REPORT OF

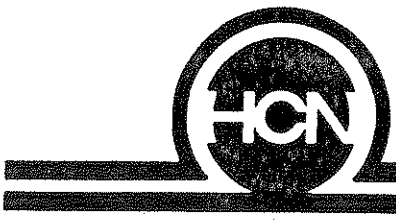
GEOTECHNICAL INVESTIGATION

CORNING 2000 PROJECT
GLASS CENTER ADDITION AND RENOVATION
CORNING, NEW YORK

FOR

CORNING INCORPORATED
CORNING, NEW YORK

1995



INVESTIGATION BY
H.C. NUTTING COMPANY

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October 6, 1995

W. O. 02092.200 jg

Mr. Suresh Shah, P.E.
Corning Incorporated
HP-CB-09 Houghton Park
Corning, New York 14831

RE: Geotechnical Investigation
Corning 2000 Project
Glass Center Addition and Renovation
Centerway at Museum Way
Corning, New York

Dear Mr. Shah:

In accordance with your request, we have completed a geotechnical investigation for the proposed Corning 2000 Glass Center addition and renovation. The purpose of this work was to obtain additional test borings at the general locations selected by Arup Consulting Engineers and to supplement data obtained in previous investigations near the Glass Center. This data was then used for our design recommendations.

This work was performed in general accordance with our proposal dated April 14, 1995 and as authorized by Mr. Shah. The drilling phase of this work was requested by Mr. Shah on August 24, 1995.

Generally, favorable subsurface conditions were encountered for building support. We have provided recommendations for shallow foundations and relatively short drilled pier foundations. The following report describes the subsurface conditions encountered, engineering analyses performed and presents recommendations for foundation design, underpinning considerations and lateral earth pressures.

We appreciate this opportunity of performing this investigation for you. We are available to meet with the Design Team to review this report or to provide additional information, as necessary.

Thank you for your consideration.

Respectfully submitted,

H. C. NUTTING COMPANY

George C. Webb, P.E.
Vice President

Dr. Andrew Bodocsi, P. E.
Senior Consultant

CC: Mr. Leo Argiris - Arup Consulting Engineers
Mr. John Conaty - Smith-Miller-Hawkinson Architects

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INTRODUCTION

This report presents the results of the geotechnical investigation performed for the Corning 2000 project in Corning, New York. This work was performed in general accordance with Arup's April 4, 1995 geotechnical investigation requirements, our proposal dated April 14, 1995 and as authorized by Mr. Suresh Shah, P.E. The drilling phase of this work was authorized on August 24, 1995.

The investigation included soil test borings, laboratory testing, review of previously completed work in the area, engineering analyses and preparation of this report. The primary concern of this investigation was to determine the depth and quality of existing fill, the thickness and quality of the anticipated, near-surface alluvial lean clay and the depth to competent outwash sand and gravel. The primary goals of this project were to provide recommendations for foundation and floor slab support, evaluate underpinning requirements in the auditorium, and provide lateral earth pressure recommendations for below grade structure.

PROJECT DESCRIPTION

The Corning 2000 project is a renovation/expansion of the existing Corning Glass Center located at the northwest corner of Centerway and Museum Way in Corning, New York. The attached Boring Location Plan shows the footprint of the proposed expansions on the east and west sides of the existing Glass Center. We have attached the architect's concept elevation views which illustrate proposed construction at the time of this report.

It is proposed to renovate the existing Corning Glass Center which will include construction of two additions and lowering the auditorium floor (for recessed seating). The "West Bridge" will be a two-story addition of steel frame construction which will be constructed on the west side of the existing Glass Center. Finish floor level is proposed at elevation 922, matching existing ground floor elevation. The "West Bridge" will be trapezoidal in shape, encompassing approximately 5500 sq. ft. Proposed building dimensions measure 212 ft. in the north-south direction by 9 ft. at the south end and by 40 ft. at the north end. Column loads less than 200 kips are expected.

