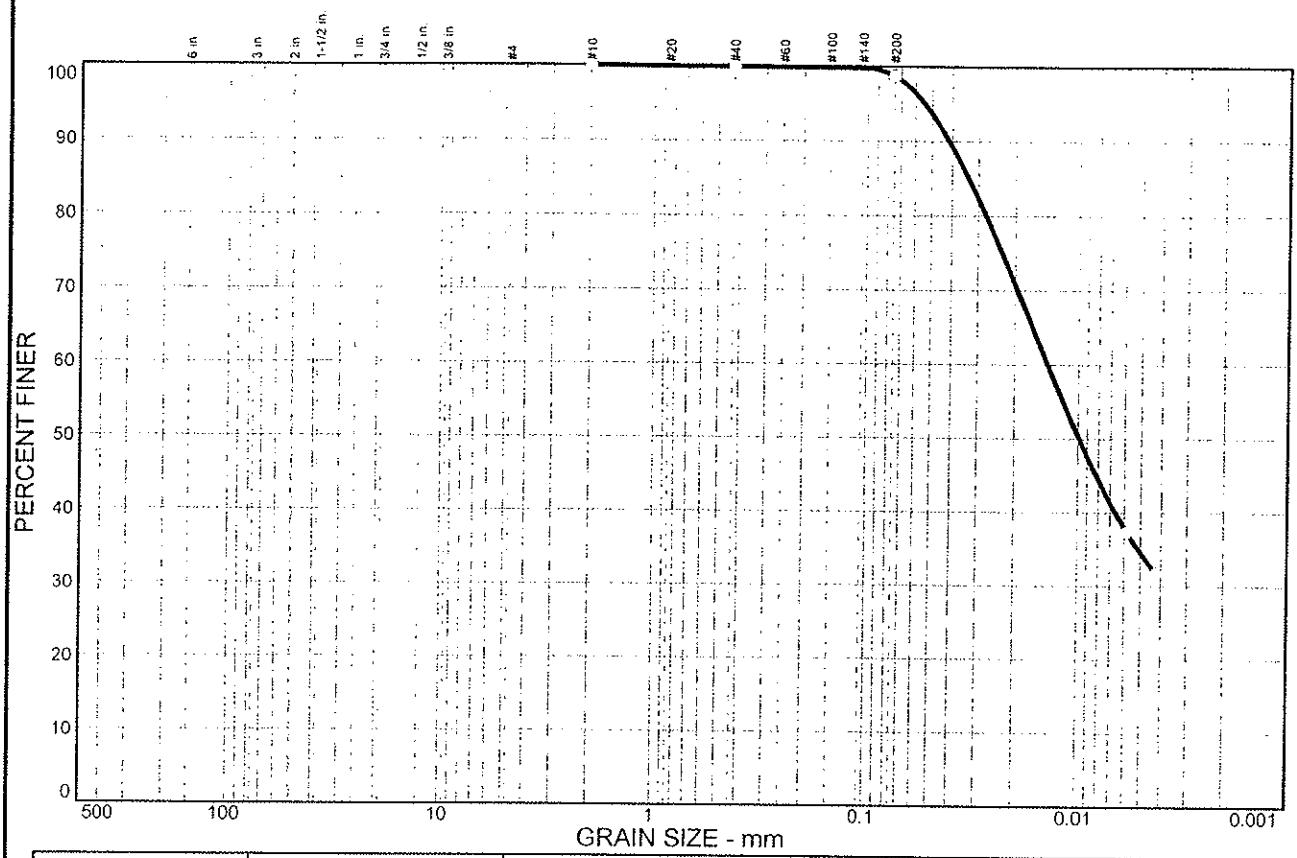
Sample No.: 6 **Source of Sample:** W-DLZ-6 **Date:** 10/31/06
Location: **Elev./Depth:** 13.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.1	1.2	64.1	34.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.9		
#200	98.7		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 19 LL= 29 PI= 10

Coefficients

D_{85}= 0.0334 D_{60}= 0.0139 D_{50}= 0.0099
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(9)

Remarks

Moisture Content= 19.9%

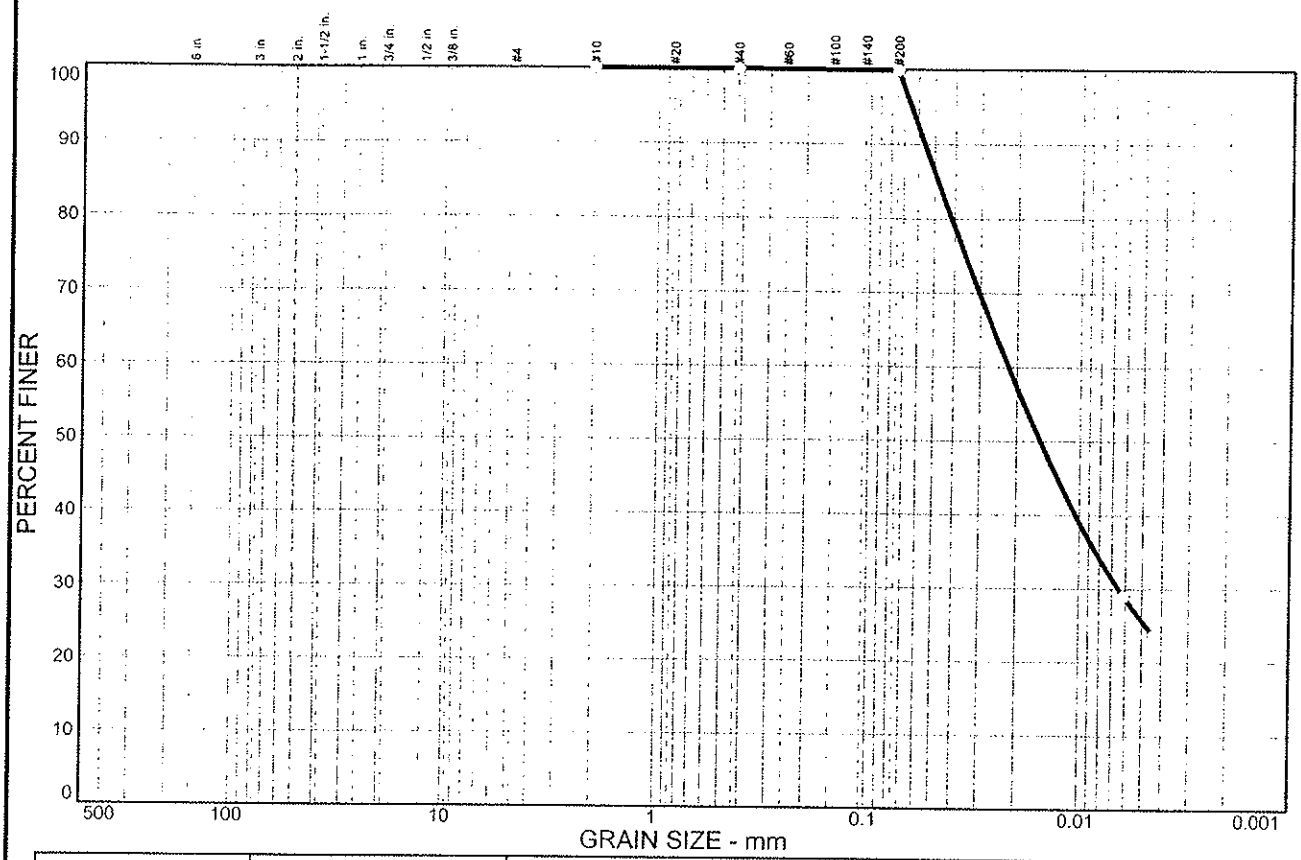
Sample No.: P-1 **Source of Sample:** W-DLZ-6 **Date:** 11/09/06
Location: **Elev./Depth:** 48 0

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.0	0.1	74.2	25.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	99.9		

* (no specification provided)

Soil Description

Silty clay

Atterberg Limits

PL= 20 LL= 25 PI= 5

Coefficients

D_{85}= 0.0481 D_{60}= 0.0219 D_{50}= 0.0155
D_{30}= 0.0065 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL-ML AASHTO= A-4(4)

Remarks

Moisture Content= 25.0%

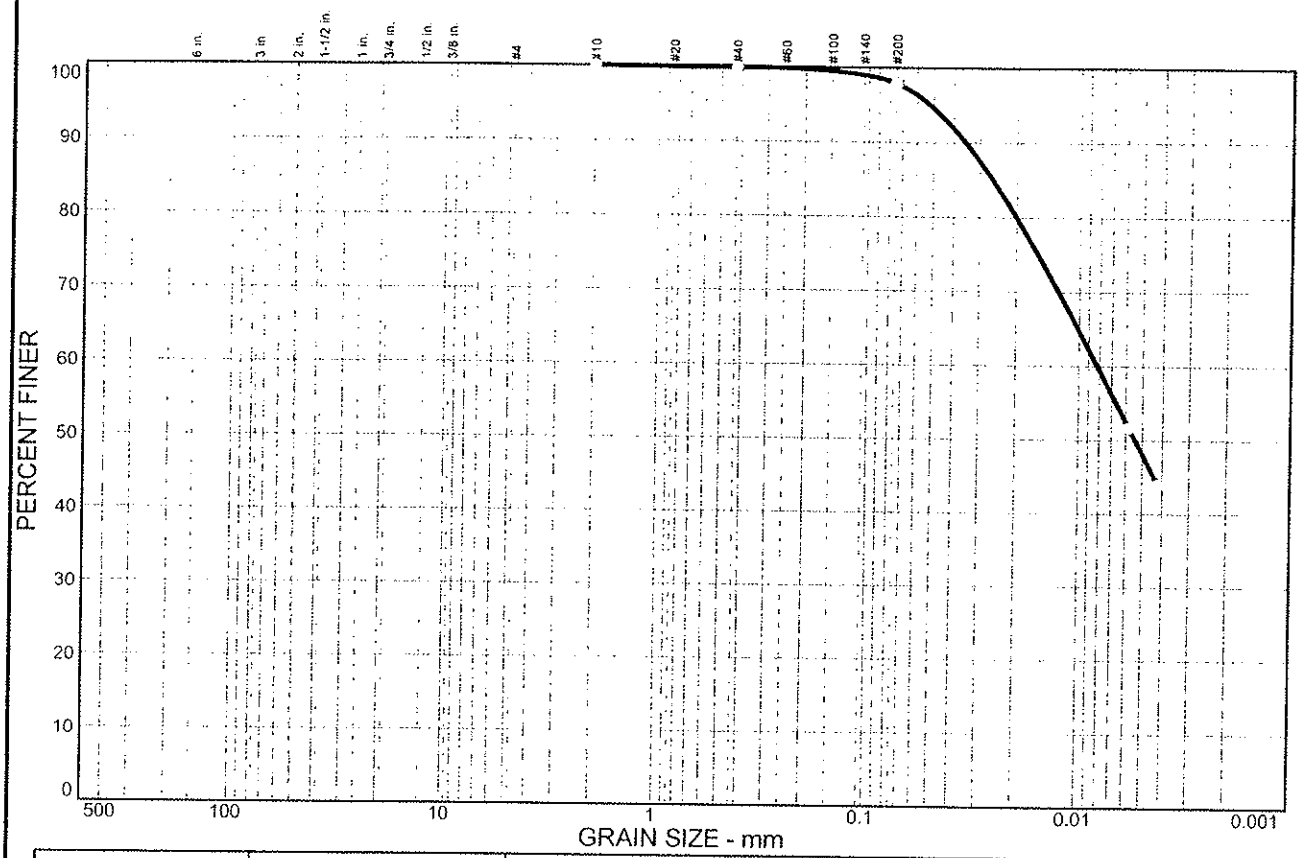
Sample No.: P-2 **Source of Sample:** W-DLZ-7 **Date:** 11/09/06
Location: **Elev./Depth:** 64.0

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.1	2.0	49.8	48.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.9		
#200	97.9		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 18 LL= 32 PI= 14

Coefficients

D_{85}= 0.0260 D_{60}= 0.0082 D_{50}= 0.0054
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(13)

Remarks

Moisture Content= 29.9%

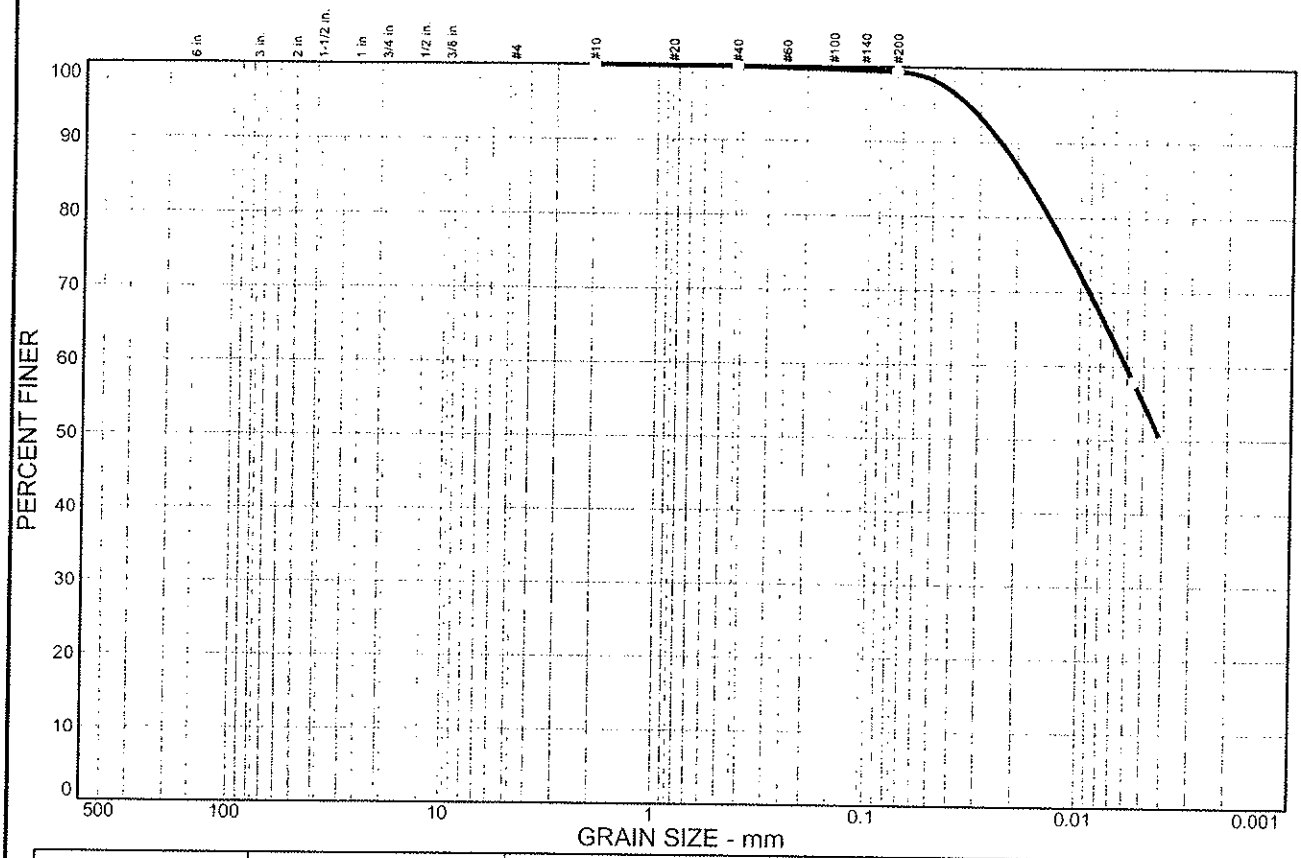
Sample No.: 11 **Source of Sample:** W-DLZ-7 **Date:** 10/31/06
Location: **Elev./Depth:** 26

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.1	0.5	44.3	55.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.9		
#200	99.4		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 18 LL= 33 PI= 15

Coefficients

D_{85}= 0.0180 D_{60}= 0.0061 D_{50}= 0.0041
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(15)

Remarks

Moisture Content= 29.7%

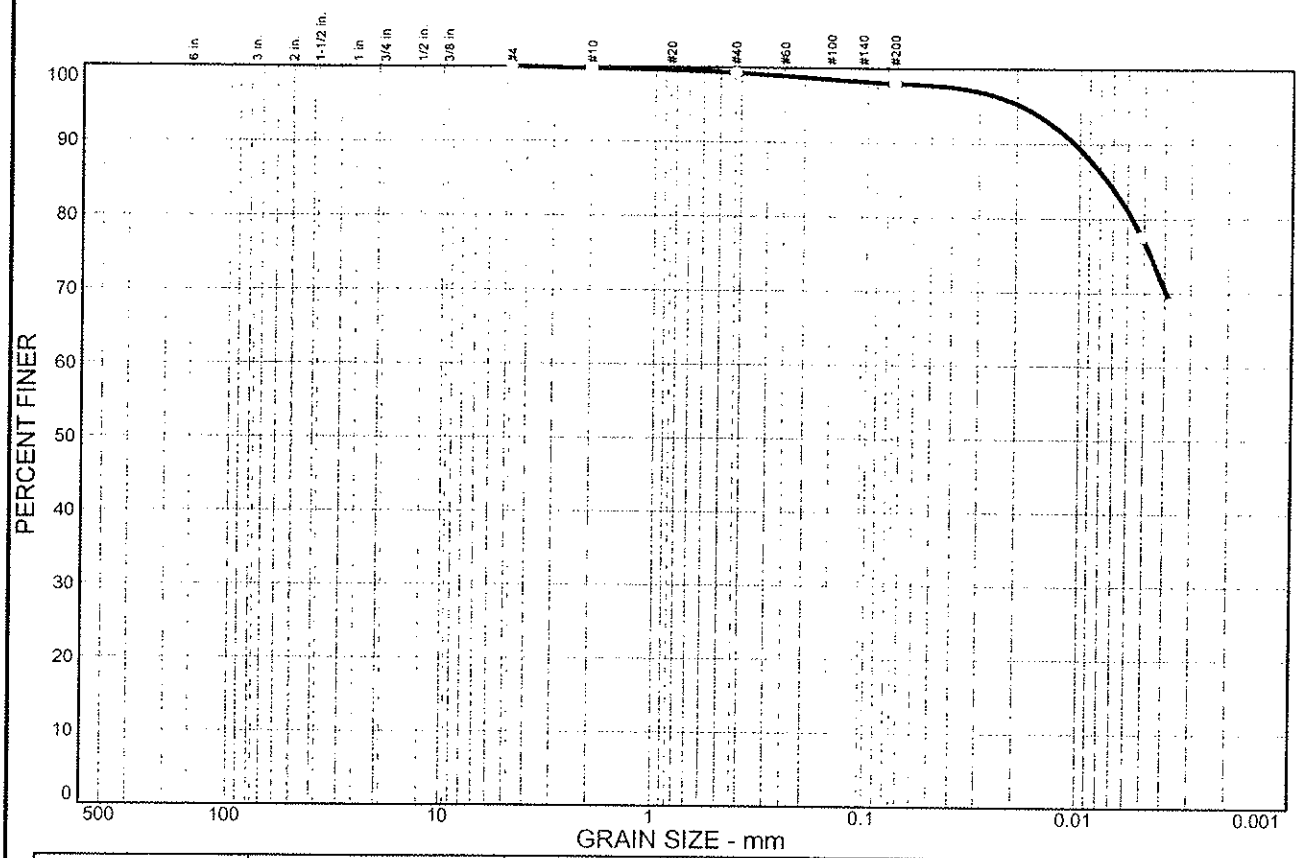
Sample No.: 15 **Source of Sample:** W-DLZ-7 **Date:** 10/31/06
Location: **Elev./Depth:** 48.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.2	0.5	1.3	21.1	76.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.8		
#40	99.3		
#200	98.0		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 24 LL= 48 PI= 24

Coefficients

D_{85}= 0.0074 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(27)

Remarks

Moisture Content= 30.7%

Sample No.: 21 **Source of Sample:** W-DLZ-7 **Date:** 10/31/06

Location: **Elev./Depth:** 83.5

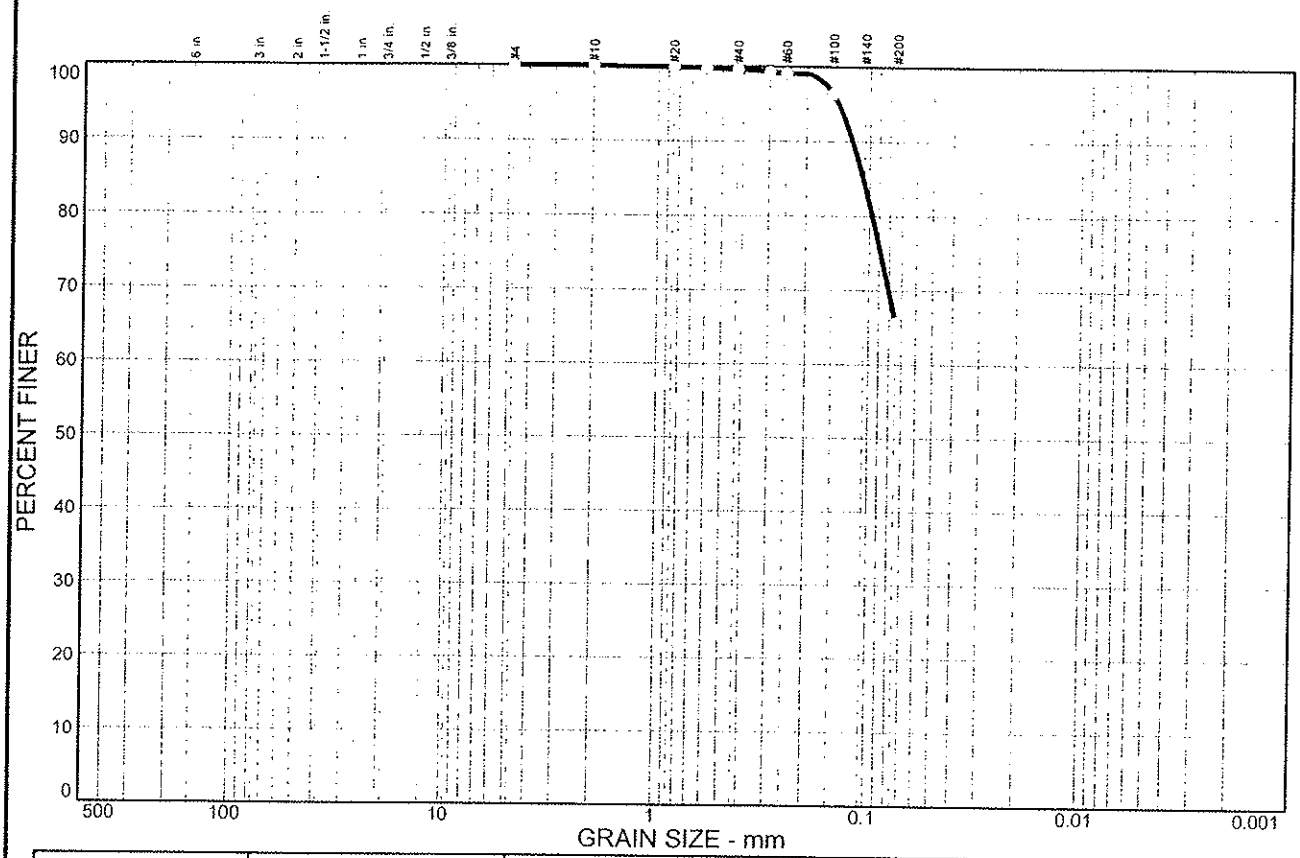
DLZ

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.4	33.9	65.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	99.9		
#30	99.8		
#40	99.6		
#50	99.3		
#60	99.1		
#100	96.4		
#200	65.7		

* (no specification provided)

Soil Description

Sandy silt

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 0.108 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Moisture Content= 24.7%