The proposed "Visitor Center" will be a two-story steel frame structure constructed on the east side of the existing Glass Center. This building will be irregularly shaped, having maximum dimensions of 264'x54' and having an approximate 12,500 sq. ft. footprint. Large deep trusses having a maximum 70 ft. clear span are proposed. Relatively heavy column loads are anticipated, ranging from 200 to 800 kips (maximum load at column A-9).

The auditorium at the ground floor level of the existing Glass Center will be lowered approximately 5 ft. to accommodate the proposed recessed seating. Underpinning requirements of existing footings will be evaluated due to the proposed excavation.

PREVIOUS WORK

The existing Glass Center was constructed in 1950. Attached on Plate 3 is a reduced copy of the Corning original foundation drawing 12668-350. This drawing shows as-built bottom of footing elevations which indicate significant lowering of footings was performed in order to bear directly on the basement outwash sand and gravel. Bottom of footing elevations vary from 911.5 to 919, indicating that up to 10.5 ft. undercut was made to expose the bearing stratum.

We have searched our archives and no geotechnical investigation was found for the original Glass Center construction. However, several subsequent subsurface investigations have been performed in the general vicinity and appropriate borings have been plotted on the location plan and used in this investigation. These previous investigations include:

- 1966 Nutting geotechnical investigation for "B" Building addition
- 1977 Nutting geotechnical investigation for the Museum of Glass
- 1984 Empire soil test borings for Steuben Glass expansion

Complete copies of these reports were recently submitted to Corning for review.

SUBSURFACE INVESTIGATION

The existing test boring data was supplemented by an additional 7 test borings which were completed at the locations shown on the attached Boring Location Plan. The borings were drilled at general locations requested by Arup Consulting Engineers with the exception of eliminating the boring scheduled at the south end of the "West Bridge", due to previous borings 77-7 and 77-8. Also, as requested, a boring was added at the southeast corner of the existing Glass Center, for future expansion purposes.

Test boring locations were staked in the field by Evans Surveying, Corning, New York. Test boring elevations were interpolated by the writer from the December, 1994 Evans topographic survey, which has numerous spot elevations and 1 ft. contours.

The test borings were drilled by CMT Laboratories, State College, Pennsylvania under the direction of H. C. Nutting. The drilling work was subcontracted to CMT to minimize mobilization cost. Test boring depth was originally scheduled at 26.5 ft., however refusal condition was encountered at shallower depths in 5 of the borings, at approximately 22 ft. below grade.

The borings were drilled using a truck-mounted drill rig between September 5 through 7, 1995. The borings were advanced between samples using 3.25" ID hollow-stem augers. Continuous soil sampling was taken through the existing fill and then at 2.5 ft. intervals to 21.5 ft. Below 21.5 ft., samples were obtained at 5 ft. intervals or when auger refusal was met. One Shelby tube sample was recovered from the upper cohesive alluvium.

The recovered soil samples were placed and sealed in glass jars which were shipped to our Soil Mechanics Laboratory in Cincinnati. The relatively undisturbed Shelby tube sample was returned to the CMT Lab in State College, Pennsylvania for triaxial and consolidation testing.

Laboratory testing was performed on representative samples to determine the soil index properties. Laboratory testing included natural moisture content, Atterberg

Limits, loss on ignition, a UU triaxial compression test and a consolidation test. The laboratory test results are shown both on the attached test boring logs and in tabular form. We have also included a consolidation test which was performed in the 1977 Glass Museum investigation.

The attached logs were reclassified according to USCS Classification by the project engineer using the lab data, driller's notes and review of the soil samples. Attached in the Appendix of this report is important information describing the purpose and methods used in this investigation, including the basis and limitations.

SUBSURFACE CONDITIONS

The proposed Glass Center additions are located in relatively flat, landscaped lawn and paved areas surrounding the existing Glass Center. Generally, the site is located within an ancestral valley containing alluvium outwash sand and gravel.