Sample No.: 5 **Source of Sample:** W-DLZ-7 **Date:** 10/31/06

Location: **Elev./Depth:** 11

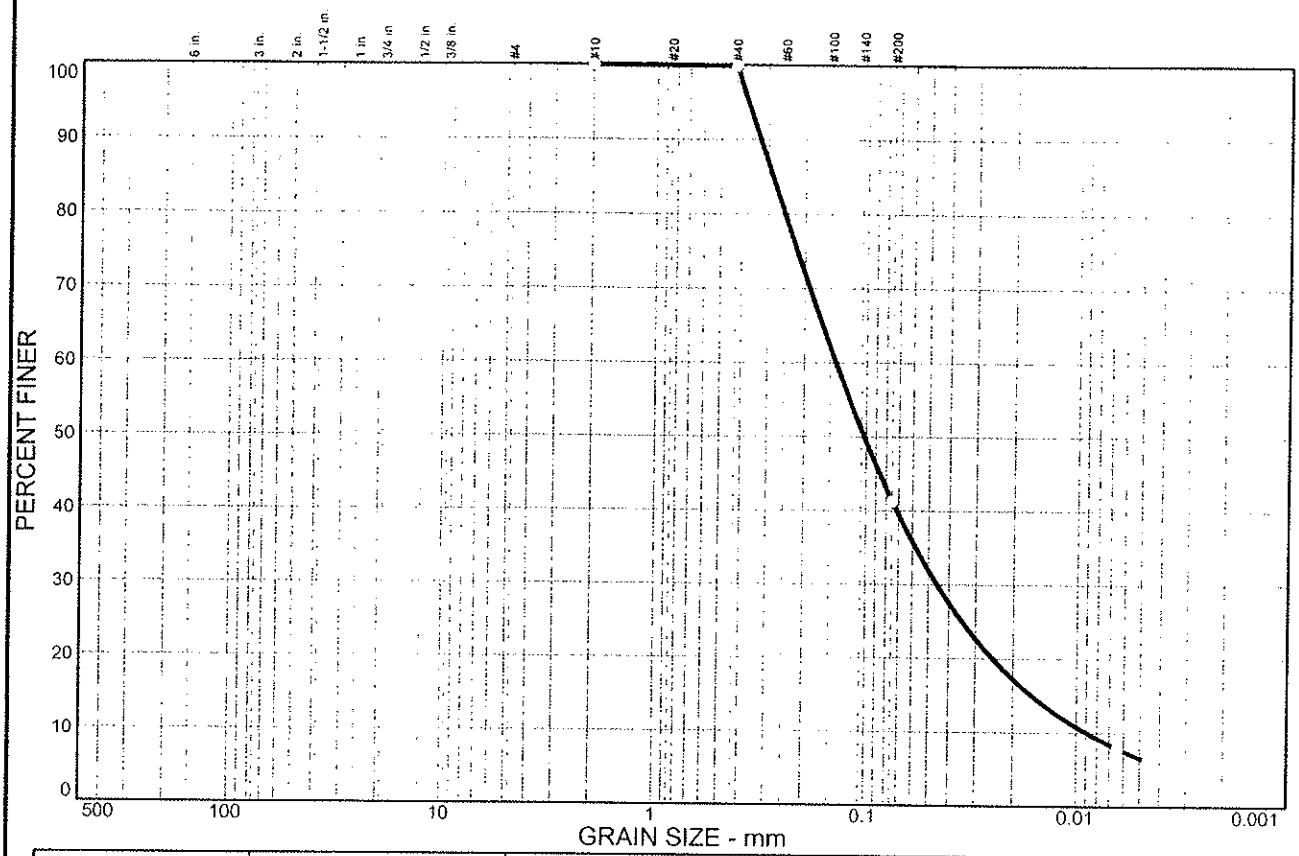
DLZ

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.1	58.6	34.7	6.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.9		
#200	41.3		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 0.286 D_{60}= 0.141 D_{50}= 0.102
D_{30}= 0.0456 D_{15}= 0.0162 D_{10}= 0.0090
C_u= 15.71 C_c= 1.65

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Moisture Content= 18.6%

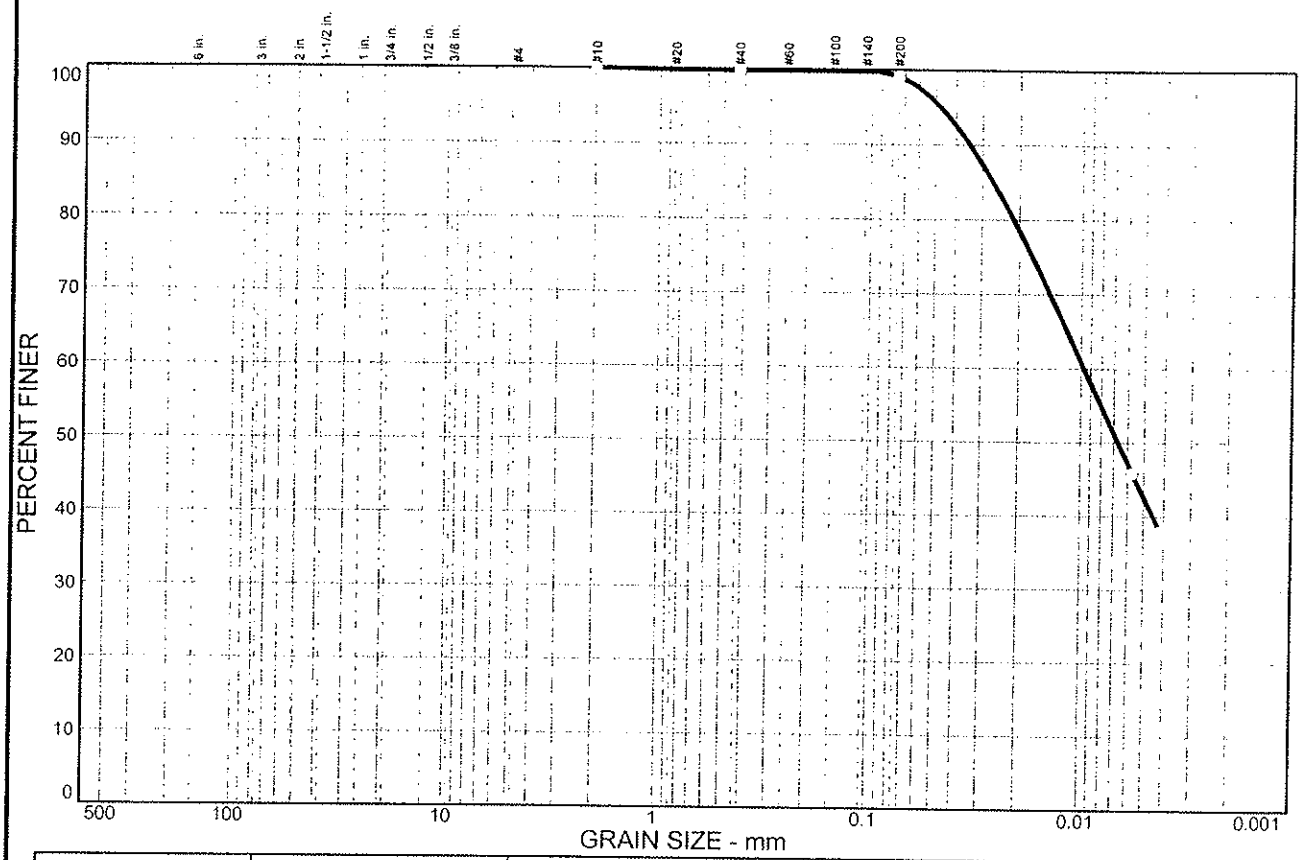
Sample No.: 7 **Source of Sample:** W-DLZ-7 **Date:** 10/31/06
Location: **Elev./Depth:** 16

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.2	0.7	56.5	42.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.8		
#200	99.1		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 18 LL= 31 PI= 13

Coefficients

D_{85}= 0.0267 D_{60}= 0.0097 D_{50}= 0.0067
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(12)

Remarks

Moisture Content= 21.1%

Sample No.: P-1 **Source of Sample:** W-DLZ-7 **Date:** 11/09/06

Location: **Elev./Depth:** 38.0

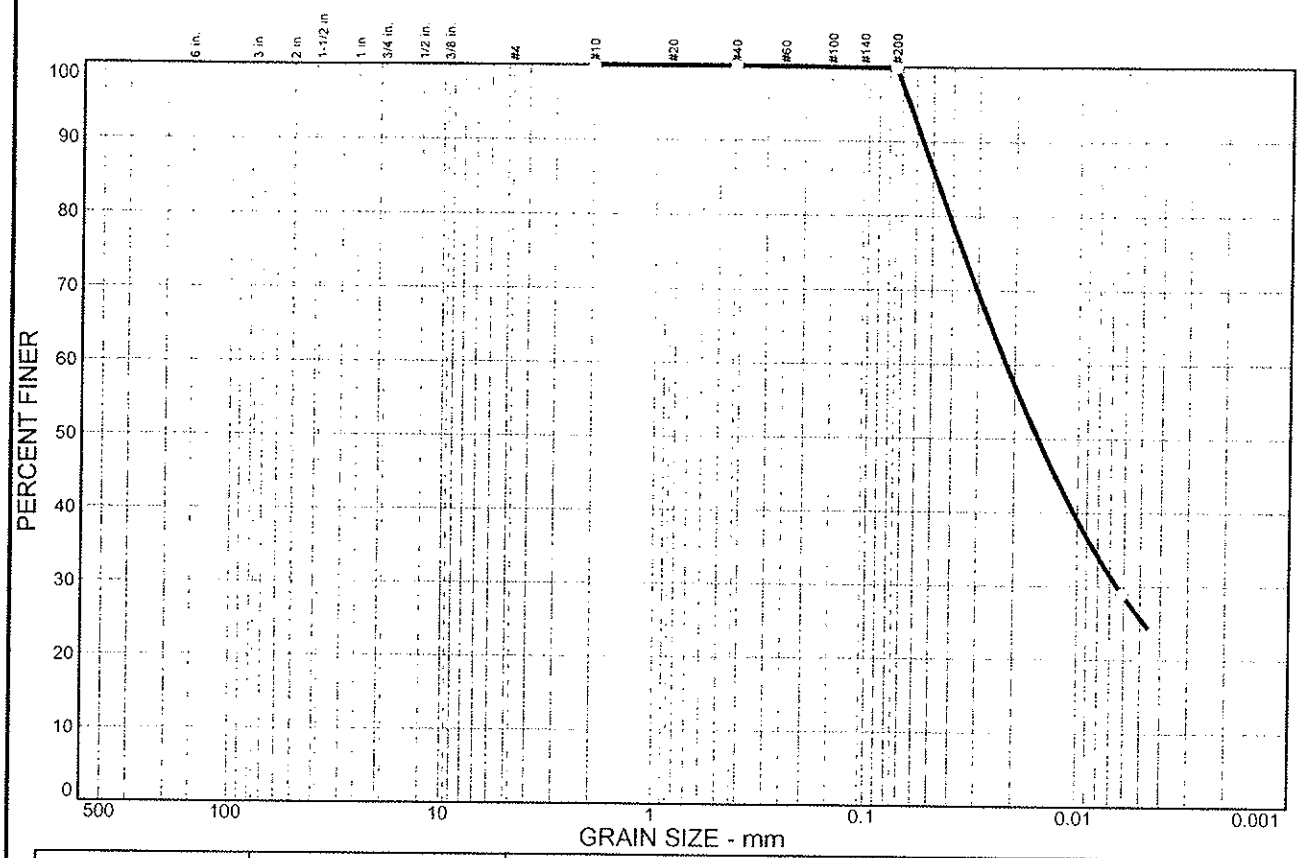
DLZ

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 Figure

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.0	0.1	74.2	25.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	99.9		

* (no specification provided)

Soil Description

Silty clay

Atterberg Limits

PL= 20 LL= 25 PI= 5

Coefficients

D_{85}= 0.0481 D_{60}= 0.0219 D_{50}= 0.0155
D_{30}= 0.0065 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL-ML AASHTO= A-4(4)

Remarks

Moisture Content= 25.0%

Sample No.: P-2 **Source of Sample:** W-DLZ-7 **Date:** 11/09/06

Location: **Elev./Depth:** 63.0

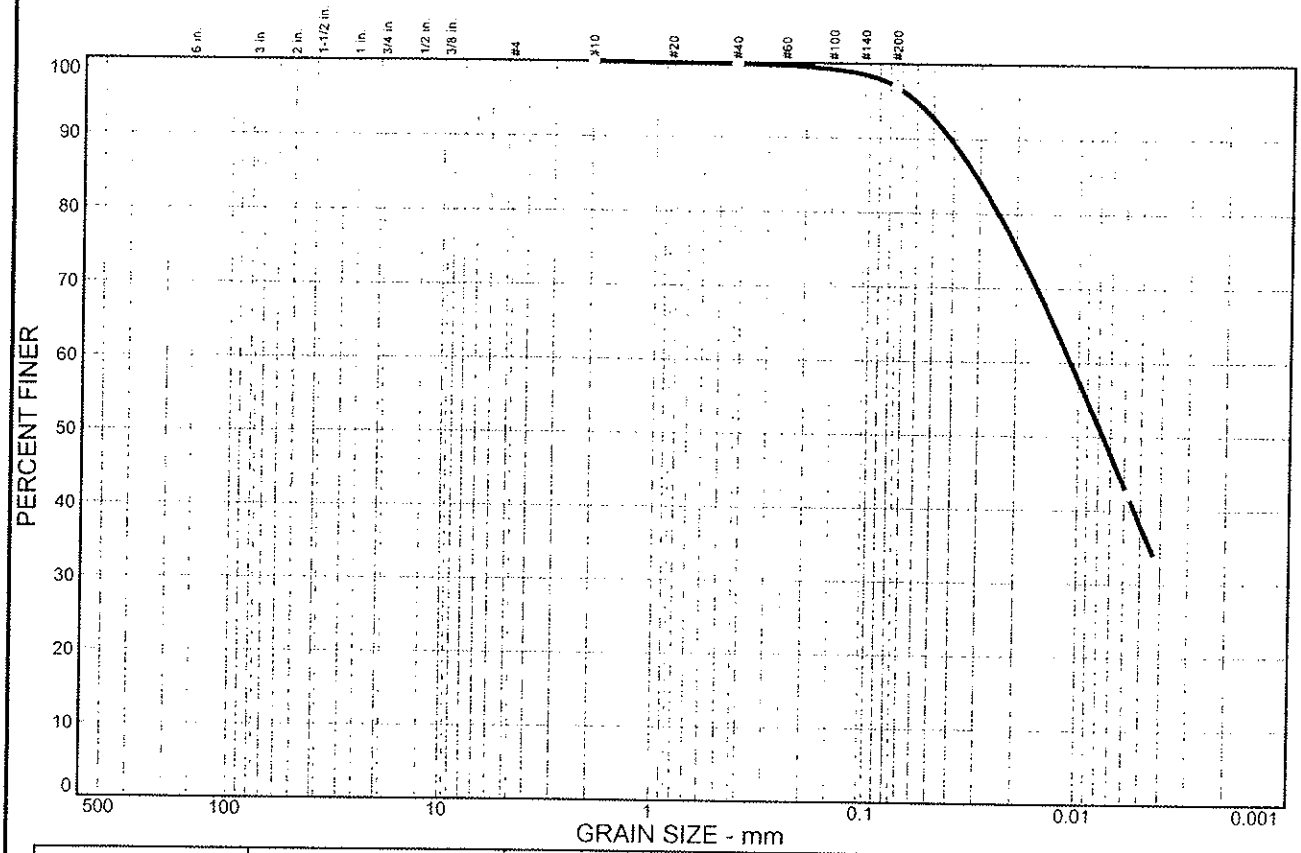
DLZ

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.2	2.9	58.9	38.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.8		
#200	96.9		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 18 LL= 29 PI= 11

Coefficients

D_{85}= 0.0312 D_{60}= 0.0109 D_{50}= 0.0076
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(10)

Remarks

Moisture Content= 27.4%

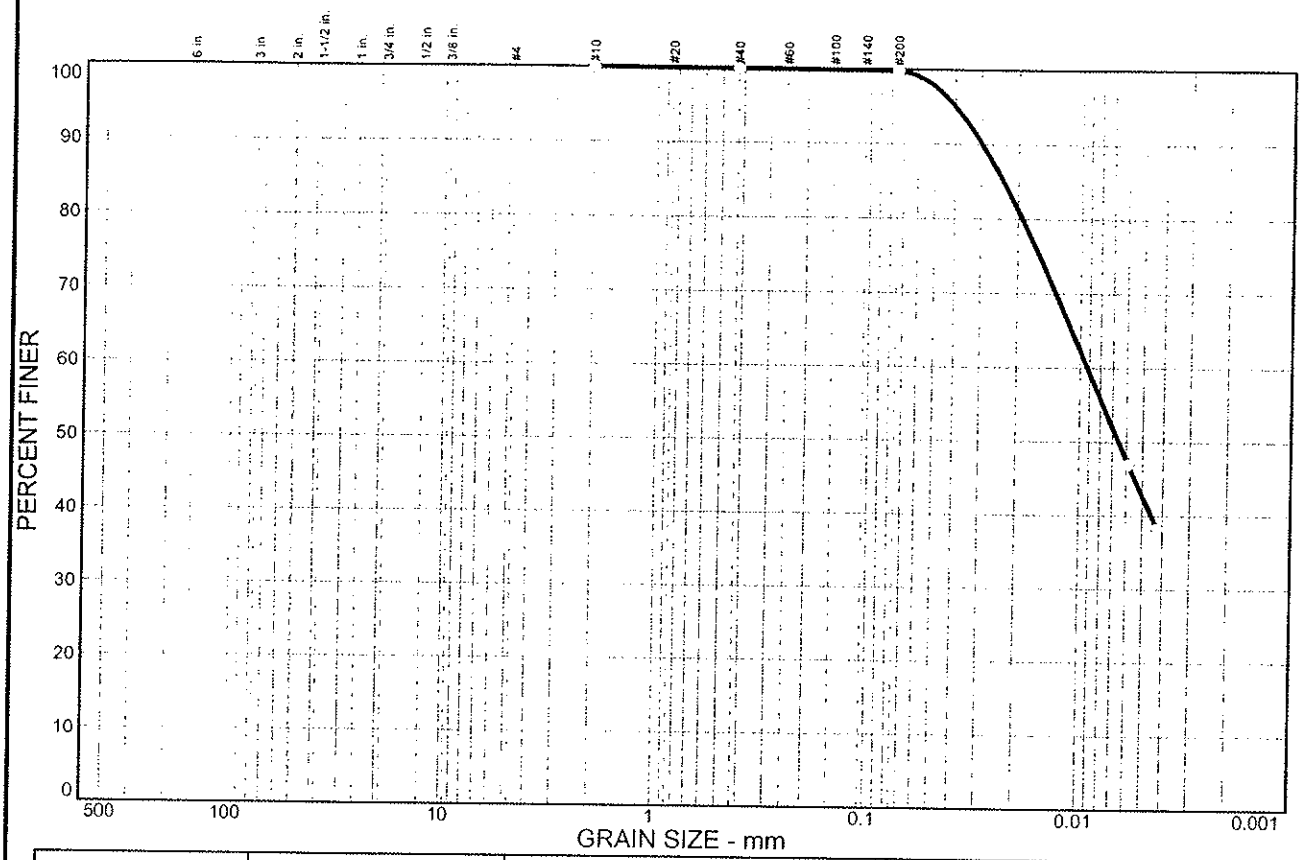
Sample No.: 10 **Source of Sample:** W-DLZ-8 **Date:** 10/31/06
Location: **Elev./Depth:** 23.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.1	0.1	57.2	42.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.9		
#200	99.8		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 19 LL= 30 PI= 11

Coefficients

D_{85}= 0.0235 D_{60}= 0.0092 D_{50}= 0.0065
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(11)

Remarks

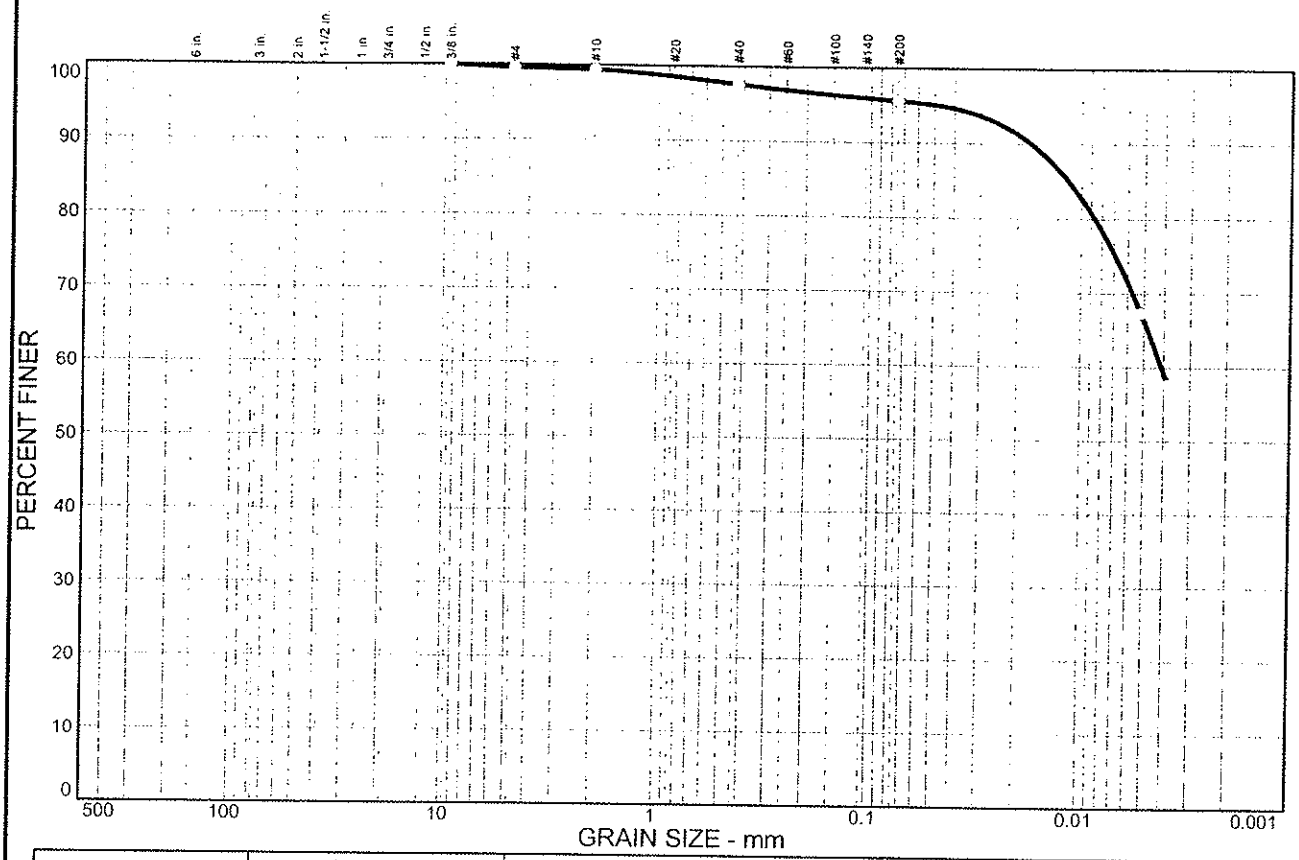
Moisture Content= 24.4%

Sample No.: 16 **Source of Sample:** W-DLZ-8 **Date:** 10/31/06
Location: **Elev./Depth:** 53.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls
Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.4	0.2	1.8	2.0	29.3	66.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375 in.	100.0		
#4	99.6		
#10	99.4		
#40	97.6		
#200	95.6		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 22 LL= 39 PI= 12

Coefficients

D_{85}= 0.0115 D_{60}= 0.0041 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(18)

Remarks

Moisture Content= 30.8%

Sample No.: 20 **Source of Sample:** W-DLZ-8 **Date:** 10/31/06

Location: **Elev./Depth:** 73.5

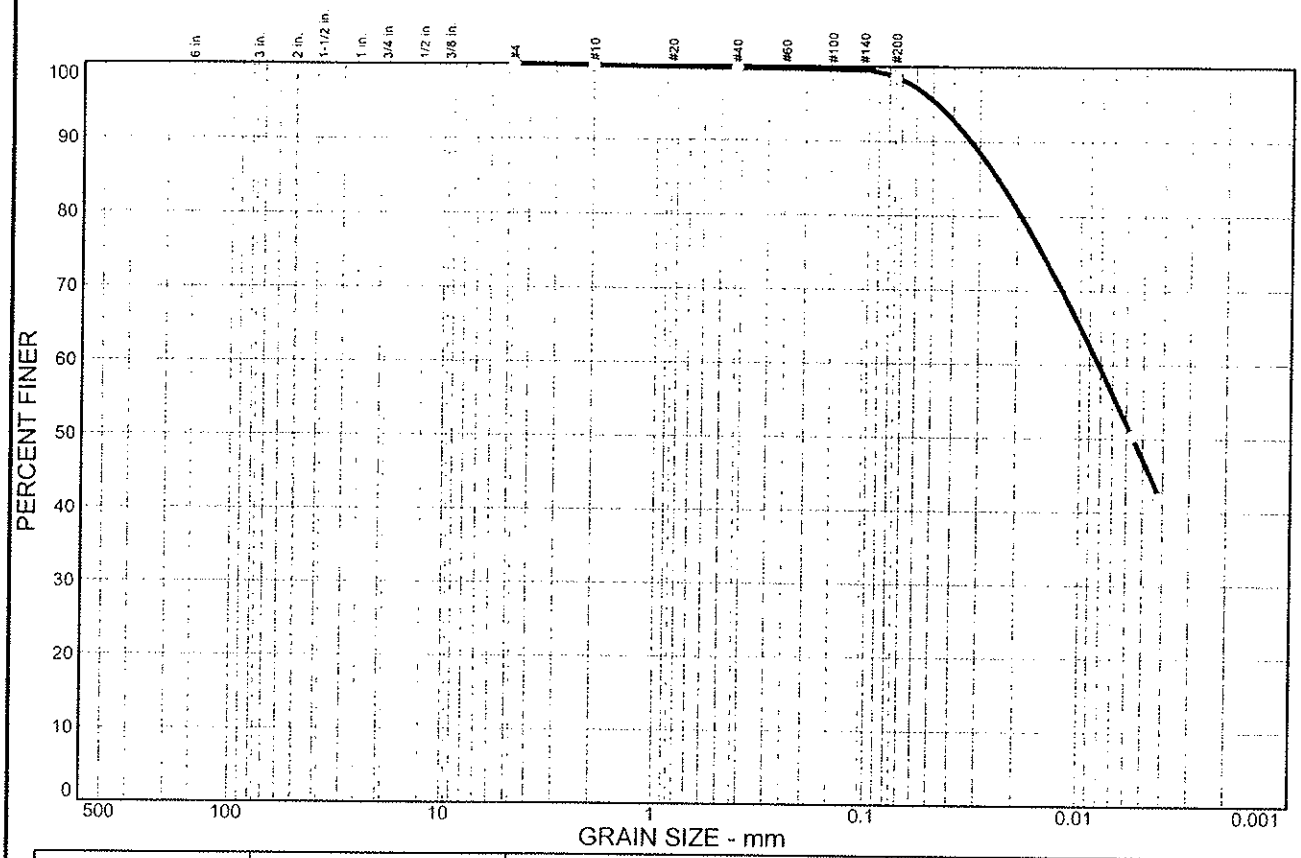
DLZ

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.1	0.2	1.1	51.5	47.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#40	99.7		
#200	98.6		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 19 LL= 33 PI= 14