Somewhat variable near-surface conditions were encountered at the boring locations. Specifically, the soils encountered in the test borings consist of existing fill soil, alluvial silt and lean clays, alluvial clayey fine sand and outwash sand, and gravel. We have graphically shown the results of the recent test borings and 9 previous vicinity borings on the attached Summary of Geotechnical Data sheet. This drawing is available on AutoCAD 12 disk, if needed.

EXISTING FILL

Existing fill was encountered in each of the 16 test borings drilled in the general study area. The fill is variable, including firm fine to coarse sand and gravel, cinders loose organic silt with glass fragments and wood. The fill thickness ranged from 2.5 to 8.5 ft. with standard penetration N-values ranging from 8 to 41, indicating significant variation within the existing fill soil.

A substantial 12" thick concrete slab (the West Glass Center apron) was encountered in both borings 95-1 and 95-2 in the vicinity of the "West Bridge". The reason for its thickness is not clear, unless designed for anticipated heavy truck loading.

NATURAL SOILS

The fill is typically underlain by cohesive alluvial soils with the exception of borings 95-2 and 77-7. The thickness of the cohesive alluvium varied from 0.8 ft. (boring 77-9) to 9.5 ft. (borings 95-5, 95-6 and 96-6A). This alluvium is typically of low plasticity, ranging from a clayey silt to a lean clay. Atterberg limits show a liquid limit ranging from 26% to 29% and a plasticity index of 6 to 8. The soil ranges in consistency from medium stiff to very stiff. Pocket penetrometer values vary from 1 to 4.5+ tsf. A UU triaxial test was performed on Shelby tube samples from borings 95-4 and 77-3. Both laboratory tests showed a compressive strength of approximately 1 tsf. Consolidation tests performed on this soil showed a preconsolidation pressure of approximately 1.3 to 1.6 tsf. This cohesive alluvium is considered to be moderately compressible.

The cohesive alluvium is locally underlain by a loose to medium dense silty fine sand alluvium, as encountered only in borings 95-3 and 95-4. Otherwise, the alluvium is underlain by medium dense to very dense fine to coarse sand and gravel outwash. This outwash deposit has a greater silt content near the surface and becomes coarser with depth. The outwash contains cobbles and boulders as indicated by high blow counts and refusal condition at several of the borings. Standard penetration N-values range from 6 to 163, or refusal condition. The lower N-values could be related to disturbance caused by heave within the augers when drilling below the water table.

Groundwater levels were recorded but were variable during the different periods of drilling. Fluctuation of the water table is largely related to the Chemung River, located approximately 1000 ft. south of the Corning 2000 project. The test borings drilled in this investigation (September) showed water levels ranging from elevation 903 to 906. However, water levels between elevation 914 to 915 were recorded in borings drilled in March and May, when river stage is normally high. Rapid fluctuation of the water table with the rise and fall of the Chemung River is expected due to the high permeability of the outwash. Our records show Buildings "A", "B" and "C", the Corning Credit Union and the northwest portion of

the Glass Center have basements. Any flooding or seepage experienced into these basements could also be helpful when evaluating the impact of seasonal water table fluctuations.

No piezometer was installed due to the high permeability of the outwash sand and gravel and the fast rate of equilibrating of water table in the boreholes.

DISCUSSION AND RECOMMENDATIONS

The presence of the existing fill on locally weak alluvium will adversely impact foundation design and construction. Several foundation options have been provided for consideration.

FOUNDATION DESIGN

Both shallow spread footing foundations and shallow drilled pier foundations can be considered for building support. Four options are presented.

A. Shallow foundations bearing on lean clay.

All foundations must extend through the existing fill due to its variability and compressibility. However, at many locations the fill soil is encountered above the proposed finish floor elevation and will be removed during the course of construction.