Coefficients

D_{85}= 0.0246 D_{60}= 0.0082 D_{50}= 0.0056
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(14)

Remarks

Moisture Content= 24.5%

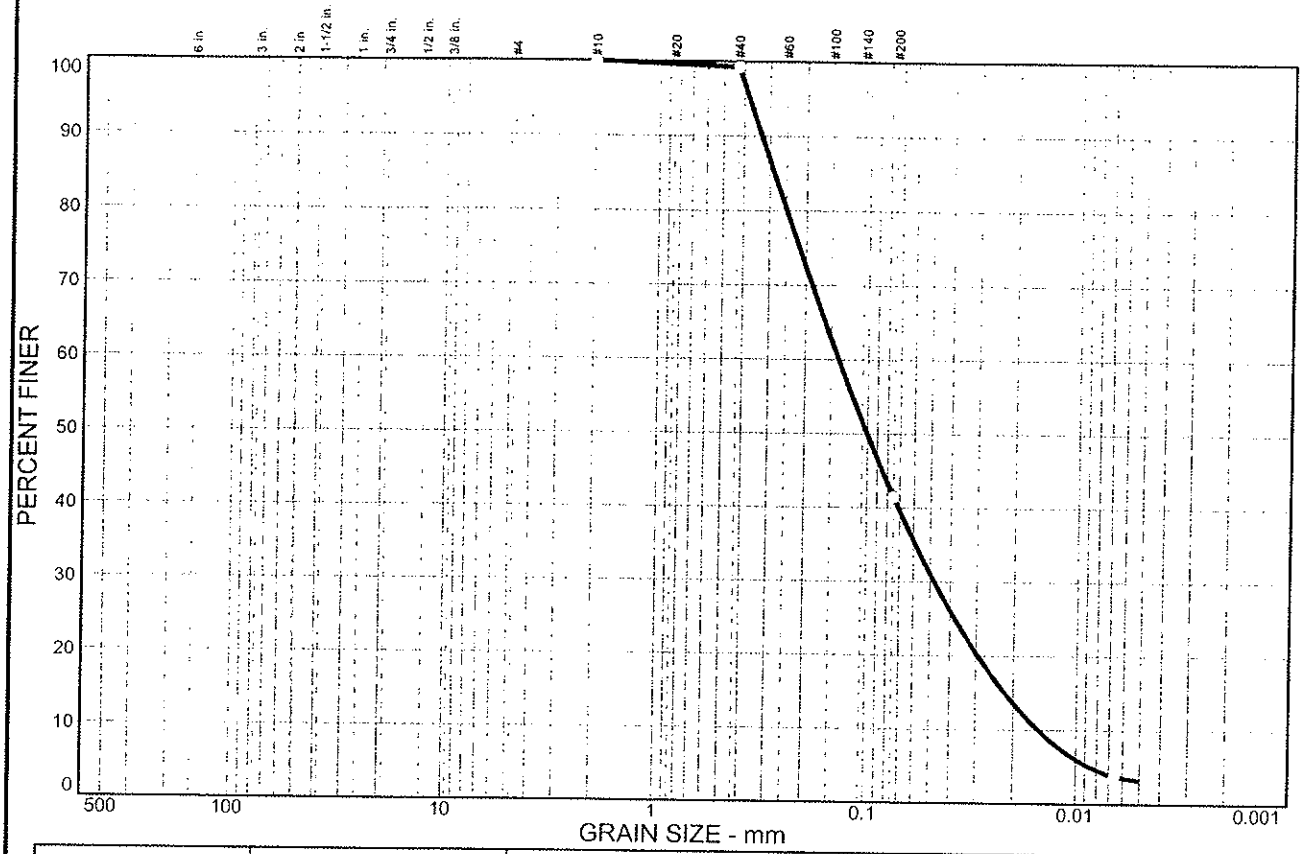
Sample No.: 24 **Source of Sample:** W-DLZ-8 **Date:** 10/31/06
Location: **Elev./Depth:** 98 5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.7	57.8	38.3	3.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.3		
#200	41.5		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 0.286 D_{60}= 0.138 D_{50}= 0.101
D_{30}= 0.0477 D_{15}= 0.0219 D_{10}= 0.0151
C_u= 9.12 C_c= 1.09

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Moisture Content= 29.0%

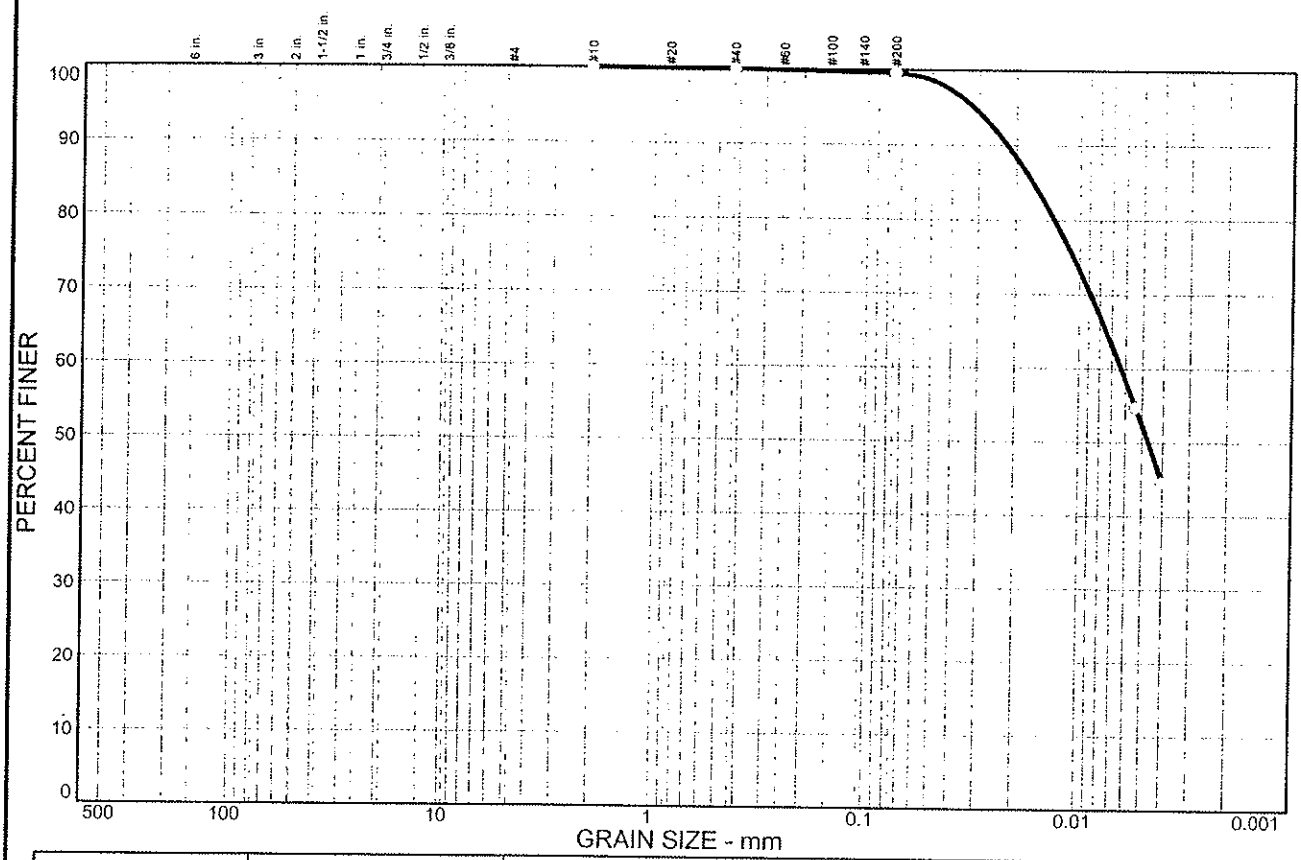
Sample No.: 6 **Source of Sample:** W-DLZ-8 **Date:** 10/31/06
Location: **Elev./Depth:** 13.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.0	0.4	47.2	52.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	99.6		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 20 LL= 35 PI= 15

Coefficients

D_{85}= 0.0166 D_{60}= 0.0063 D_{50}= 0.0047
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(16)

Remarks

Moisture Content= 26.4%
Specific Gravity= 2.73

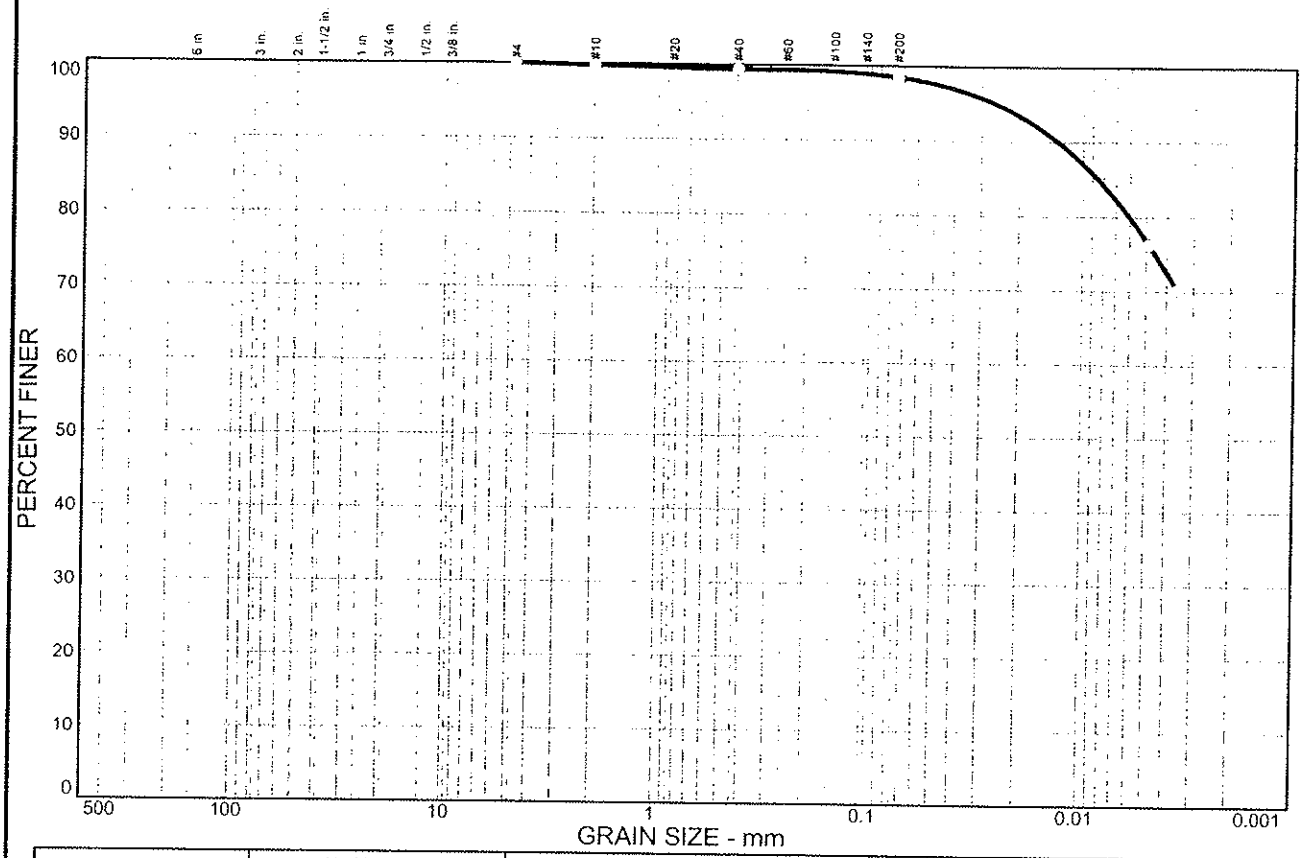
Sample No.: P-1 **Source of Sample:** W-DLZ-8 **Date:** 11/09/06
Location: **Elev./Depth:** 38.0

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.2	0.4	0.9	21.7	76.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.8		
#40	99.4		
#200	98.5		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 22 LL= 42 PI= 20

Coefficients

D_{85}= 0.0085 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(22)

Remarks

Moisture Content= 29.8%

Sample No.: P-2 **Source of Sample:** W-DLZ-8 **Date:** 11/09/06

Location: **Elev./Depth:** 78.0

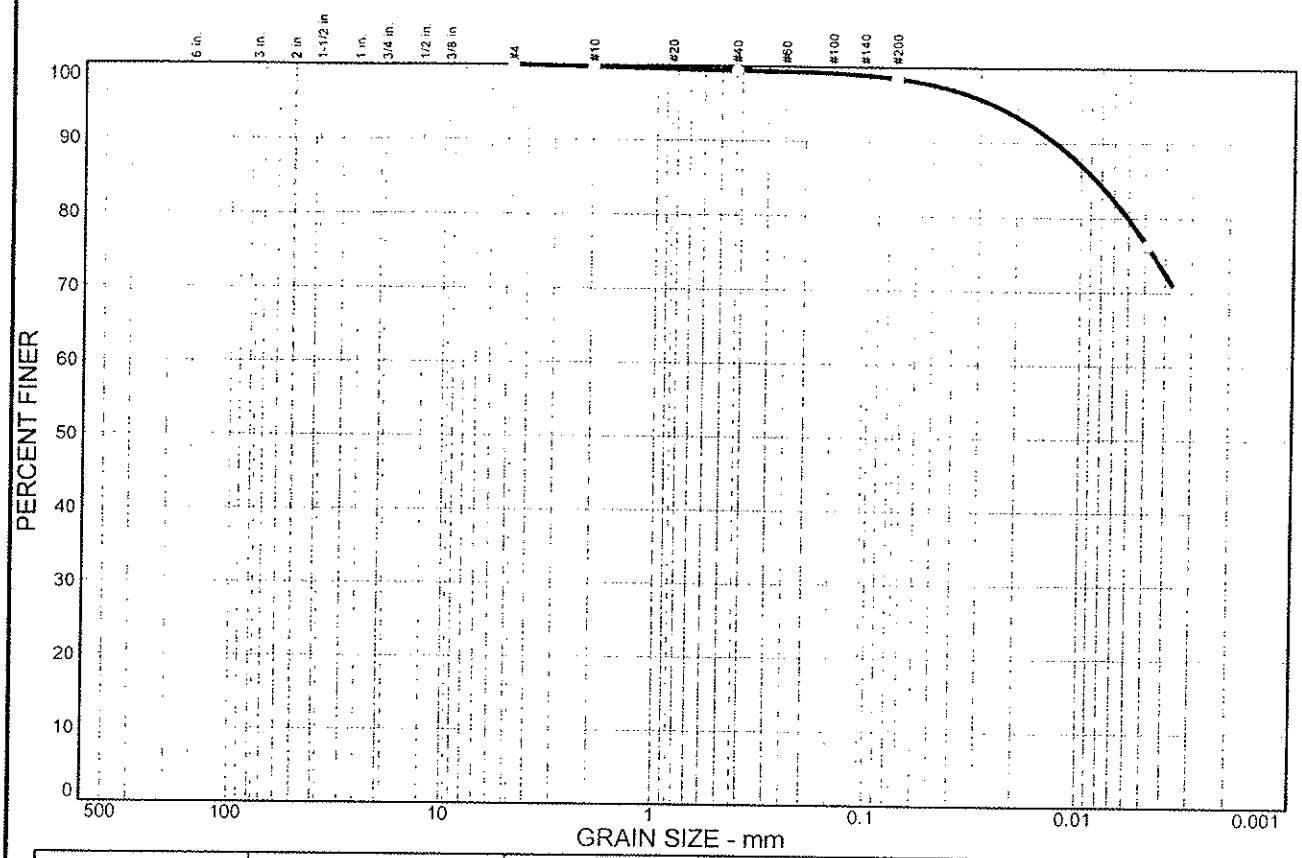
DLZ

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.2	0.4	0.9	21.7	76.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.8		
#40	99.4		
#200	98.5		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 22 LL= 42 PI= 20

Coefficients

D_{85}= 0.0085 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(22)

Remarks

Moisture Content= 29.8%

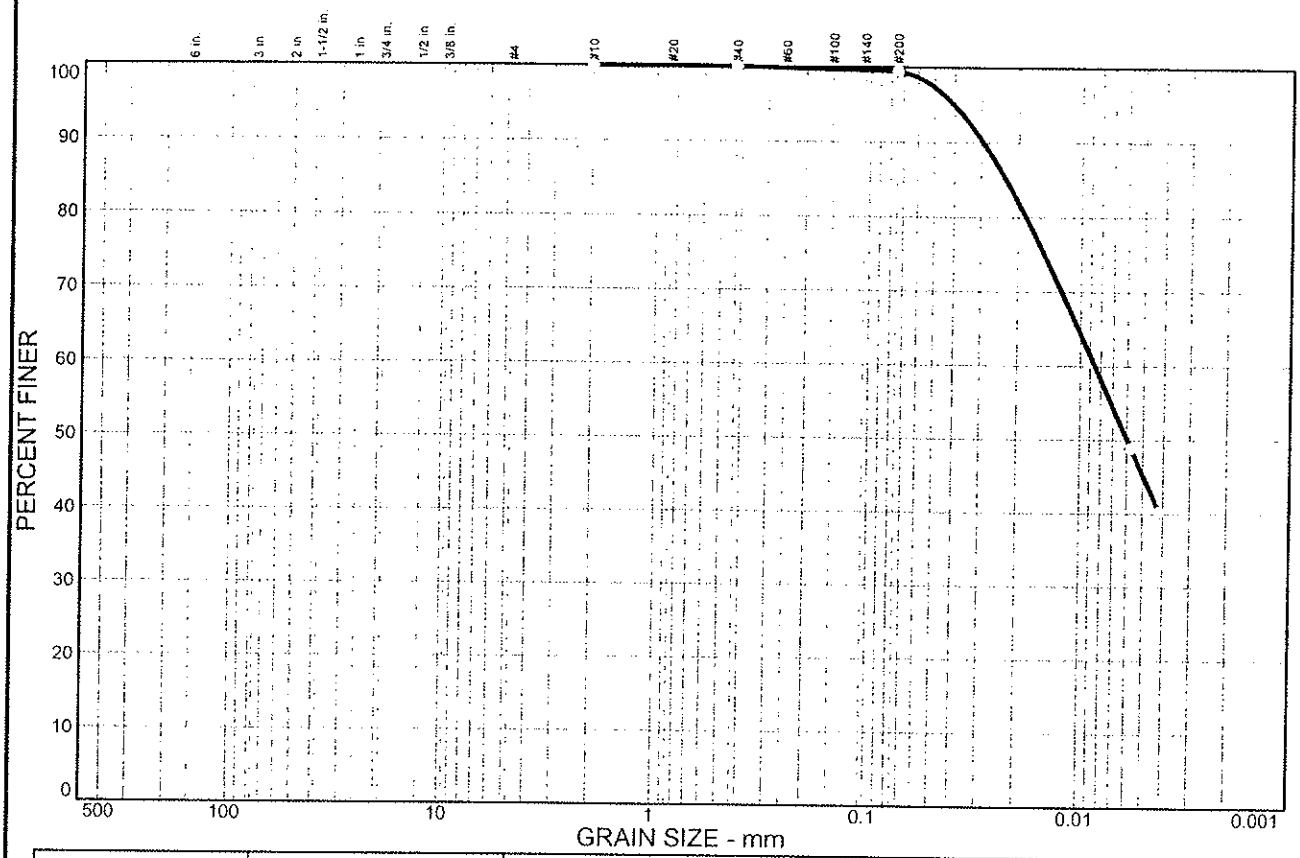
Sample No.: P-2 **Source of Sample:** W-DLZ-8 **Date:** 11/09/06
Location: **Elev./Depth:** 79.0

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.0	0.5	54.3	45.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	99.5		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 19 LL= 32 PI= 13

Coefficients

D_{85}= 0.0229 D_{60}= 0.0086 D_{50}= 0.0060
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(13)

Remarks

Moisture Content= 26.0%

Sample No.: 13 **Source of Sample:** W-DLZ-9 **Date:** 10/31/06

Location: **Elev./Depth:** 33.5

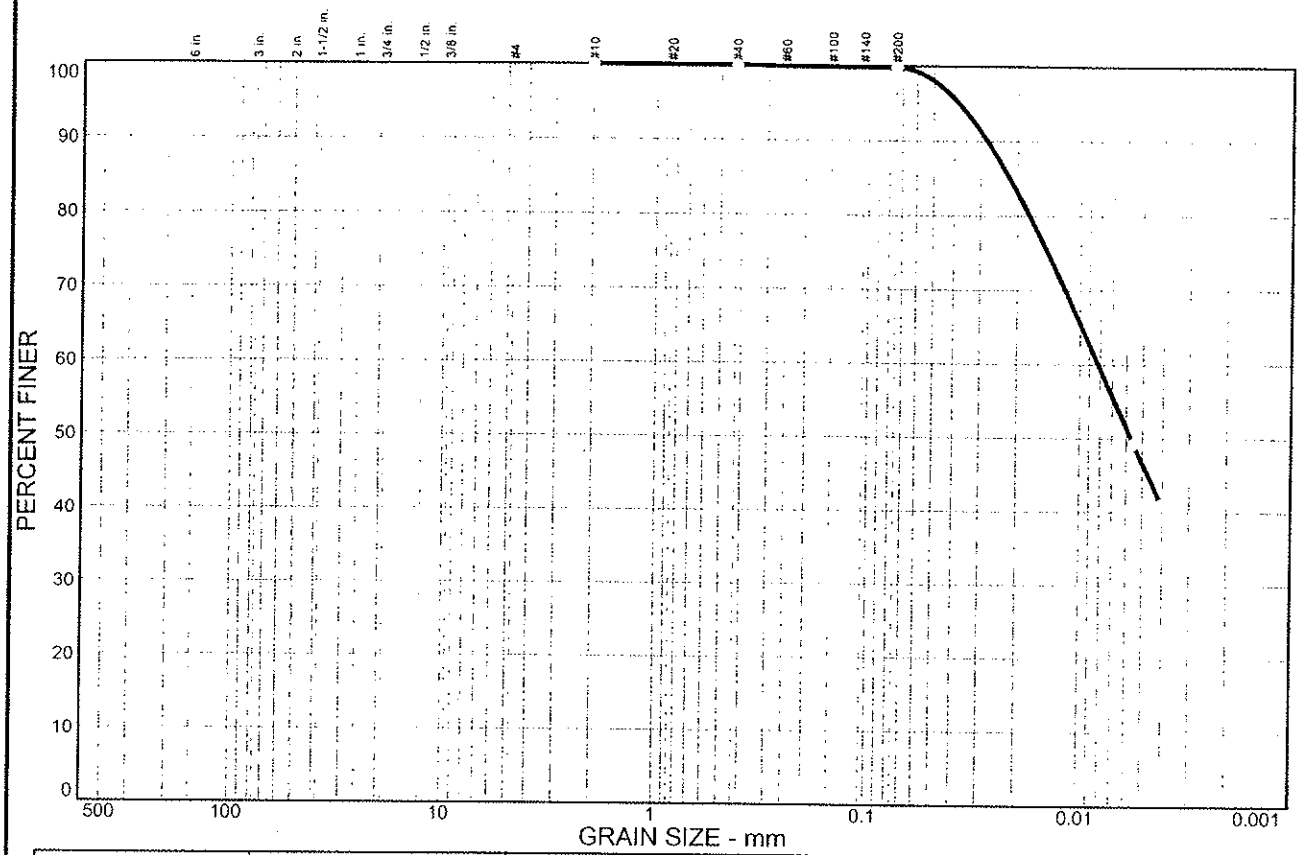
DLZ

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.0	0.2	53.2	46.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	99.8		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 18 LL= 31 PI= 13

Coefficients

D_{85}= 0.0219 D_{60}= 0.0082 D_{50}= 0.0057
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(13)

Remarks

Moisture Content= 26.3%

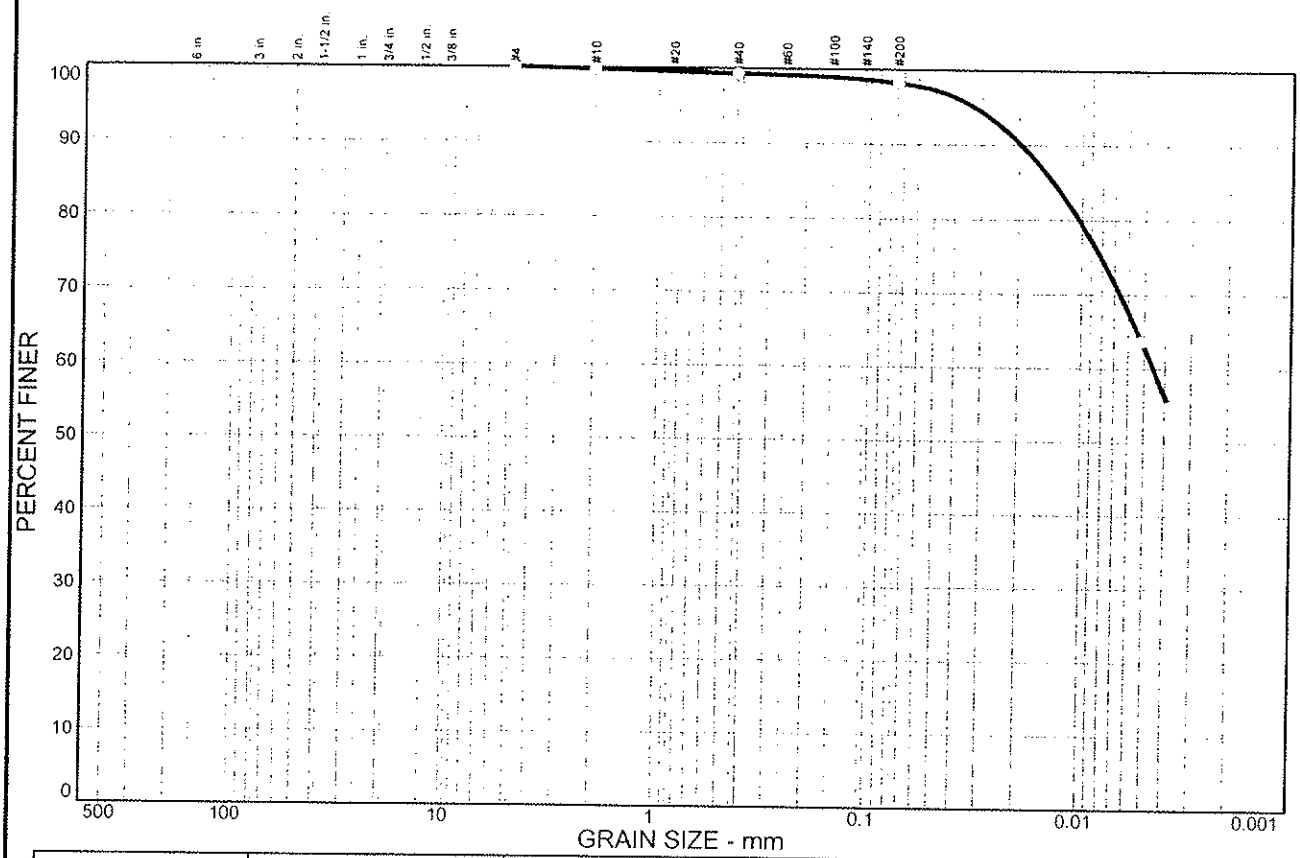
Sample No.: 17 **Source of Sample:** W-DLZ-9 **Date:** 10/31/06
Location: **Elev./Depth:** 585

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.2	0.5	1.1	35.4	62.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.8		
#40	99.3		
#200	98.2		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 20 LL= 37 PI= 17

Coefficients

D_{85}= 0.0137 D_{60}= 0.0045 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(17)

Remarks

Moisture Content= 29.2%

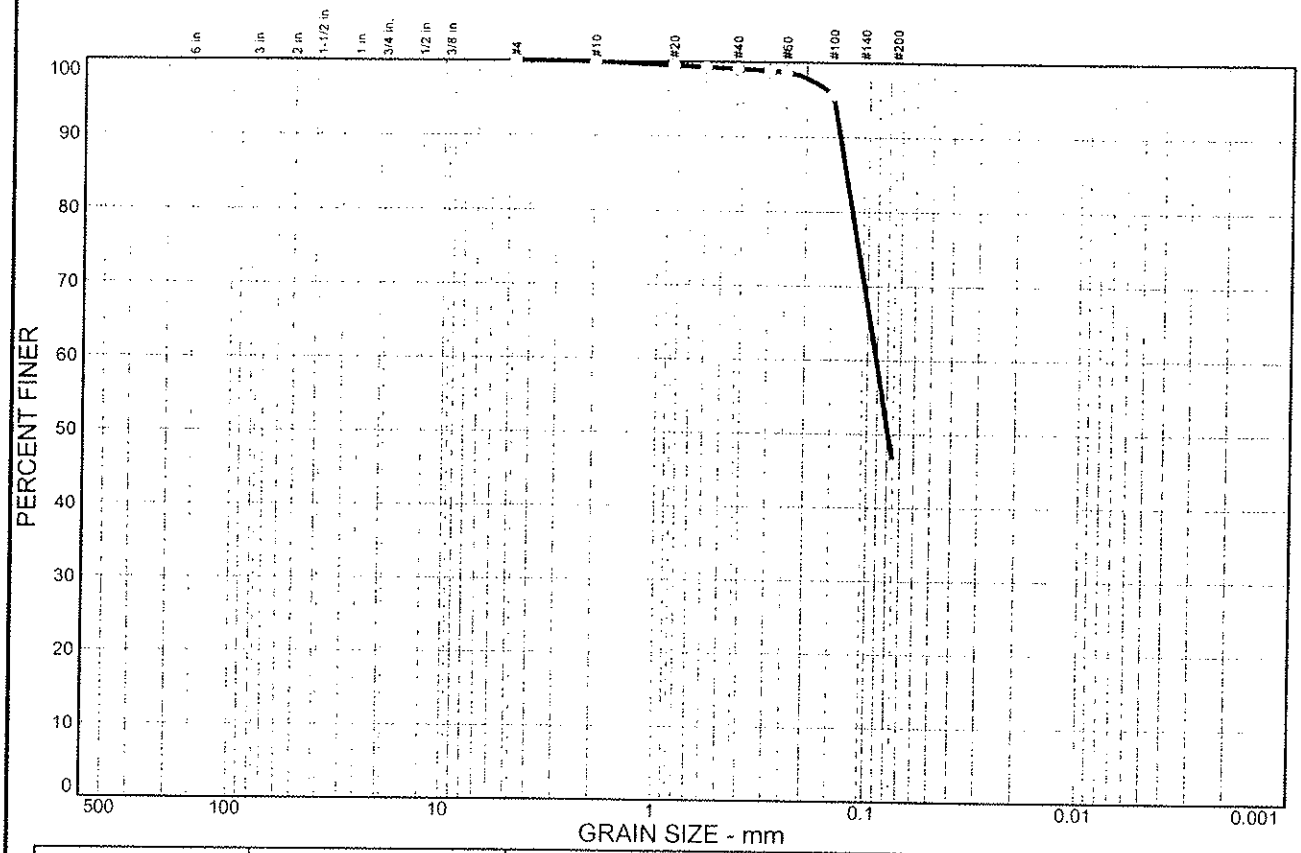
Sample No.: 21 **Source of Sample:** W-DLZ-9 **Date:** 10/31/06
Location: **Elev./Depth:** 78.5

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.1	0.8	53.2	45.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.5		
#30	99.3		
#40	99.1		
#50	98.8		
#60	98.7		
#100	95.7		
#200	45.9		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= np LL= np PI= np

Coefficients

D_{85}= 0.129 D_{60}= 0.0909 D_{50}= 0.0793
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Moisture Content= 24.2%

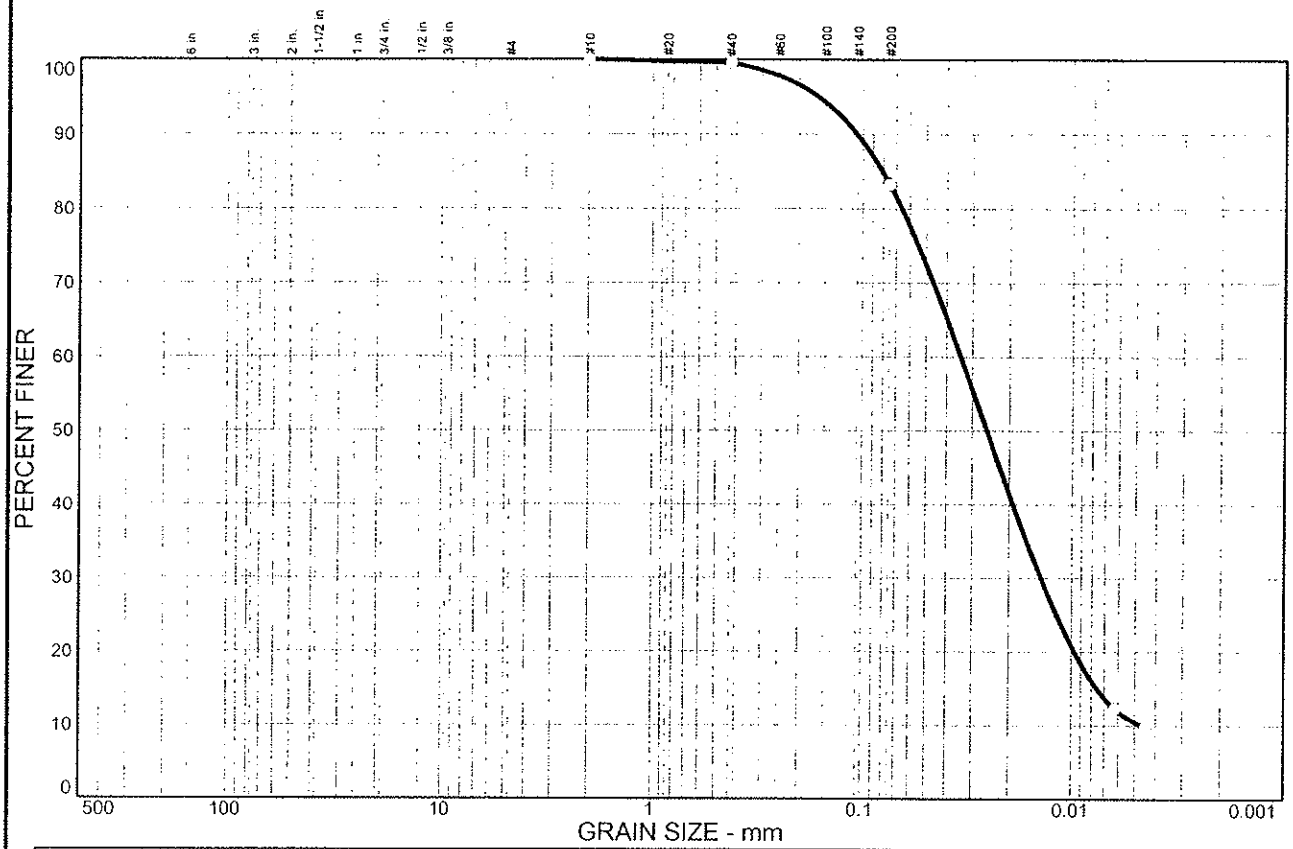
Sample No.: 3 **Source of Sample:** W-DLZ-9 **Date:** 10/31/06
Location: **Elev./Depth:** 6.0

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.4	16.3	72.8	10.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.6		
#200	83.3		

* (no specification provided)

Soil Description

Silt with sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 0.0810 D_{60}= 0.0342 D_{50}= 0.0256
D_{30}= 0.0140 D_{15}= 0.0076 D_{10}= 0.0046
C_u= 7.40 C_c= 1.24

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Moisture Content= 26.2%

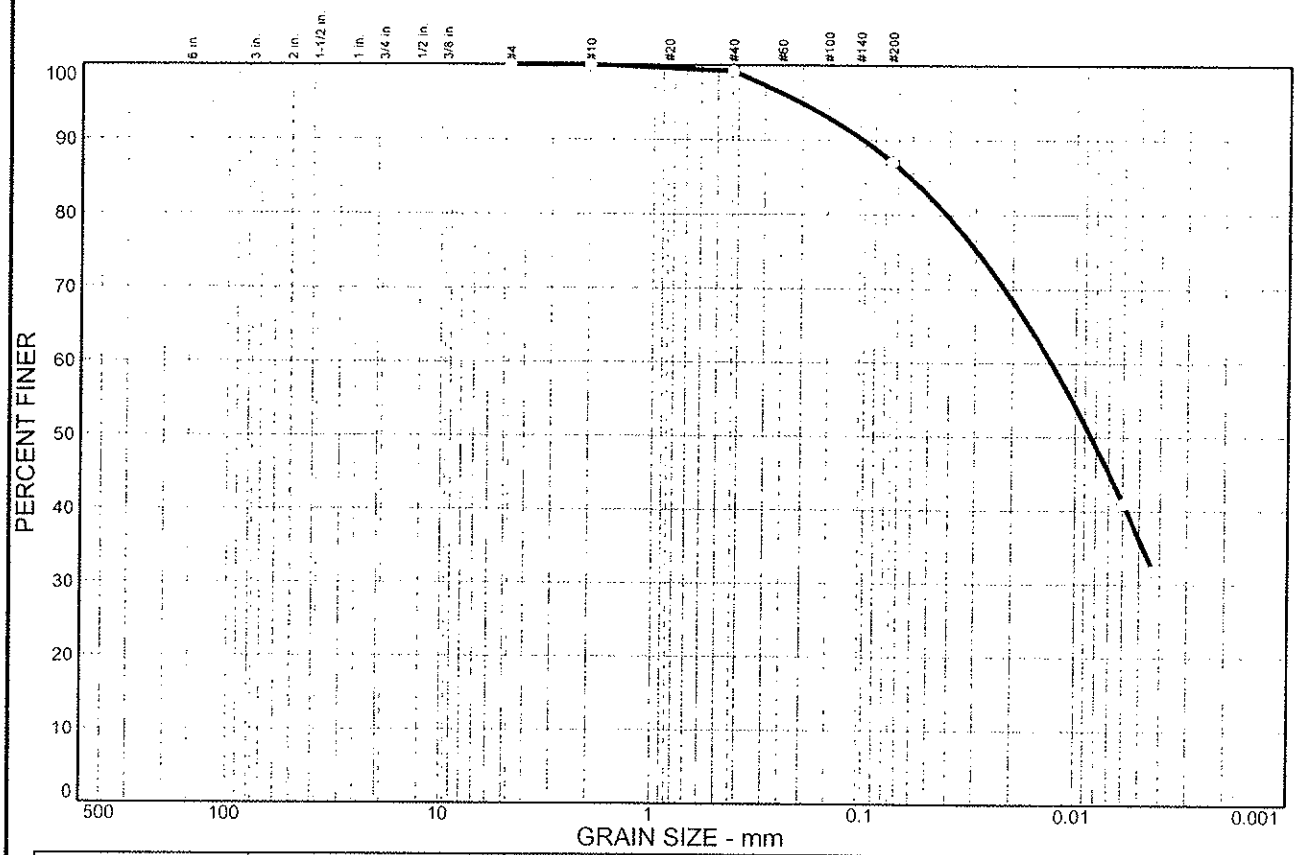
Sample No.: 7 **Source of Sample:** W-DLZ-9 **Date:** 10/31/06
Location: **Elev./Depth:** 16

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.8	12.1	51.0	36.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#40	99.2		
#200	87.1		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 17 LL= 26 PI= 9

Coefficients

D_{85}= 0.0616 D_{60}= 0.0130 D_{50}= 0.0084
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(6)

Remarks

Moisture Content= 25.3%

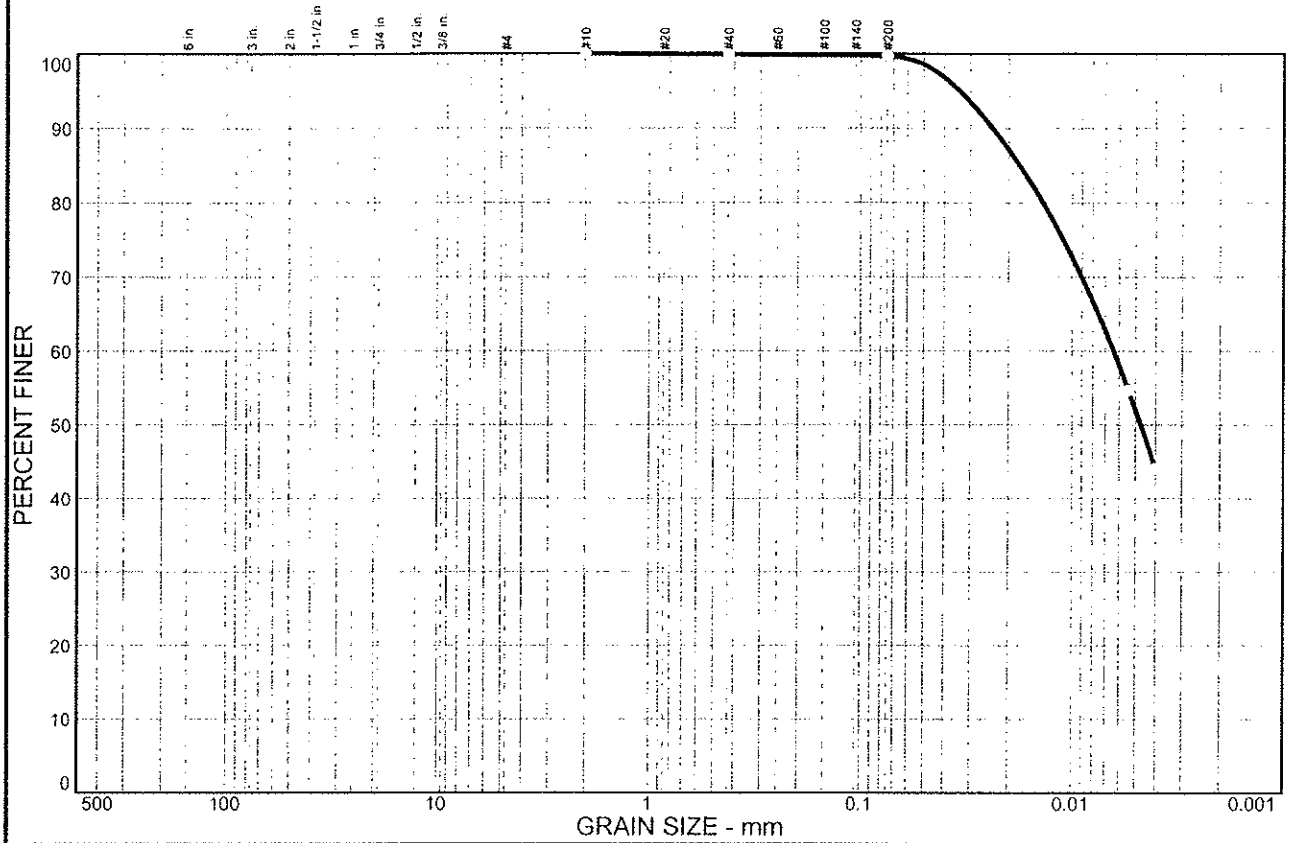
Sample No.: 9 **Source of Sample:** W-DLZ-9 **Date:** 10/31/06
Location: **Elev./Depth:** 21

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.1	0.2	47.7	52.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.9		
#200	99.7		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 20 LL= 33 PI= 13

Coefficients

D_{85}= 0.0177 D_{60}= 0.0064 D_{50}= 0.0047
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(13)

Remarks

Moisture Content= 25.9%

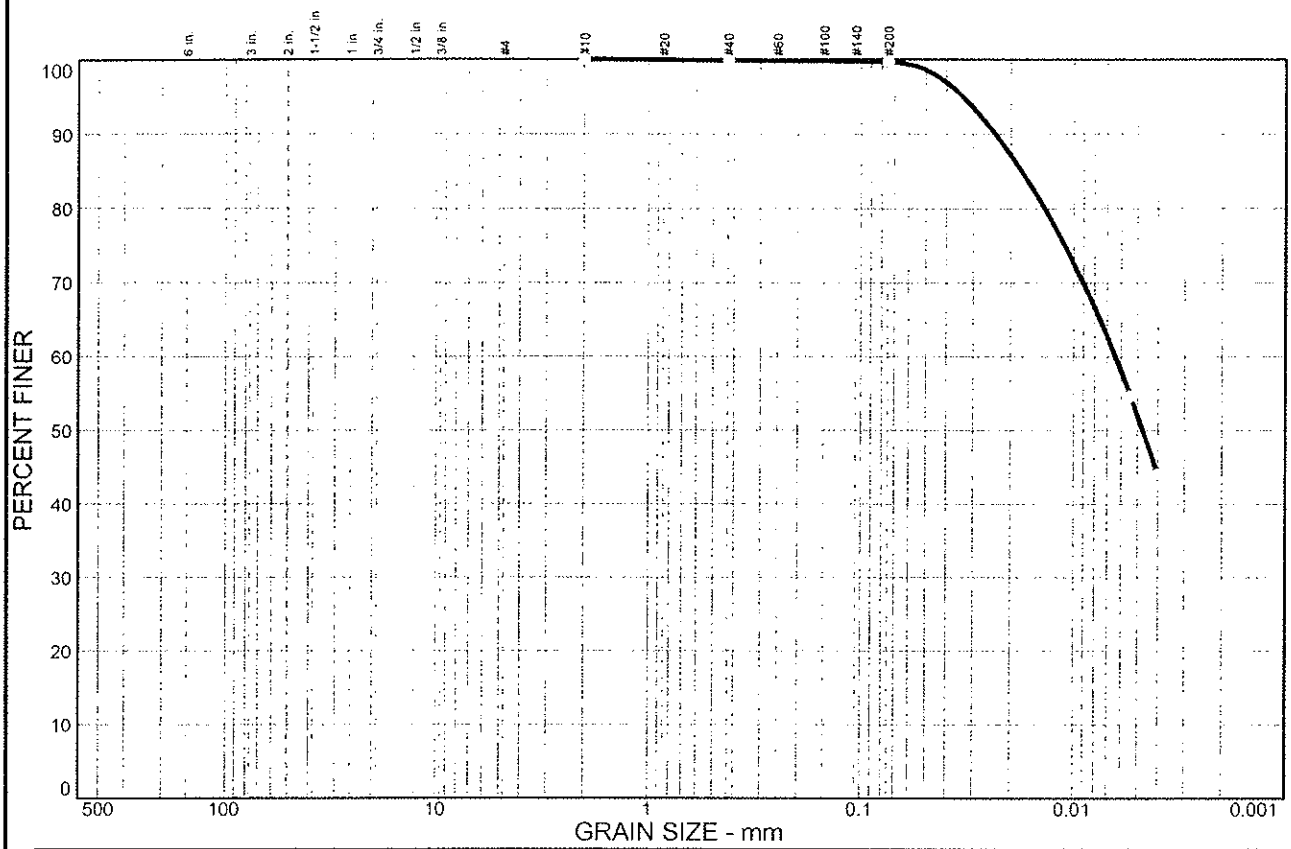
Sample No.: P-1 **Source of Sample:** W-DLZ-9 **Date:** 11/09/06
Location: **Elev./Depth:** 48.0

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.1	0.2	47.7	52.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.9		
#200	99.7		

* (no specification provided)

Soil Description

Lean clay

Atterberg Limits

PL= 20 LL= 33 PI= 13

Coefficients

D_{85}= 0.0177 D_{60}= 0.0064 D_{50}= 0.0047
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(13)

Remarks

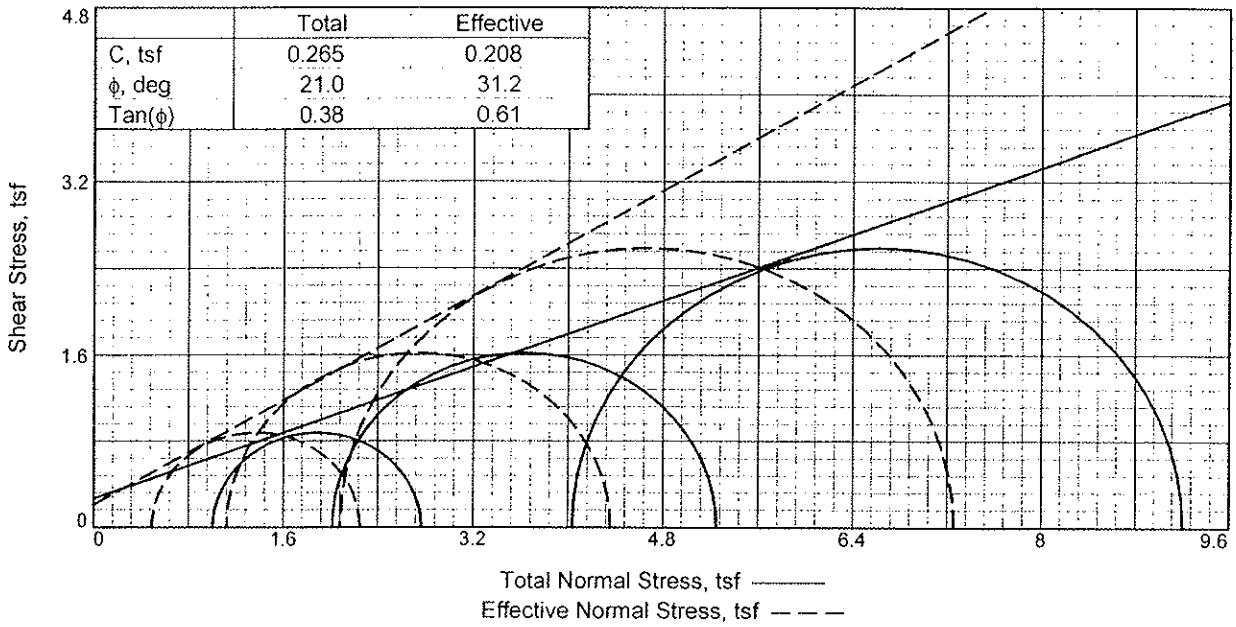
Moisture Content= 25.9%

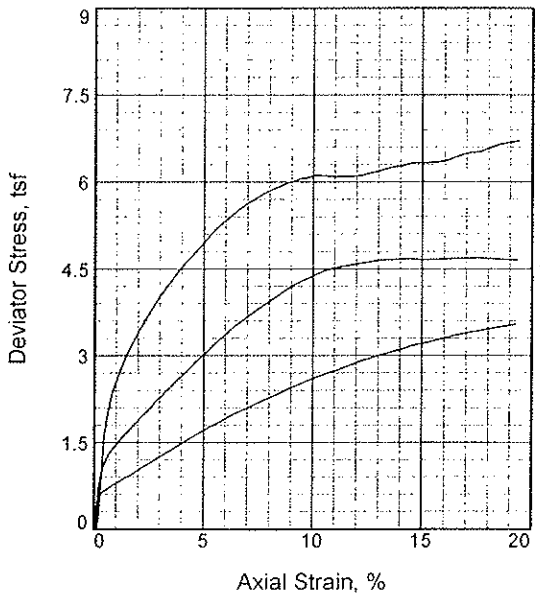
Sample No.: P-1 **Source of Sample:** W-DLZ-9 **Date:** 11/09/06
Location: **Elev./Depth:** 49.0

DLZ

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls

Project No: 0422-1007.00 **Figure**





Sample No.		1	2	3
Initial	Water Content,	21.4	23.7	23.5
	Dry Density, pcf	109.0	103.9	108.1
	Saturation,	105.6	103.1	113.4
	Void Ratio	0.5459	0.6220	0.5591
	Diameter, in.	2.79	2.81	2.81
	Height, in.	5.59	5.58	5.55
At Test	Water Content,	20.0	21.1	19.4
	Dry Density, pcf	109.4	107.3	110.7
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.5407	0.5705	0.5225
	Diameter, in.	2.79	2.76	2.77
	Height, in.	5.59	5.58	5.55
Strain rate, in./min.		0.01	0.01	0.01
Back Pressure, tsf		4.03	4.03	4.03
Cell Pressure, tsf		5.04	6.05	8.06
Fail. Stress, tsf		1.76	3.23	5.18
Total Pore Pr., tsf		4.55	4.93	5.99
Ult. Stress, tsf		1.76	3.23	5.18
Total Pore Pr., tsf		4.55	4.93	5.99
$\bar{\sigma}_1$ Failure, tsf		2.25	4.36	7.26
$\bar{\sigma}_3$ Failure, tsf		0.49	1.12	2.08

Type of Test:
CU with Pore Pressures

Sample Type: 3" Press Tube

Description: @ 88.0'; 24" Press Tube - 24" recovery.