Shallow footings bearing directly on stiff to very stiff lean clay alluvium can be based on a net allowable bearing capacity of 4000 psf. As noted above, the consistency of this alluvium is variable, which will likely require some local undercutting to extend below weaker, wetter natural soils to expose the stiff to very stiff lean clay alluvium.

Settlement calculations performed on conditions represented by boring 95-6 with a bottom of footing elevation 919, showed an approximate 1½" to 2" of settlement should be expected from an 800 kip column load. These calculations considered a sustained load of 75 percent of the total column load.

The natural clayey silts and lean clays have a low plasticity and are therefore easily disturbed under construction traffic, especially in wet conditions. Natural soils disturbed during construction will require undercutting to minimize differential settlement.

B. Shallow foundations bearing on outwash sand and gravel.

Alternately, footings could be lowered to bear directly on undisturbed outwash sand and gravel. This will result in variable footing depths. Footings bearing directly on medium dense outwash sand and gravel can be designed for a net allowable bearing capacity of 6000 psf. Settlement calculations performed at boring 95-6 indicate less than ½" settlement would be expected under an 800 kip column load.

C. Shallow footings on controlled fill.

Alternately, the existing cohesive alluvium could be excavated at the column footing locations and be replaced with flowable fill (CLSM) or quality controlled compacted sand and gravel which is locally available. The fill should be compacted to a minimum of 98% Standard Proctor (ASTM D 698) which would allow footings to be designed for an allowable bearing capacity of 6000 psf. This option would require overexcavation such that the bottom of excavation measures the footing width plus the depth below bottom of footing. This overexcavation is recommended to allow for pressure distribution and dissipation below the footing. This alternative would allow for a more uniform minimum bottom of footing elevation.

D. Shallow drilled piers

A fourth option would include straight shaft drilled piers which would extend the building loads to the underlying outwash sand and gravel. Minimum 30" diameter drilled piers are recommended. Drilled piers extending a minimum of 1 pier diameter into the bearing stratum can be designed for a net allowable bearing pressure of 8000 psf. Belling in the sand and gravel would not be possible due to caving. Similarly, temporary casing might be required

for maintaining the pier hole during construction, especially through granular fill or loose fine sand alluvium. Difficulties could be encountered in establishing proposed pier tip elevations if construction is performed in the spring when groundwater levels are high.

Tabulated below are the recommended minimum bearing elevations for the various foundation alternatives.

BORING NO.	PROPOSED FINISH FLOOR ELEVATION	MINIMUM BOTTOM OF FOOTING FOR 4000 psf	MINIMUM BOTTOM OF FOOTING FOR 6000 psf	MINIMUM PIER TIP ELEVATION FOR 8000 psf
95.1	922	918	917	914
95.2	922	* NA	916	913
95.3	922	* NA	919	916
95.4	922	* NA	917	914
95.5	922	919	916	913
95.6	922	919	915	912
95.6A	922	919	916	913
77-4	922	918	916	913
77-7	922	* NA	919	915
77-8	922	* NA	920	910
77-9	922	* NA	920	913

* NA = Not Applicable

Exterior footings should extend a minimum of 48" below exterior grade, for frost protection.

Generally, we recommend that shallow foundations bearing directly on the outwash sand and gravel be used, to minimize differential settlement. This is the approach which was successfully used during the original construction, as noted on the original foundation drawings.

If shallow foundations are used for support, the exposed bearing soil should be inspected by a qualified geotechnical representative to confirm that an adequate bearing stratum is exposed for footing support. Construction drawings will need to clearly identify the bearing soil upon which footings are designed. Inspection should include visual examination and hand auger borings to confirm consistency of the bearing stratum. Hand auger borings should extend at least 3 ft. below

bottom of footing. Local areas of undercut should be expected. Minimum footing subgrade elevation can be reestablished in undercut areas using either lean concrete or quality controlled compacted backfill which is uniformly compacted to at least 98% Standard Proctor.