Assumed Specific Gravity= 2.7

Remarks:

Client: Ohio Department of Transportation - District 12

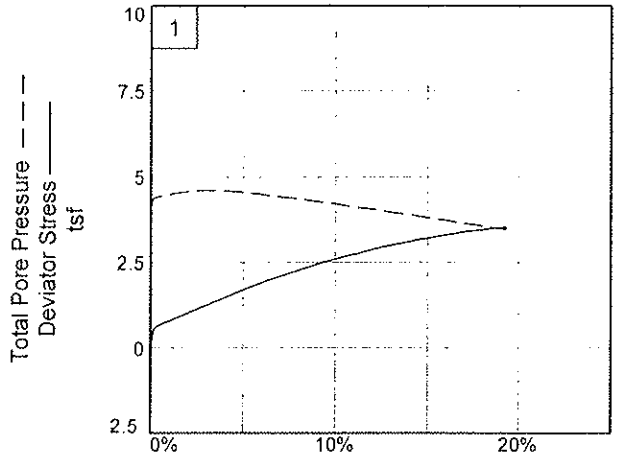
Project: ODOT Innerbelt - Retaining Walls

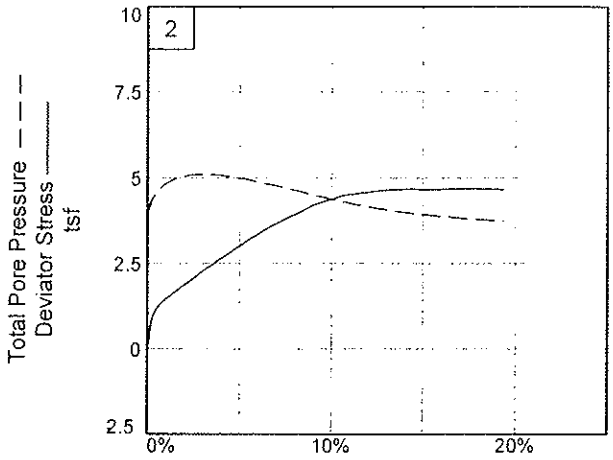
Source of Sample: W-DLZ-1 **Depth:** 88.0

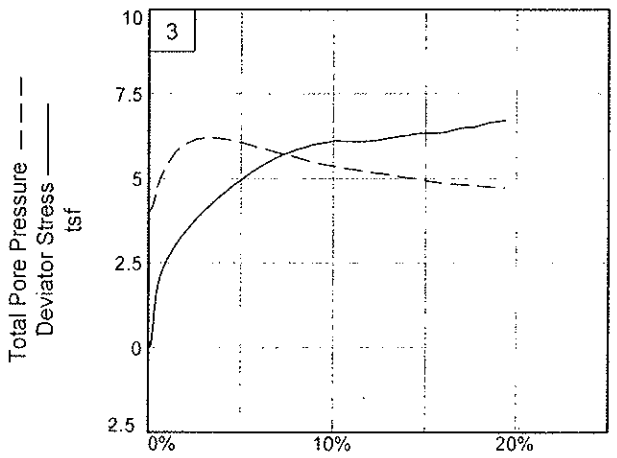
Proj. No.: 0422-1007.00 **Date:**

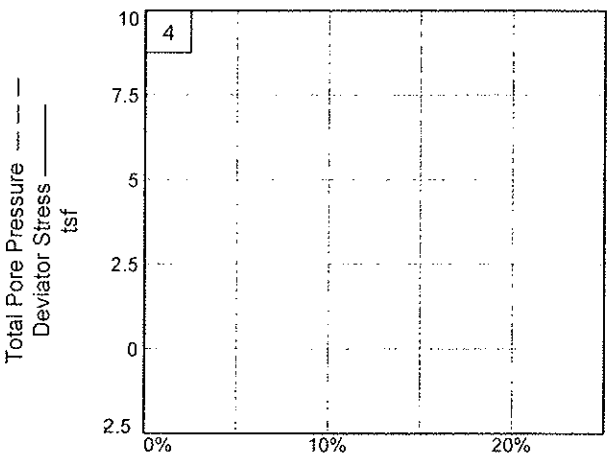
DLZ

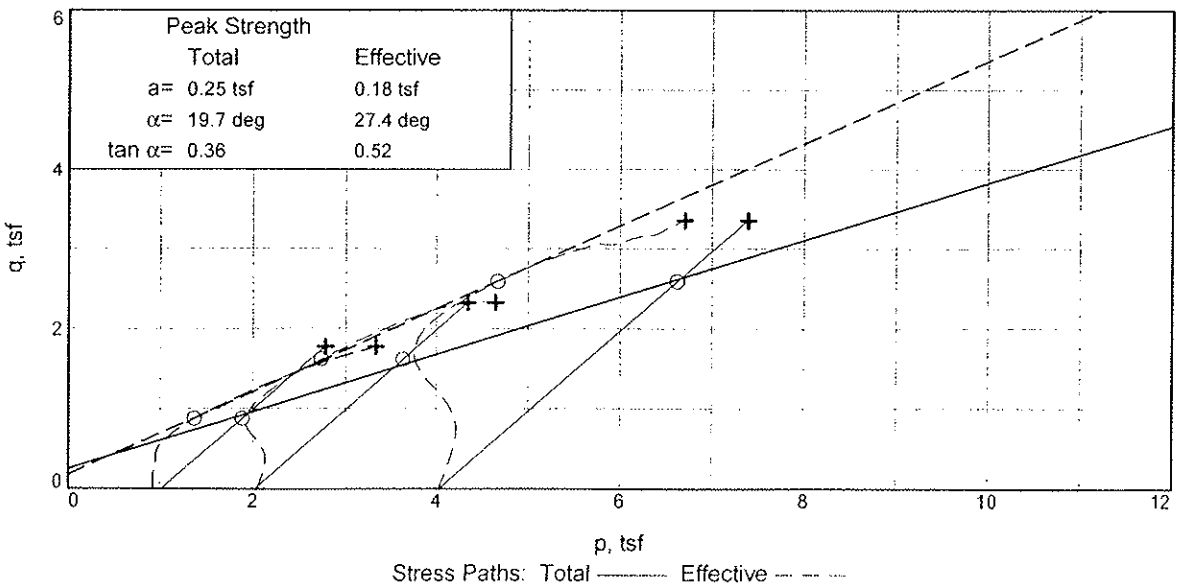
Figure _____





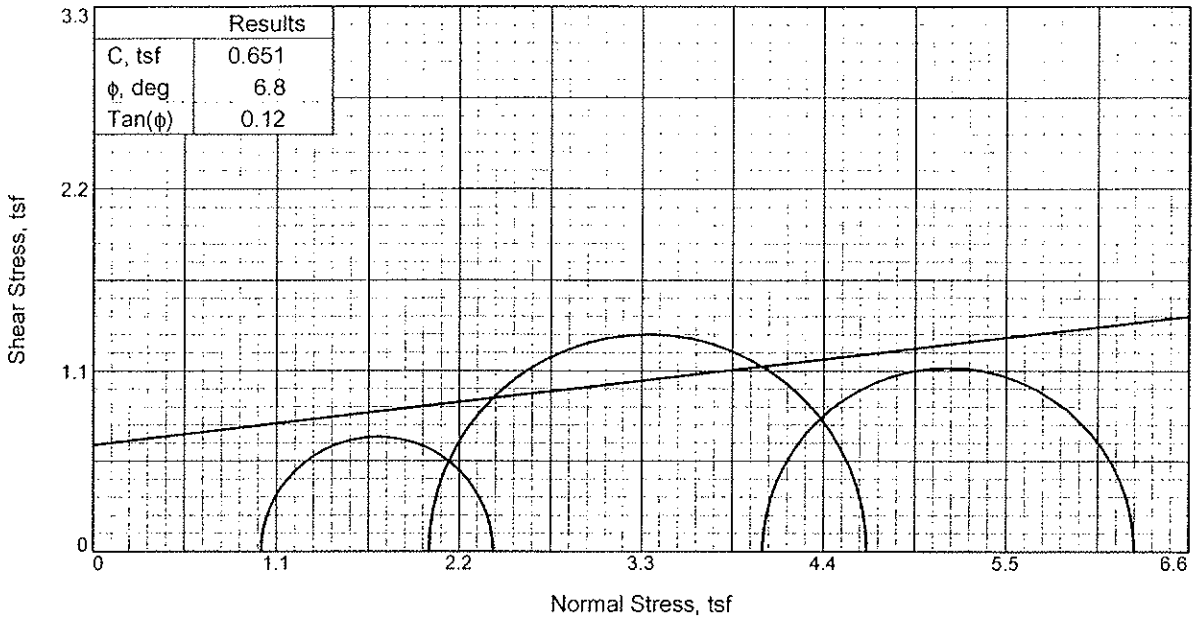


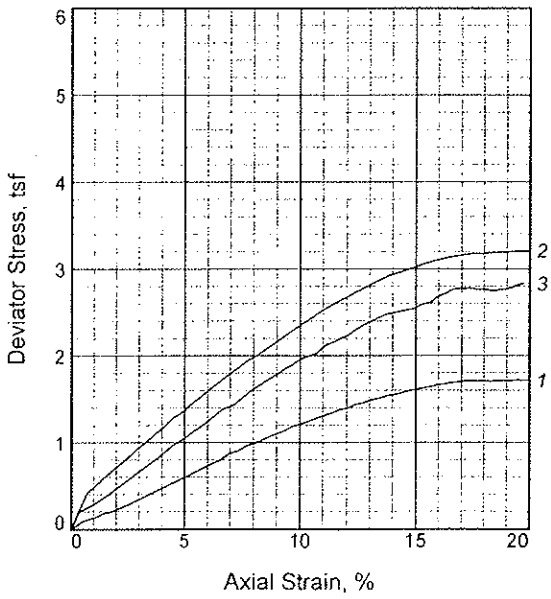




Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls
Source of Sample: W-DLZ-1 **Depth:** 88.0
Project No.: 0422-1007.00 **Figure** _____

DLZ, INC.





Sample No.		1	2	3
Initial	Water Content,	19.8	19.8	20.0
	Dry Density, pcf	112.6	112.1	112.6
	Saturation,	107.7	106.2	108.6
	Void Ratio	0.4965	0.5039	0.4963
	Diameter, in.	2.81	2.82	2.82
	Height, in.	5.58	5.60	5.57
At Test	Water Content,	21.3	19.9	20.0
	Dry Density, pcf	112.6	112.1	112.6
	Saturation,	115.7	106.7	109.1
	Void Ratio	0.4965	0.5039	0.4963
	Diameter, in.	2.81	2.82	2.82
	Height, in.	5.58	5.60	5.57
Strain rate, in./min.		0.06	0.06	0.06
Back Pressure, tsf		0.00	0.00	0.00
Cell Pressure, tsf		1.01	2.02	4.03
Fail. Stress, tsf		1.40	2.64	2.24
Ult. Stress, tsf		1.40	2.64	2.24
σ_1 Failure, tsf		2.40	4.66	6.27
σ_3 Failure, tsf		1.01	2.02	4.03

Type of Test:
Unconsolidated Undrained

Sample Type: 3" press tube

Description: Lean clay

LL= 28 **PL=** 16 **PI=** 12

Assumed Specific Gravity= 2.7

Remarks:

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

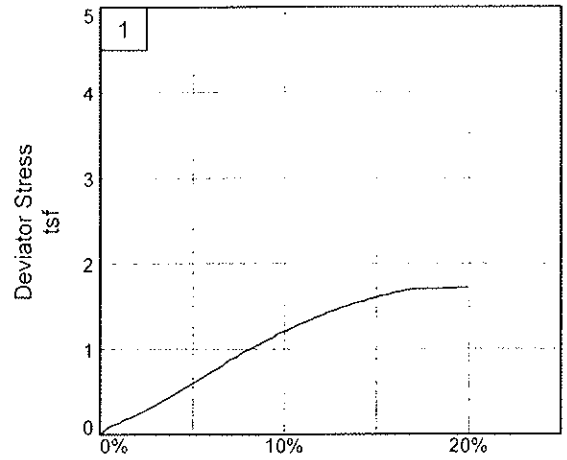
Source of Sample: W-DLZ-2 **Depth:** 68.0

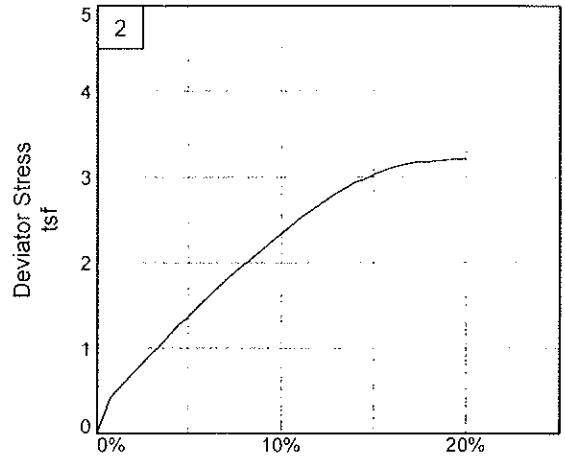
Sample Number: P-1

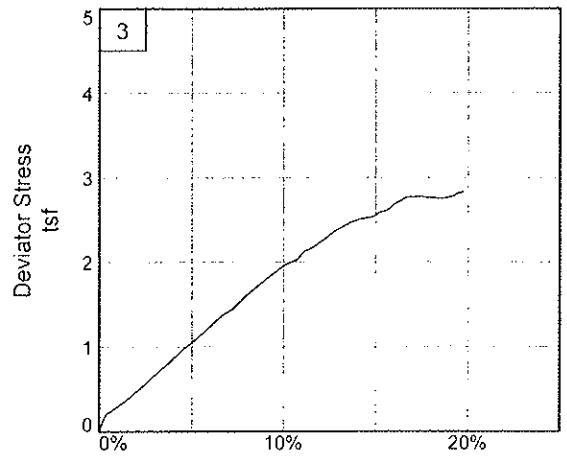
Proj. No.: 0422-1007.00 **Date:** 11/09/06

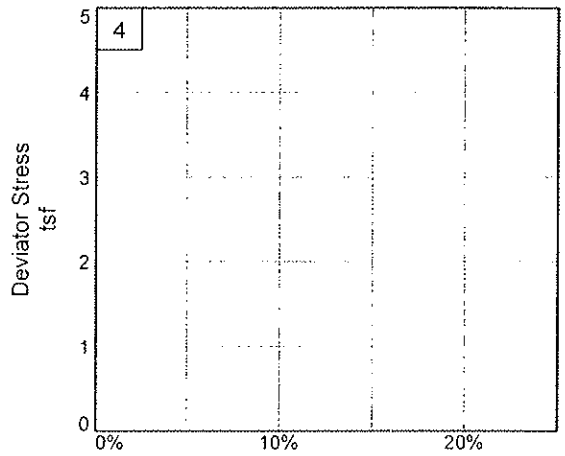
DLZ

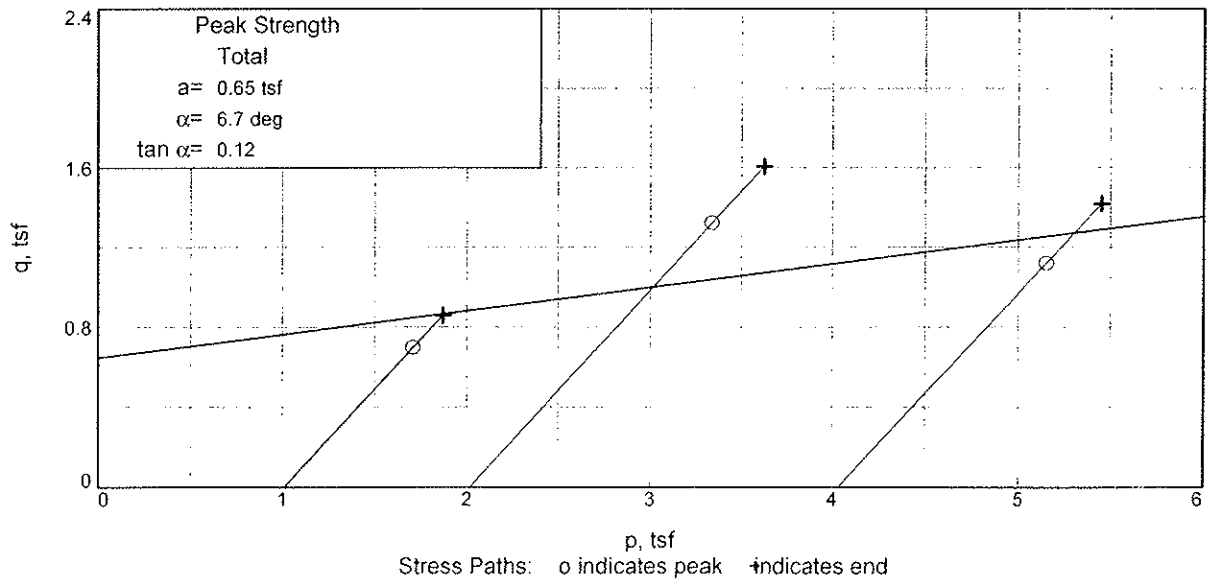
Figure _____







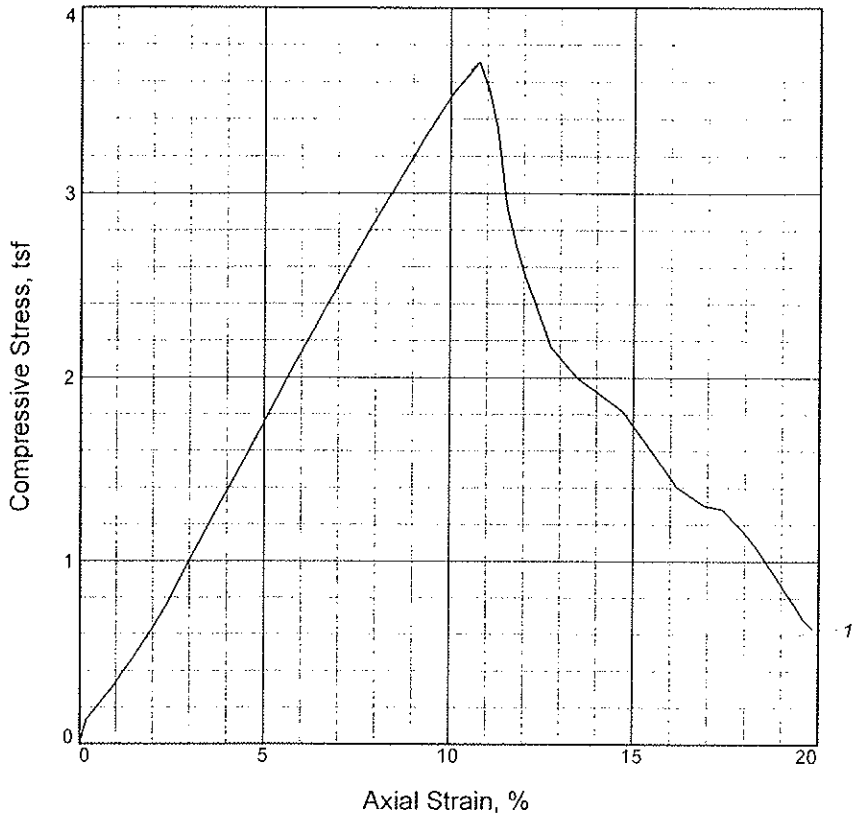




Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls
Source of Sample: W-DLZ-2 **Depth:** 68.0 **Sample Number:** P-1
Project No.: 0422-1007.00 **Figure** _____

DLZ, INC.

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	3.708			
Undrained shear strength, tsf	1.854			
Failure strain,	10.8			
Strain rate, in./min.	0.06			
Water content, %	19.0			
Wet density, pcf	136.0			
Dry density, pcf	114.3			
Saturation, %	107.9			
Void ratio	0.4746			
Specimen diameter, in.	2.82			
Specimen height, in.	5.57			
Height/diameter ratio	1.97			

Description: Lean clay

LL = 28	PL = 18	PI = 10	**Assumed GS=** 2.7	**Type:** 3" Press tube

Project No.: 0422-1007 00

Date: 11/09/06

Remarks:

Figure _____

Client: Ohio Department of Transportation - District 12

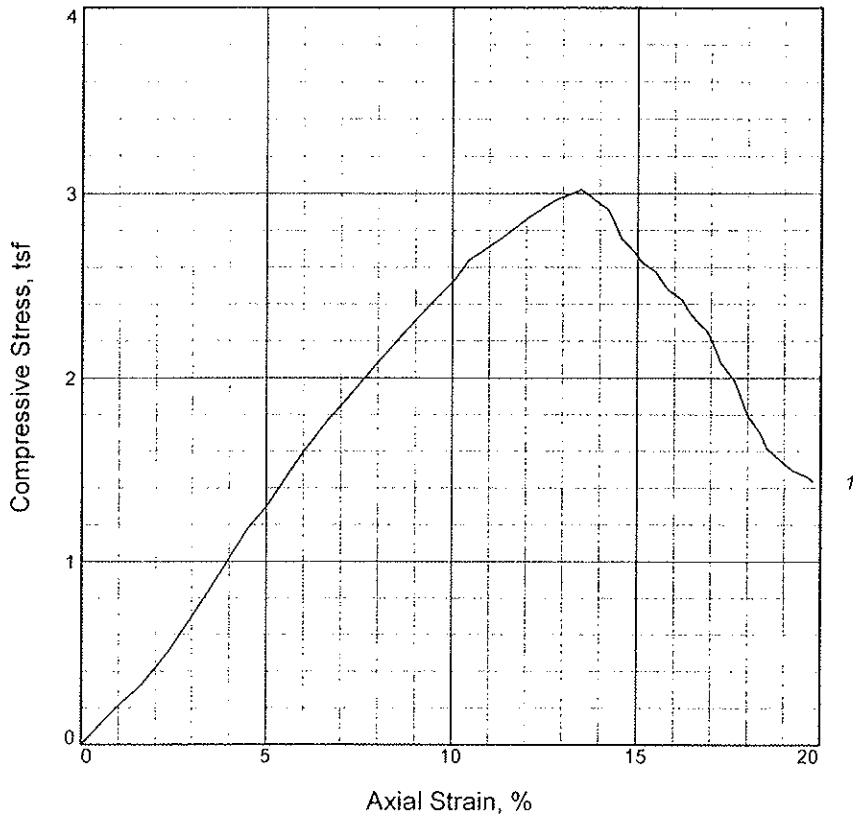
Project: ODOT Innerbelt - Retaining Walls

Source of Sample: W-DLZ-3 **Depth:** 53.5

Sample Number: P-1

DLZ

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	3.019			
Undrained shear strength, tsf	1.509			
Failure strain,	13.5			
Strain rate, in./min.	0.06			
Water content, %	20.2			
Wet density, pcf	134.9			
Dry density, pcf	112.2			
Saturation, %	108.6			
Void ratio	0.5023			
Specimen diameter, in.	2.81			
Specimen height, in.	5.56			
Height/diameter ratio	1.98			

Description: Lean clay

LL = 28	PL = 18	PI = 10	**Assumed GS=** 2.7	**Type:** 3" Press Tube

Project No.: 0422-1007 00

Date: 11/09/06

Remarks:

Client: Ohio Department of Transportation - District 12

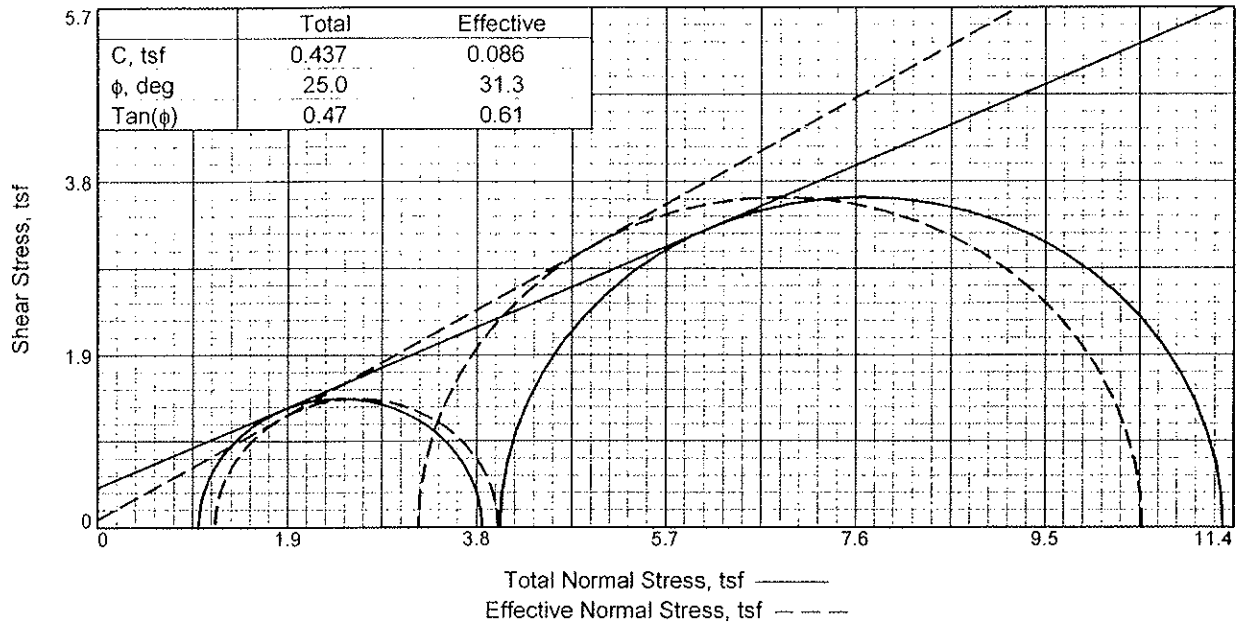
Project: ODOT Innerbelt - Retaining Walls

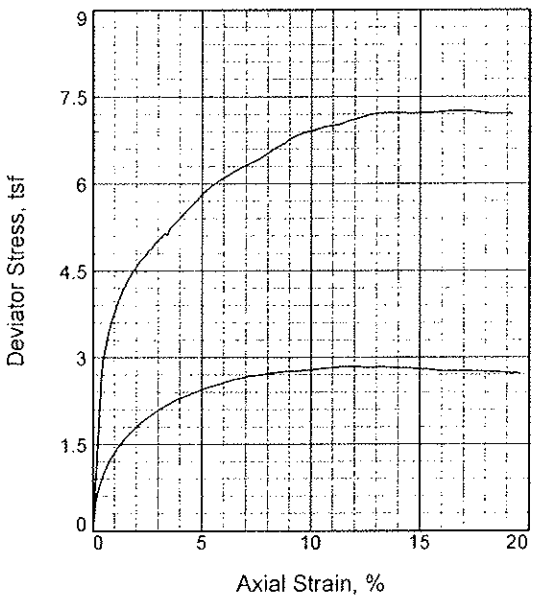
Source of Sample: W-DLZ-3 **Depth:** 53.5

Sample Number: P-1

Figure _____

DLZ





Sample No.		1	2
Initial	Water Content,	25.9	24.2
	Dry Density, pcf	101.2	105.0
	Saturation,	105.0	108.2
	Void Ratio	0.6653	0.6046
	Diameter, in.	2.82	2.82
	Height, in.	5.49	5.35
At Test	Water Content,	22.8	21.7
	Dry Density, pcf	104.4	106.3
	Saturation,	100.0	100.0
	Void Ratio	0.6150	0.5862
	Diameter, in.	2.77	2.80
	Height, in.	5.49	5.35
Strain rate, in./min.		0.01	0.01
Back Pressure, tsf		4.0	4.0
Cell Pressure, tsf		5.0	8.1
Fail. Stress, tsf		2.8	7.3
Total Pore Pr., tsf		3.9	4.9
Ult. Stress, tsf			
Total Pore Pr., tsf			
$\bar{\sigma}_1$ Failure, tsf		4.0	10.5
$\bar{\sigma}_3$ Failure, tsf		1.2	3.2

Type of Test:
CU with Pore Pressures
Sample Type: 3" Press Tube
Description: Silt

LL= 22 **PL=** 20 **PI=** 2
Assumed Specific Gravity= 2.7
Remarks:

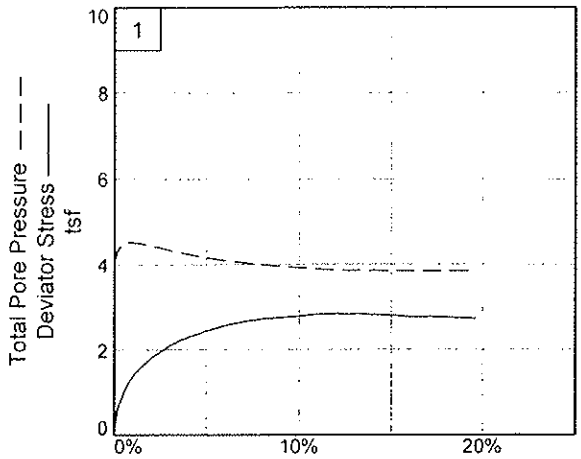
Client: Ohio Department of Transportation - District 12

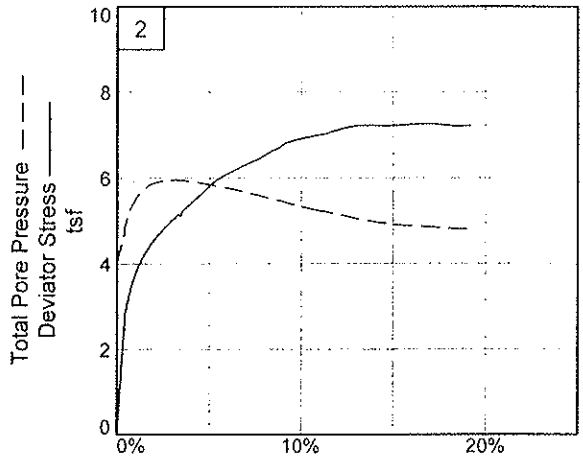
Project: ODOT Innerbelt - Retaining Walls

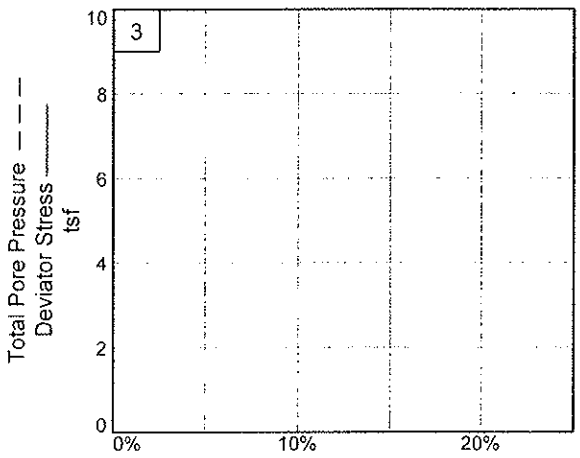
Source of Sample: W-DLZ-4 **Depth:** 33.0
Sample Number: P-1

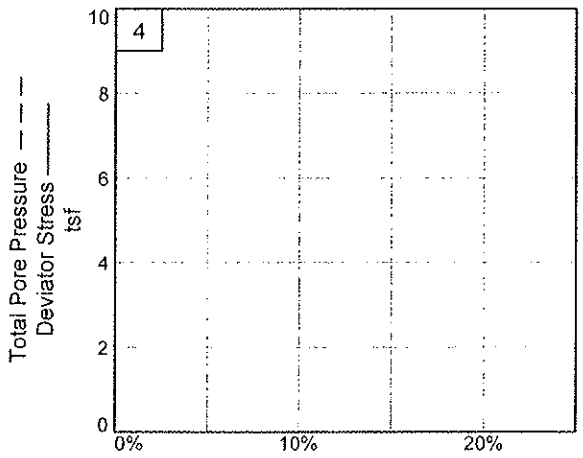
Proj. No.: 0422-1007 00 **Date:** 11/09/06

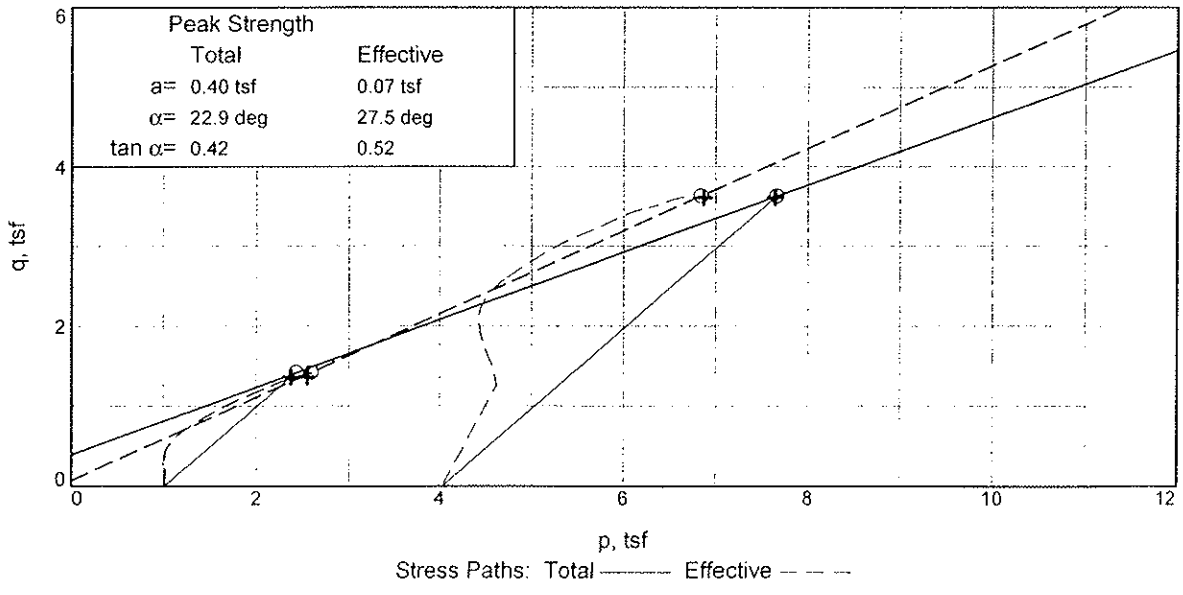
Figure _____







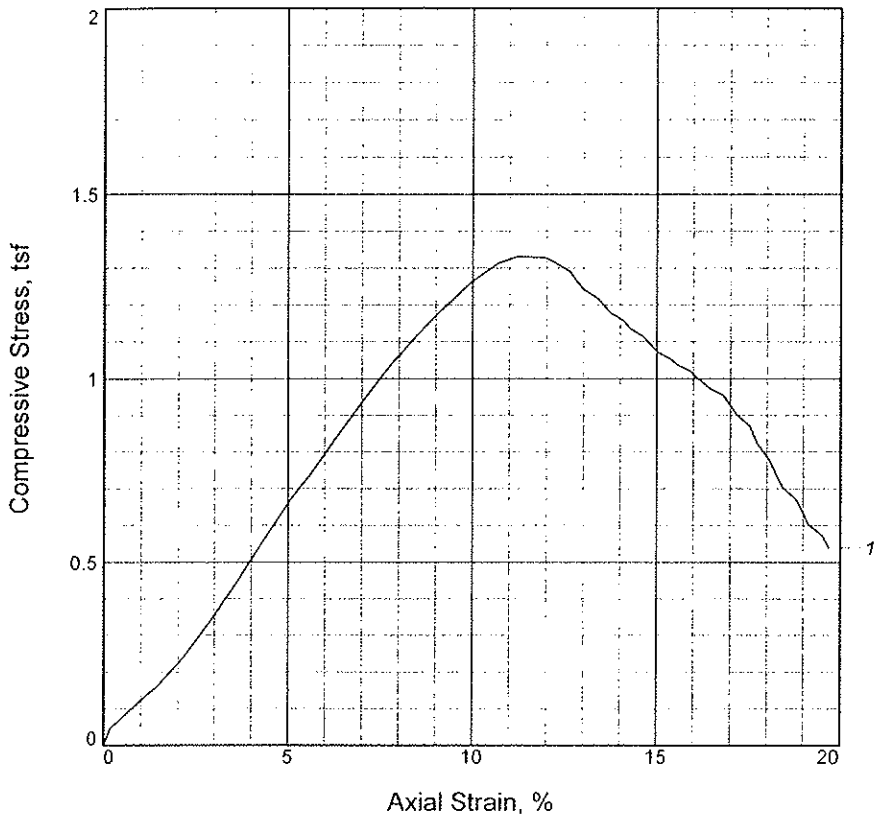




Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls
Source of Sample: W-DLZ-4 **Depth:** 33.0 **Sample Number:** P-1
Project No.: 0422-1007.00 **Figure** _____

DLZ, INC.

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	1.331			
Undrained shear strength, tsf	0.666			
Failure strain,	11.2			
Strain rate, in./min.	0.06			
Water content, %	24.5			
Wet density, pcf	129.5			
Dry density, pcf	104.0			
Saturation, %	106.6			
Void ratio	0.6213			
Specimen diameter, in.	2.79			
Specimen height, in.	5.53			
Height/diameter ratio	1.98			

Description: Lean clay

LL = 28	PL = 17	PI = 11	Assumed GS= 2.7	Type: 3" Press Tube

Project No.: 0422-1007.00

Date: 11/09/06

Remarks:

Figure _____

Client: Ohio Department of Transportation - District 12

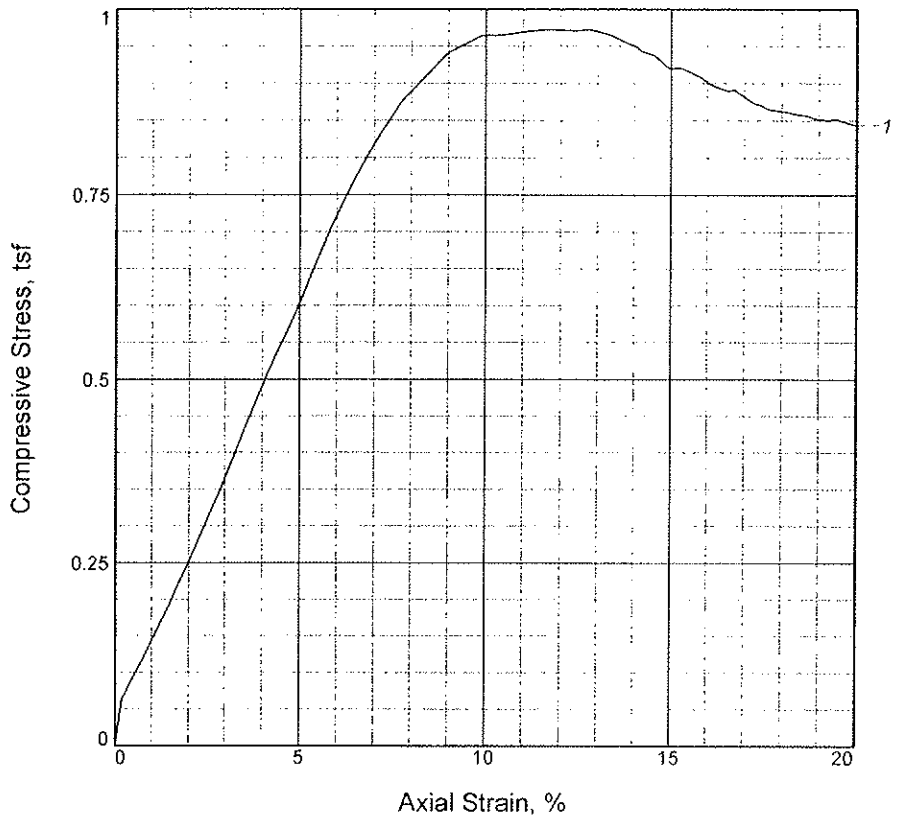
Project: ODOT Innerbelt - Retaining Walls

Source of Sample: W-DLZ-4 **Depth:** 73

Sample Number: P-2

DLZ

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	0.973			
Undrained shear strength, tsf	0.486			
Failure strain,	11.7			
Strain rate, in./min.	0.06			
Water content, %	24.3			
Wet density, pcf	128.7			
Dry density, pcf	103.6			
Saturation, %	104.4			
Void ratio	0.6277			
Specimen diameter, in.	2.78			
Specimen height, in.	5.56			
Height/diameter ratio	2.00			

Description: Lean clay

LL = 28	**PL** = 17	**PI** = 11	**Assumed GS**= 2.7	**Type:** 3" Press Tube

Project No.: 0422-1007 00

Date: 11/09/06

Remarks:

Client: Ohio Department of Transportation - District 12

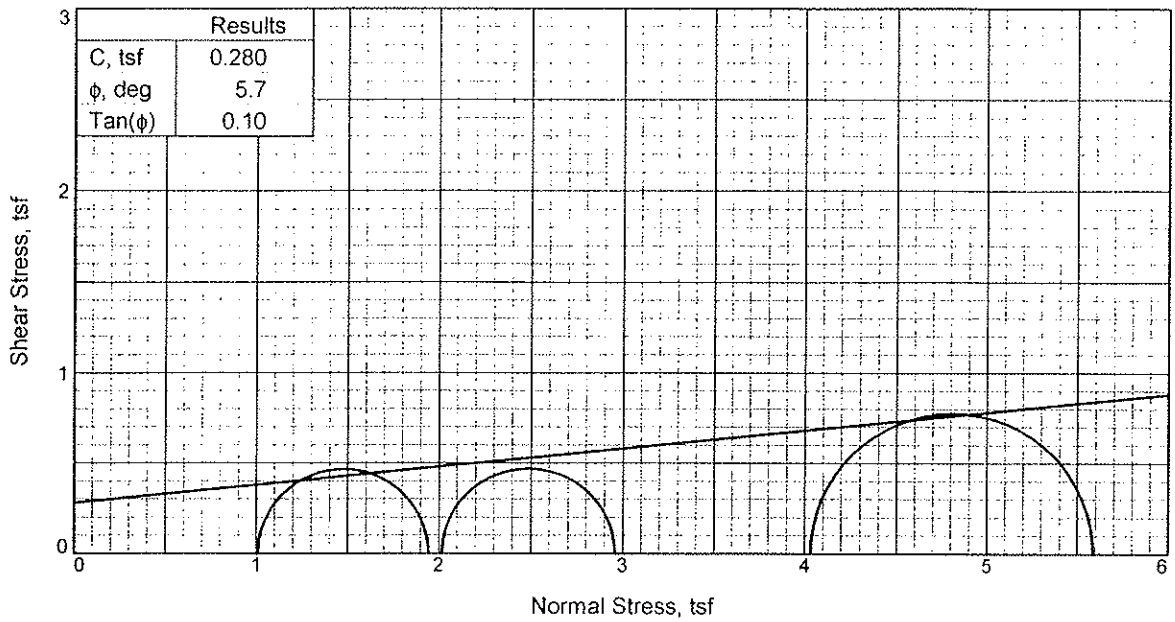
Project: ODOT Innerbelt - Retaining Walls

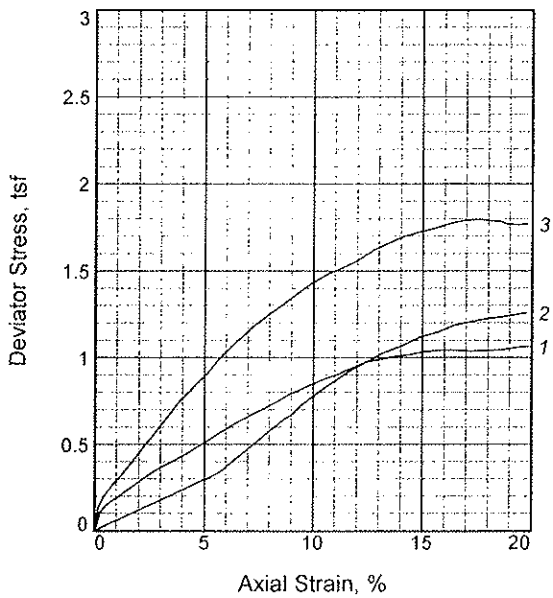
Source of Sample: W-DLZ-4 **Depth:** 74

Sample Number: P-2

Figure _____

DLZ





Sample No.		1	2	3
Initial	Water Content,	28.4	30.7	31.6
	Dry Density, pcf	100.1	93.9	98.9
	Saturation,	112.0	104.3	121.4
	Void Ratio	0.6845	0.7949	0.7034
	Diameter, in.	2.78	2.81	2.76
	Height, in.	5.46	4.97	5.53
At Test	Water Content,	27.7	29.8	26.7
	Dry Density, pcf	100.1	93.9	98.9
	Saturation,	109.5	101.4	102.5
	Void Ratio	0.6845	0.7949	0.7034
	Diameter, in.	2.78	2.81	2.76
	Height, in.	5.46	4.97	5.53
Strain rate, in./min.		0.06	0.06	0.06
Back Pressure, tsf		0.00	0.00	0.00
Cell Pressure, tsf		1.01	2.02	4.03
Fail. Stress, tsf		0.93	0.94	1.55
Ult. Stress, tsf		0.93	0.94	1.55
σ_1 Failure, tsf		1.94	2.96	5.59
σ_3 Failure, tsf		1.01	2.02	4.03

Type of Test:
Unconsolidated Undrained

Sample Type: 3" Press tube

Description: Lean clay

LL= 38 **PL=** 19 **PI=** 19

Assumed Specific Gravity= 2.7

Remarks:

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

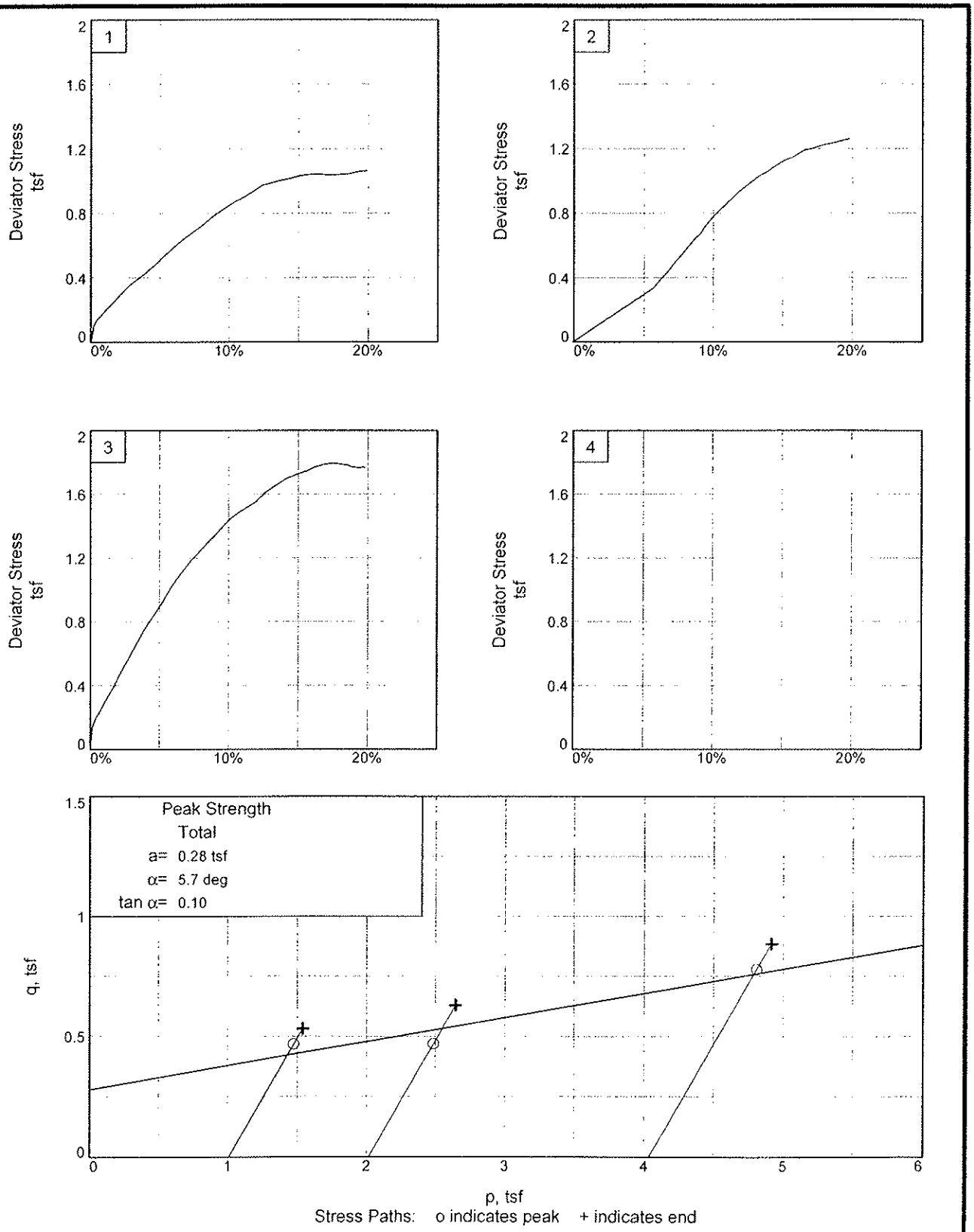
Source of Sample: W-DLZ-5 **Depth:** 40

Sample Number: P-1

Proj. No.: 0422-1007 00 **Date:** 11/09/06

DLZ

Figure _____



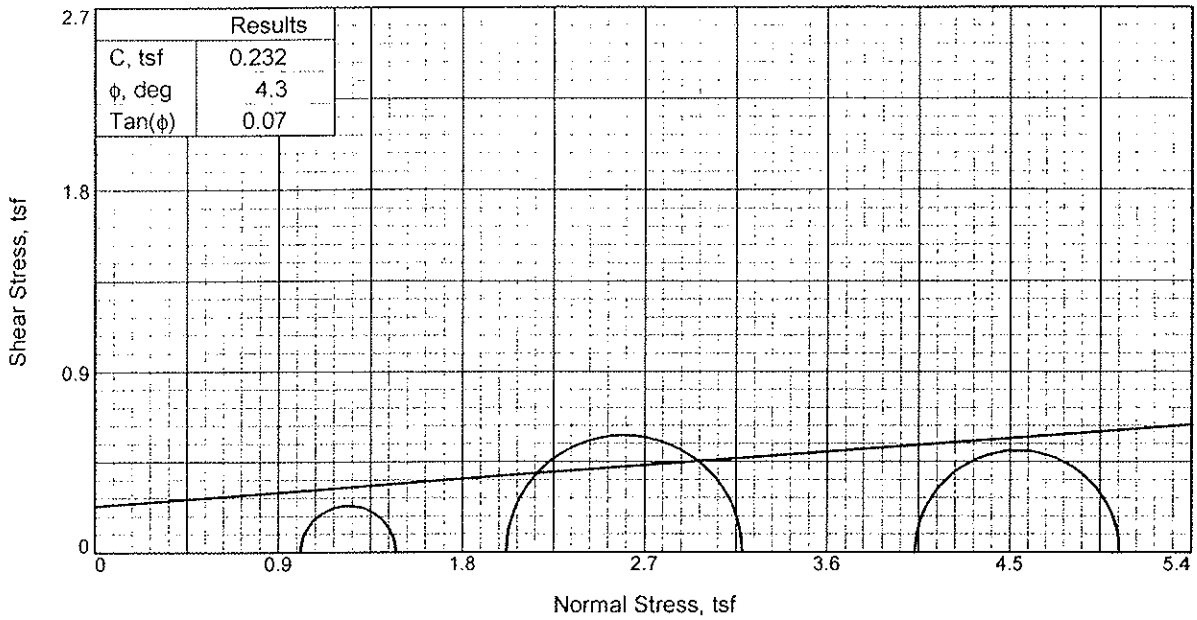
Client: Ohio Department of Transportation - District 12

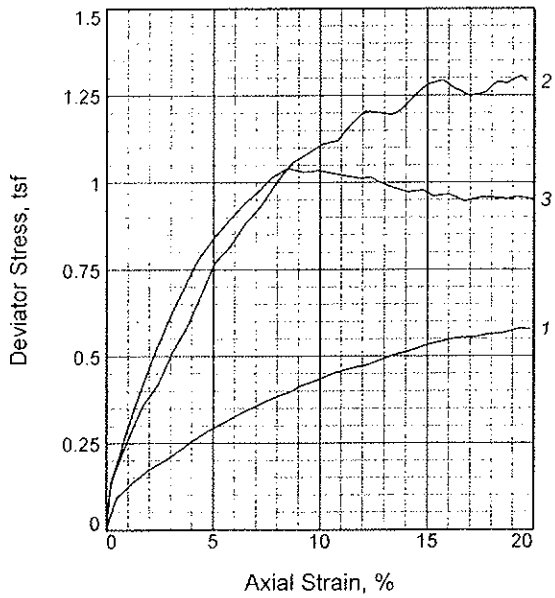
Project: ODOT Innerbelt - Retaining Walls

Source of Sample: W-DLZ-5 **Depth:** 40 **Sample Number:** P-1

Project No.: 0422-1007.00 **Figure** _____

DLZ, INC.





Sample No.		1	2	3
Initial	Water Content,	25.6	26.2	25.1
	Dry Density, pcf	105.4	99.3	101.4
	Saturation,	115.5	101.4	102.4
	Void Ratio	0.5985	0.6972	0.6627
	Diameter, in.	2.83	2.82	2.83
	Height, in.	5.31	5.55	5.56
At Test	Water Content,	26.6	26.3	26.2
	Dry Density, pcf	105.4	99.3	101.4
	Saturation,	120.2	101.9	106.6
	Void Ratio	0.5985	0.6972	0.6627
	Diameter, in.	2.83	2.82	2.83
	Height, in.	5.31	5.55	5.56
Strain rate, in./min.		0.06	0.06	0.06
Back Pressure, tsf		0.00	0.00	0.00
Cell Pressure, tsf		1.01	2.02	4.03
Fail. Stress, tsf		0.46	1.16	1.01
Ult. Stress, tsf		0.46	1.16	1.01
σ_1 Failure, tsf		1.47	3.18	5.04
σ_3 Failure, tsf		1.01	2.02	4.03

Type of Test:
Unconsolidated Undrained

Sample Type: 3" Press Tube

Description: Lean clay

LL= 29 **PL=** 19 **PI=** 10

Assumed Specific Gravity= 2.7

Remarks:

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

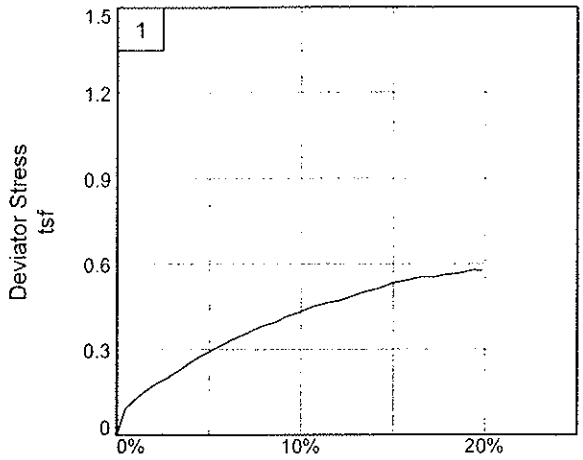
Source of Sample: W-DLZ-6 **Depth:** 48.0

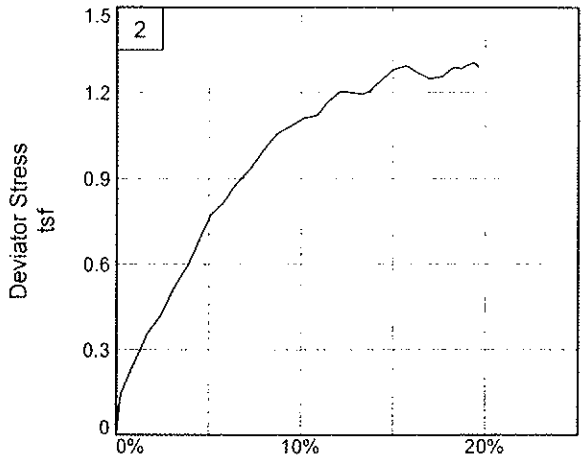
Sample Number: P-1

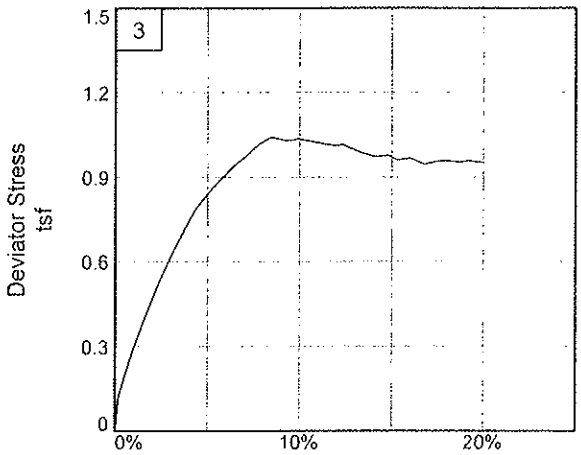
Proj. No.: 0422-1007.00 **Date:** 11/09/06

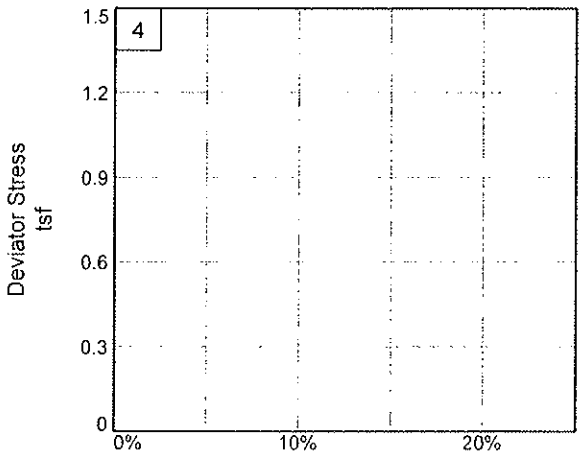
DLZ

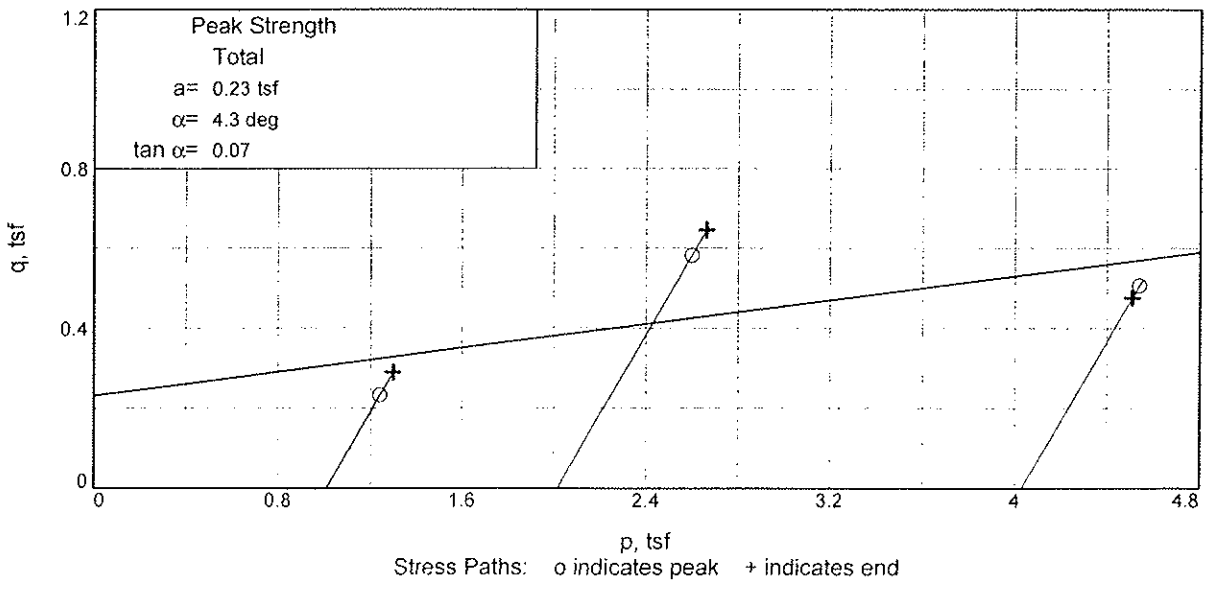
Figure _____





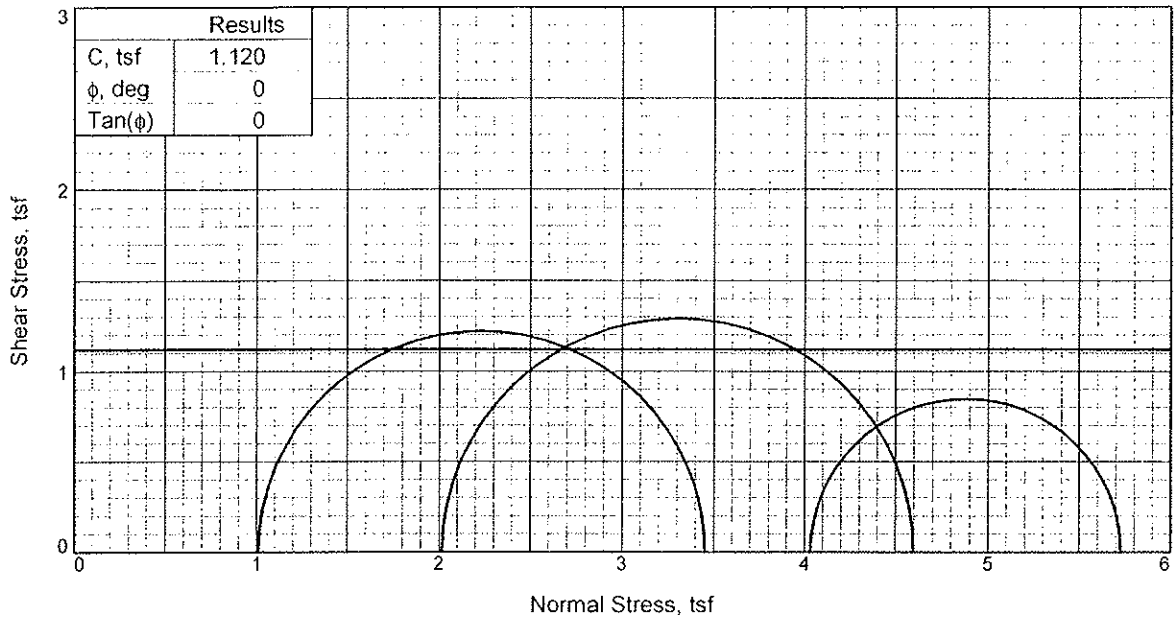


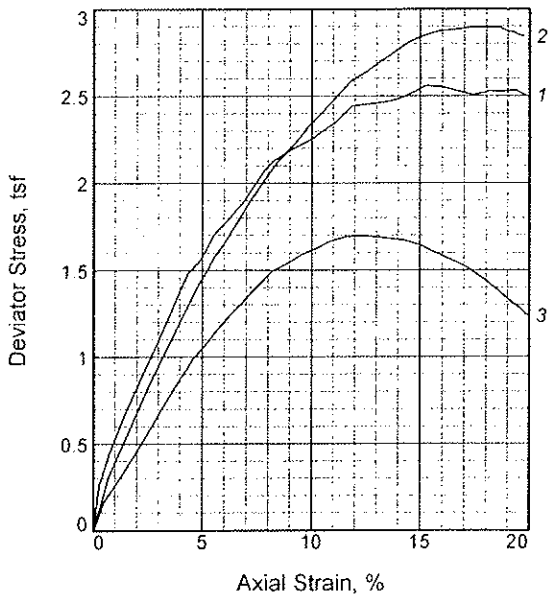




Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls
Source of Sample: W-DLZ-6 **Depth:** 48.0 **Sample Number:** P-1
Project No.: 0422-1007.00 **Figure** _____

DLZ, INC.





Sample No.		1	2	3
Initial	Water Content,	22.3	21.7	21.4
	Dry Density, pcf	107.4	108.4	109.4
	Saturation,	105.6	105.8	106.7
	Void Ratio	0.5690	0.5547	0.5409
	Diameter, in.	2.83	2.85	2.85
	Height, in.	5.58	5.59	5.57
At Test	Water Content,	22.0	21.8	23.3
	Dry Density, pcf	107.4	108.4	109.4
	Saturation,	104.5	105.9	116.5
	Void Ratio	0.5690	0.5547	0.5409
	Diameter, in.	2.83	2.85	2.85
	Height, in.	5.58	5.59	5.57
Strain rate, in./min.		0.06	0.06	0.06
Back Pressure, tsf		0.00	0.00	0.00
Cell Pressure, tsf		1.01	2.02	4.03
Fail. Stress, tsf		2.44	2.58	1.69
Ult. Stress, tsf		2.44	2.58	1.69
σ_1 Failure, tsf		3.45	4.60	5.73
σ_3 Failure, tsf		1.01	2.02	4.03

Type of Test:
Unconsolidated Undrained
Sample Type: 3" Press tube
Description: Lean clay

LL= 31 **PL=** 18 **PI=** 13
Assumed Specific Gravity= 2.7
Remarks:

Client: Ohio Department of Transportation - District 12

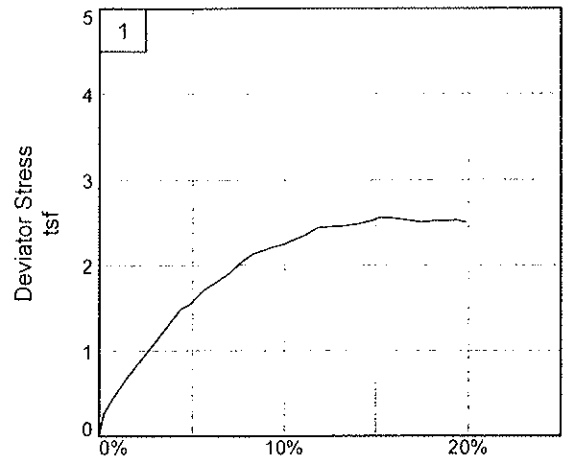
Project: ODOT Innerbelt - Retaining Walls

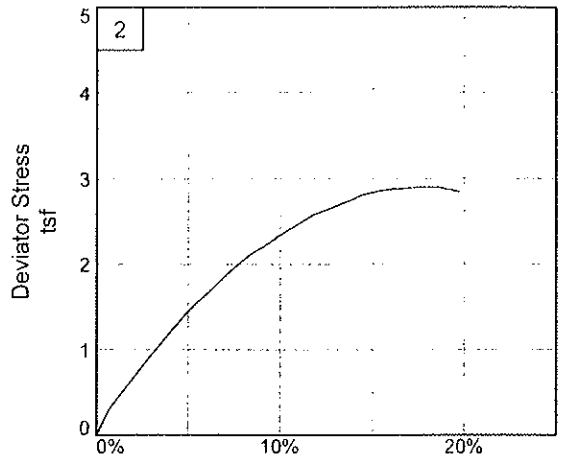
Source of Sample: W-DLZ-7 **Depth:** 38.0
Sample Number: P-1

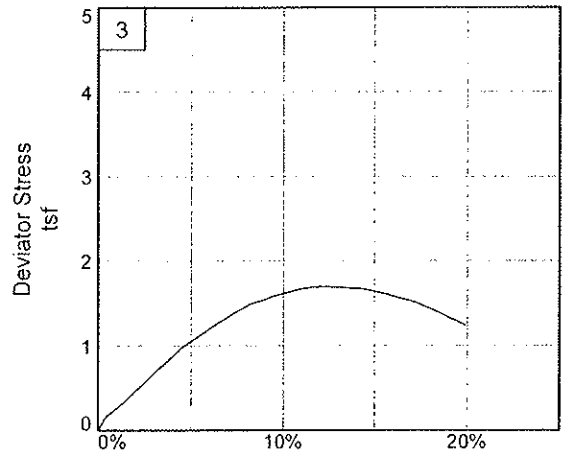
Proj. No.: 0422-1007 00 **Date:** 11/09/06

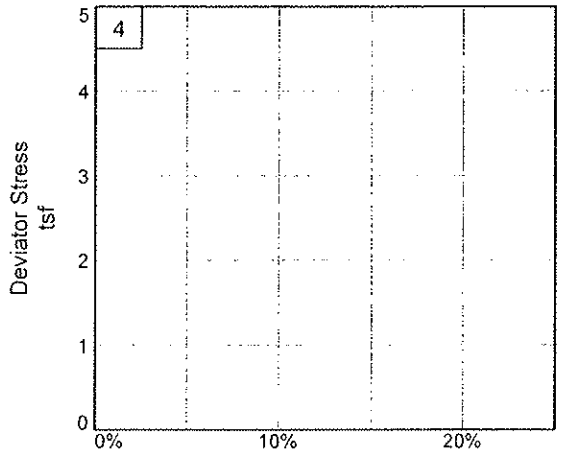
DLZ

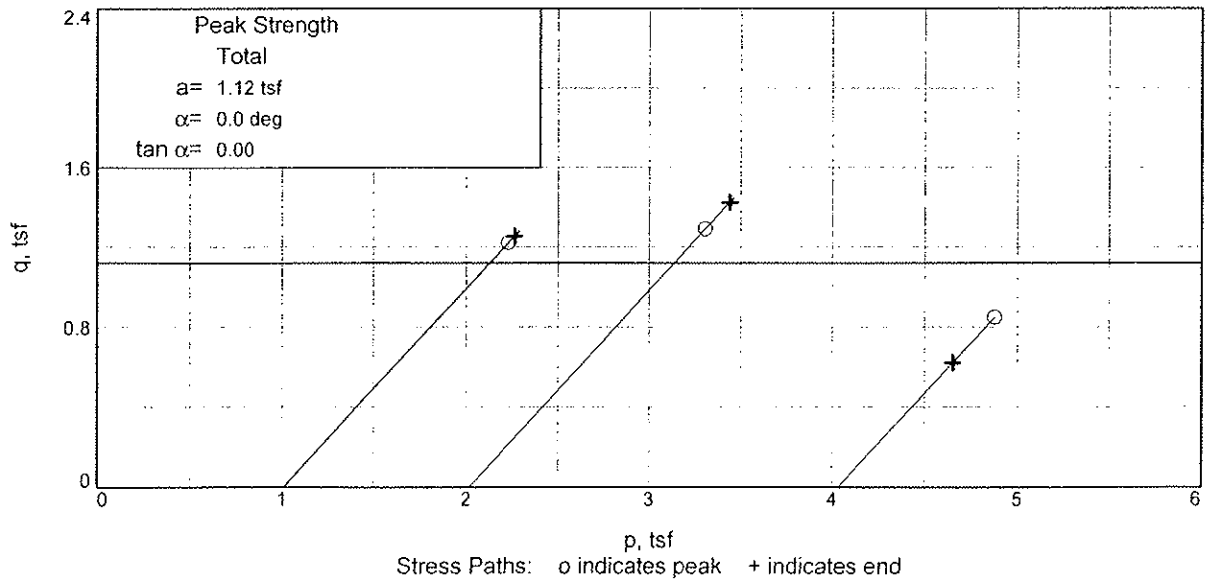
Figure _____









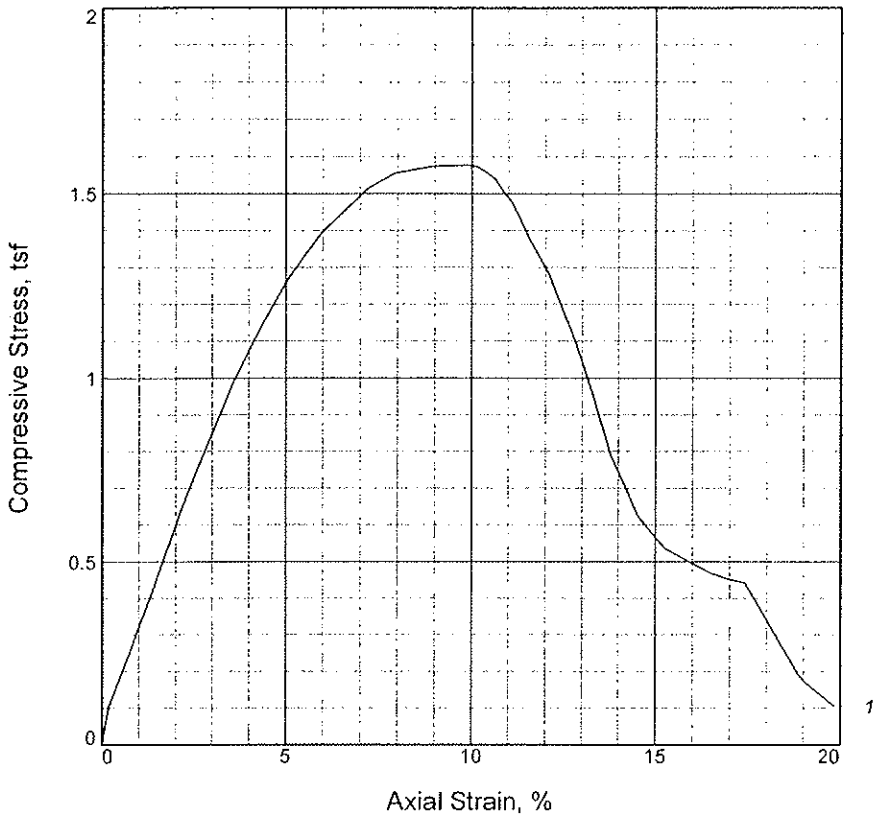


Stress Paths: o indicates peak + indicates end

Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls
Source of Sample: W-DLZ-7 **Depth:** 38.0 **Sample Number:** P-1
Project No.: 0422-1007.00 **Figure** _____

DLZ, INC.

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	1.577			
Undrained shear strength, tsf	0.788			
Failure strain,	9.9			
Strain rate, in./min.	0.06			
Water content, %	24.6			
Wet density, pcf	126.7			
Dry density, pcf	101.7			
Saturation, %	101.1			
Void ratio	0.6582			
Specimen diameter, in.	2.83			
Specimen height, in.	5.58			
Height/diameter ratio	1.97			

Description: Silty clay

LL = 25	PL = 20	PI = 5	Assumed GS= 2.7	Type: 3" Press Tube

Project No.: 0422-1007.00

Date: 11/09/06

Remarks:

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

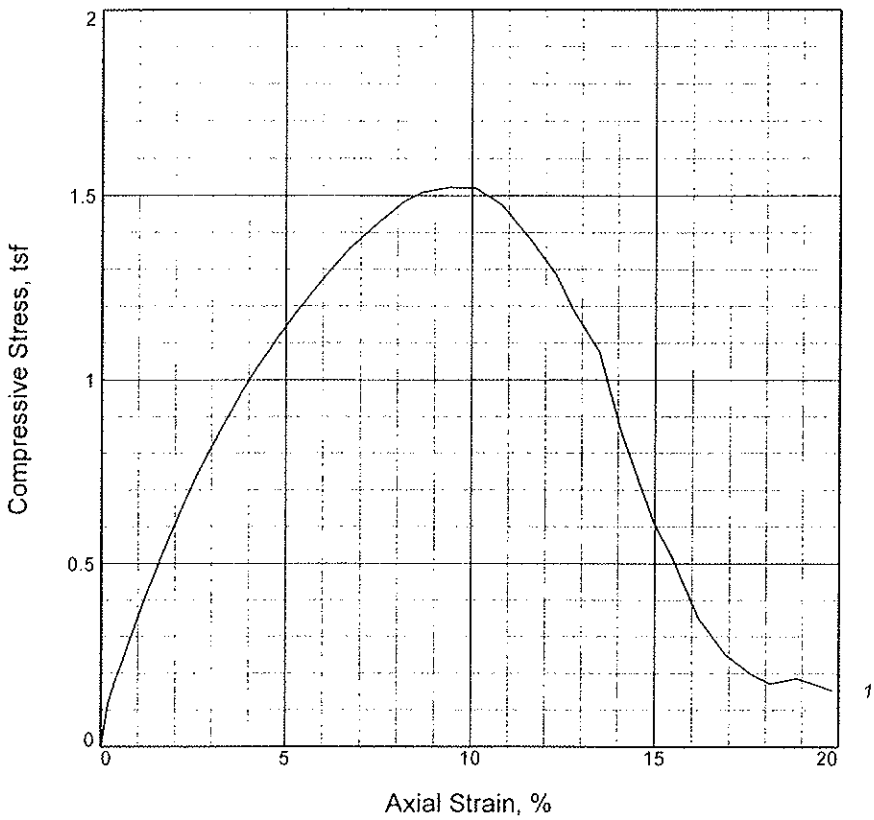
Source of Sample: W-DLZ-7 **Depth:** 63.0

Sample Number: P-2

Figure _____

DLZ

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	1.522			
Undrained shear strength, tsf	0.761			
Failure strain,	9.4			
Strain rate, in./min.	0.06			
Water content, %	25.2			
Wet density, pcf	126.9			
Dry density, pcf	101.4			
Saturation, %	102.4			
Void ratio	0.6630			
Specimen diameter, in.	2.82			
Specimen height, in.	5.59			
Height/diameter ratio	1.98			

Description: Silty clay

LL = 25	PL = 20	PI = 5	Assumed GS= 2.7	Type: 3" Press Tube

Project No.: 0422-1007 00

Date: 11/09/06

Remarks:

Client: Ohio Department of Transportation - District 12

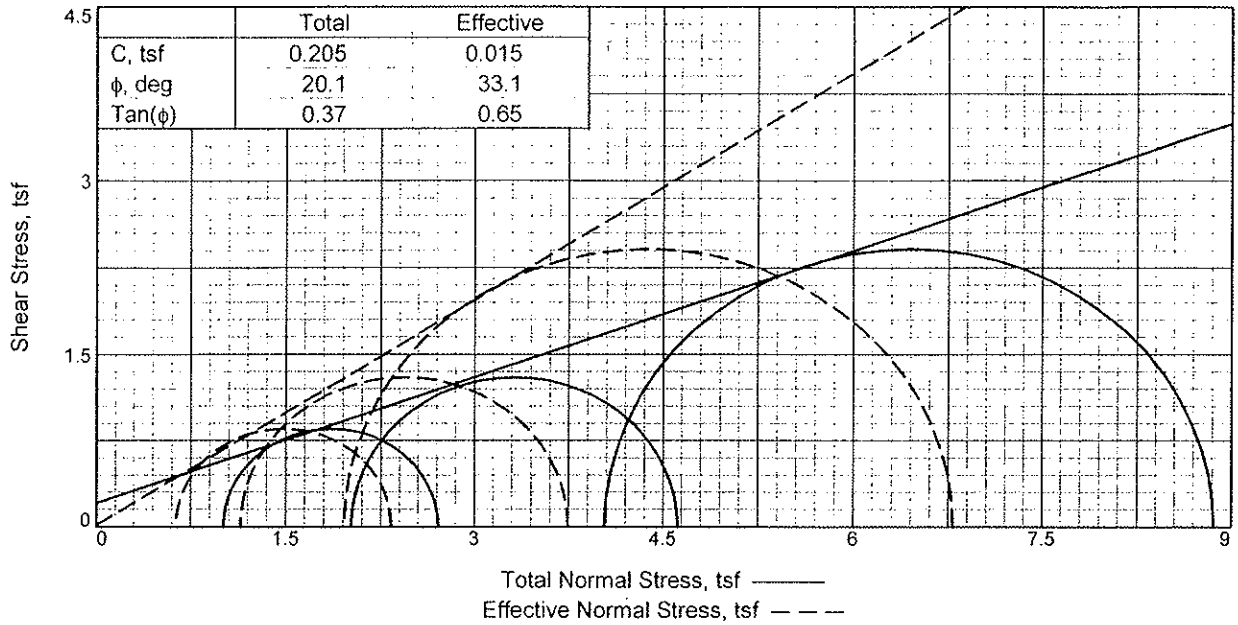
Project: ODOT Innerbelt - Retaining Walls

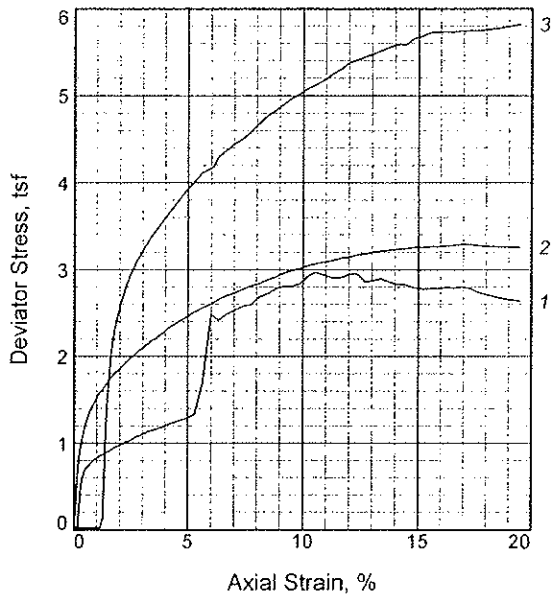
Source of Sample: W-DLZ-7 **Depth:** 64.0

Sample Number: P-2

Figure _____

DLZ





Sample No.		1	2	3
Initial	Water Content,	26.4	26.4	26.4
	Dry Density, pcf	100.6	103.5	101.1
	Saturation,	105.7	113.4	106.9
	Void Ratio	0.6755	0.6293	0.6674
	Diameter, in.	2.79	2.72	2.74
	Height, in.	5.55	5.54	5.53
At Test	Water Content,	25.4	23.7	21.0
	Dry Density, pcf	100.0	102.8	107.5
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6850	0.6401	0.5682
	Diameter, in.	2.79	2.73	2.66
	Height, in.	5.55	5.54	5.53
Strain rate, in./min.		0.01	0.01	0.01
Back Pressure, tsf		4.03	4.03	4.03
Cell Pressure, tsf		5.04	6.05	8.06
Fail. Stress, tsf		1.70	2.60	4.83
Total Pore Pr., tsf		4.41	4.91	6.11
Ult. Stress, tsf		1.70	2.60	4.83
Total Pore Pr., tsf		4.41	4.91	6.11
$\bar{\sigma}_1$ Failure, tsf		2.33	3.74	6.79
$\bar{\sigma}_3$ Failure, tsf		0.63	1.14	1.96

Type of Test:
CU with Pore Pressures
Sample Type: 3" Press Tube
Description: Lean clay

LL= 35 **PL=** 20 **PI=** 15
Assumed Specific Gravity= 2.7
Remarks:

Client: Ohio Department of Transportation - District 12

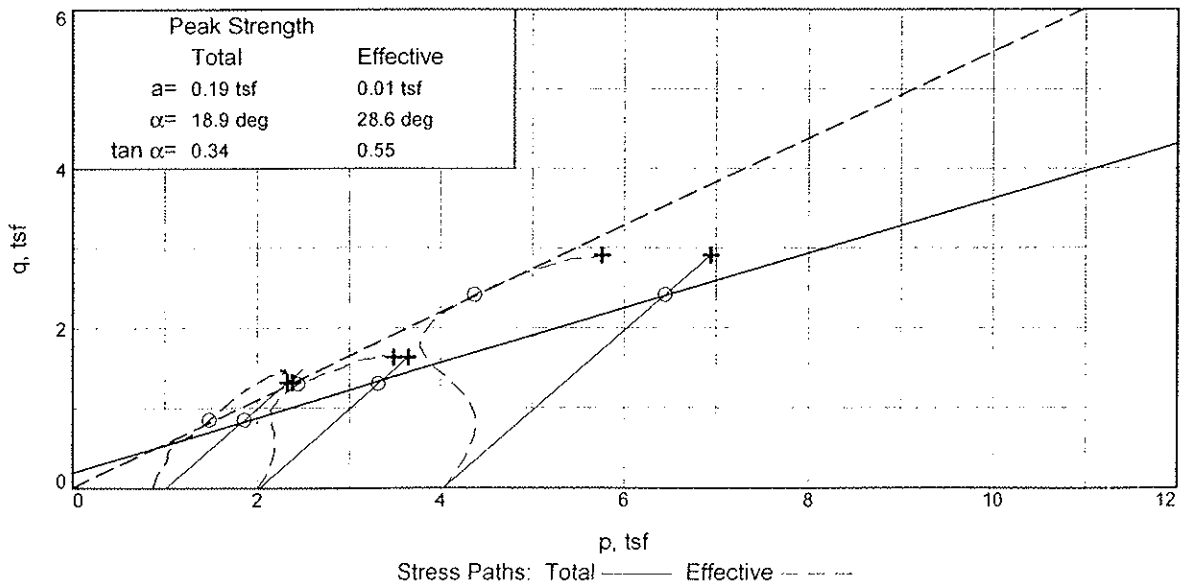
Project: ODOT Innerbelt - Retaining Walls

Source of Sample: W-DLZ-8 **Depth:** 38.0
Sample Number: P-1

Proj. No.: 0422-1007.00 **Date:** 11/09/06

DLZ

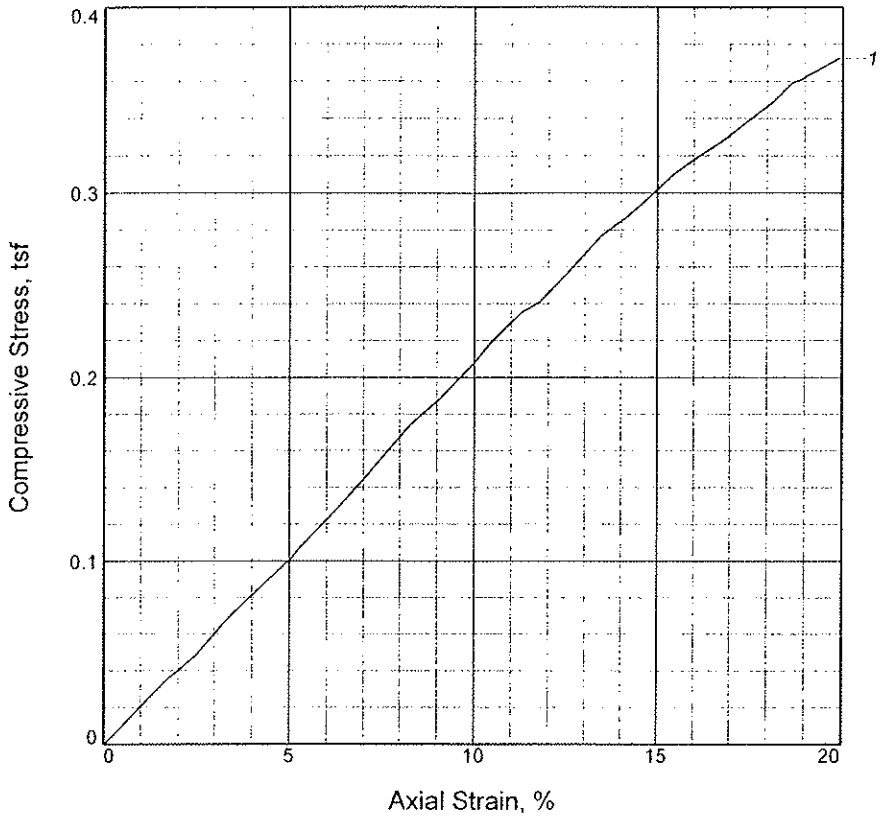
Figure _____



Client: Ohio Department of Transportation - District 12
Project: ODOT Innerbelt - Retaining Walls
Source of Sample: W-DLZ-8 **Depth:** 38.0 **Sample Number:** P-1
Project No.: 0422-1007.00 **Figure** _____

DLZ, INC.

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	0.241			
Undrained shear strength, tsf	0.120			
Failure strain,	11.7			
Strain rate, in./min.	0.06			
Water content, %	31.7			
Wet density, pcf	126.5			
Dry density, pcf	96.0			
Saturation, %	113.4			
Void ratio	0.7554			
Specimen diameter, in.	2.80			
Specimen height, in.	5.48			
Height/diameter ratio	1.96			

Description: Lean clay

LL = 42	**PL** = 22	**PI** = 20	**Assumed GS**= 2.7	**Type:** 3'Press Tube

Project No.: 0422-1007.00

Date: 11/09/06

Remarks:

Figure _____

Client: Ohio Department of Transportation - District 12

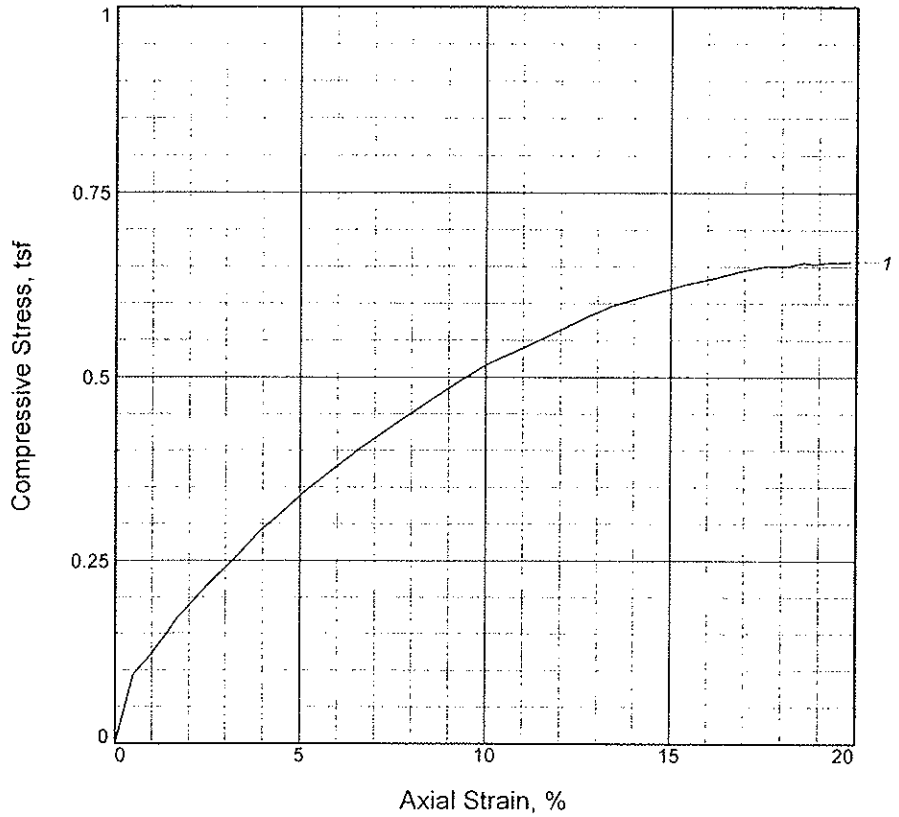
Project: ODOT Innerbelt - Retaining Walls

Source of Sample: W-DLZ-8 **Depth:** 78.0

Sample Number: P-2

DLZ

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	0.564			
Undrained shear strength, tsf	0.282			
Failure strain,	12.0			
Strain rate, in./min.	0.06			
Water content, %	29.4			
Wet density, pcf	125.9			
Dry density, pcf	97.3			
Saturation, %	108.4			
Void ratio	0.7329			
Specimen diameter, in.	2.79			
Specimen height, in.	5.55			
Height/diameter ratio	1.99			

Description: Lean clay

LL = 42	**PL** = 22	**PI** = 20	**Assumed GS**= 2.7	**Type:** 3"Press Tube

Project No.: 0422-1007 00

Date: 11/09/06

Remarks:

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

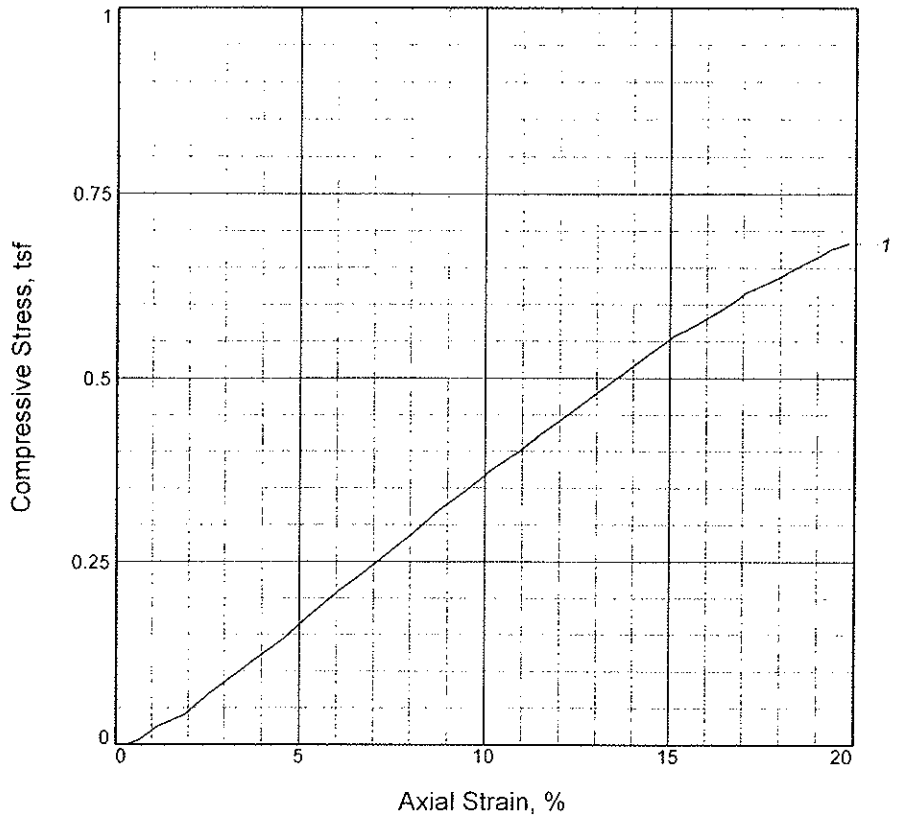
Source of Sample: W-DLZ-8 **Depth:** 79.0

Sample Number: P-2

Figure _____

DLZ

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	0.423			
Undrained shear strength, tsf	0.211			
Failure strain,	11.5			
Strain rate, in./min.	0.06			
Water content, %	24.2			
Wet density, pcf	132.2			
Dry density, pcf	106.4			
Saturation, %	112.0			
Void ratio	0.5834			
Specimen diameter, in.	2.79			
Specimen height, in.	5.51			
Height/diameter ratio	1.98			

Description: Lean clay

LL = 33	**PL** = 20	**PI** = 13	**Assumed GS=** 2.7	**Type:** 3" Press Tube

Project No.: 0422-1007 00

Date: 11/09/06

Remarks:

Figure _____

Client: Ohio Department of Transportation - District 12

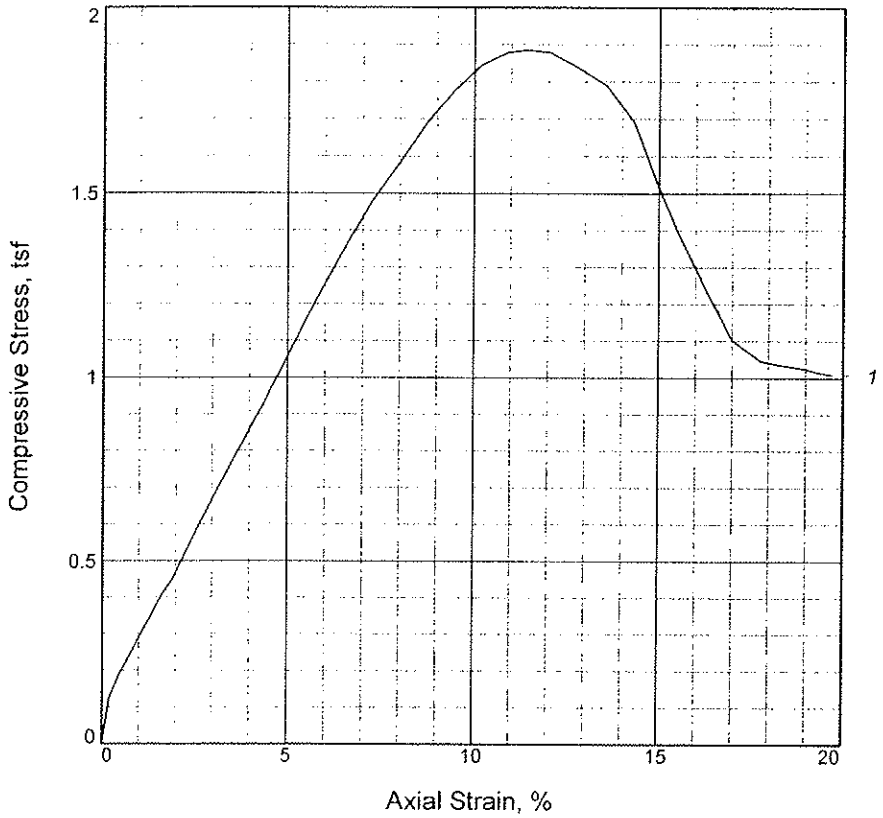
Project: ODOT Innerbelt - Retaining Walls

Source of Sample: W-DLZ-9 **Depth:** 48.0

Sample Number: P-1

DLZ

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	1.885			
Undrained shear strength, tsf	0.942			
Failure strain,	11.4			
Strain rate, in./min.	0.06			
Water content, %	21.6			
Wet density, pcf	130.7			
Dry density, pcf	107.5			
Saturation, %	102.6			
Void ratio	0.5685			
Specimen diameter, in.	2.84			
Specimen height, in.	5.55			
Height/diameter ratio	1.95			

Description: Lean clay

LL = 33	PL = 20	PI = 13	**Assumed GS=** 2.7	**Type:** 3" Press Tube

Project No.: 0422-1007 00

Date: 11/09/06

Remarks:

Client: Ohio Department of Transportation - District 12

Project: ODOT Innerbelt - Retaining Walls

Source of Sample: W-DLZ-9 **Depth:** 49.0

Sample Number: P-1

Figure _____

DLZ