INCREASING LOAD ON EXISTING FOOTINGS

The 1950 foundation drawings indicate the existing footings were lowered to bear on natural sand and gravel and were designed based on an allowable bearing capacity of 4000 psf.

Analyses performed in this investigation indicate footings bearing in the natural medium dense alluvial sand and gravel can be sized for an allowable bearing capacity of 6000 psf. Higher capacities are available within the dense outwash sand and gravel. Negligible settlement (less than ¼") is expected if footing loads are increased from 4000 to 6000 psf and the footings are bearing on sand.

Footings which will receive additional load should be inspected or at least probed during construction to confirm that they are bearing on firm natural sand. This could be accomplished by hand digging along side of the footing to expose the bearing soil. Alternately, the footing depth could be probed with a No. 4 rebar to determine top of footing elevation. A hand auger boring could then be made outside the footing to determine the bearing soil at footing subgrade elevation.

If the existing footing is bearing on natural clay, a greater amount of settlement would be expected from additional load. We are available to evaluate each footing which will have an increased load, when that information becomes available. However, due to the variable thickness of the lean clay alluvium, it will be difficult to determine with confidence the bearing soil.

It is our recommendation to base design on the assumption that all footings have extended to sand and gravel, as indicated on the 1950 foundation drawings. If clay soils are encountered during construction then the existing footings can either be underpinned to the sand and gravel or factual data be determined on the thickness of the cohesive soil such that settlement due to additional loading can be calculated.

RECESSED SEATING

An 80'x20' recessed seating area is proposed between columns F-3.4 to F-7.2 in the existing auditorium. Floor level in the pit has been established at elevation 918.5. This construction will be within 2 ft. of the existing column F-3 and 13 ft. south of existing column F-8.

The original foundation drawings show an elevation 918.6 subgrade for the existing footings. Test borings 95-1, 95-3, 95-6A, 77-8 and 77-10 (closest borings to this area) show variable soil conditions. Borings 95-1 and 95-6A show stiff to very stiff lean clay at elevation 918.6 whereas the other 3 borings show a medium dense sand and gravel.

Because of the expected granular bearing soil, underpinning requirements should be determined wherever the edge of the excavation is within a 2H:1V projection from bottom of footing. This relatively gentle slope is due to the raveling potential of the founding sand and gravel and is in compliance with current BOCA Code.

Additional exploration should be made during demolition/renovation to expose and determine actual bottom of footing elevation at footings F-3 and F-8. Because the proposed bottom of footing is so close to the proposed bottom of pit elevation, significant underpinning is not expected. If underpinning is required, simple mass concrete pit underpinning would be appropriate to lower the 2H:1V projection.

A new column F-7.5 is proposed immediately north of the recessed pit. This footing should extend a minimum of 1 ft. below pit subgrade elevation to bear on undisturbed sand and gravel.

FLOOR SLAB SUPPORT

The proposed construction will remove the majority of the existing fill to expose either outwash sand and gravel or alluvial lean clays at floor slab subgrade elevation. All existing fill should be undercut wihtin the building additiona footprint. The exposed soil should be evaluated by a qualified geotechnical representative

to determine local areas of undercut. The subgrade surface should be proof rolled and compacted as needed in order to provide a non-yielding floor slab subgrade.

It is recommended that a minimum 6" thick layer of free-draining granular base (sand and gravel) be provided above the floor slab subgrade soil in order to provide a capillary break and to allow for a uniform floor slab thickness. Alternately, a 6" thick lift of compacted crushed stone could be used to establish floor slab subgrade. The benefit of using the crushed stone is that a higher design modulus of subgrade reaction would be available for support and it would also allow concrete truck traffic with minimum disturbance, and pumping of the floor slab concrete would be avoided.

If a crushed stone aggregate base is used, it is recommended that it be compacted to at least 98% Standard Proctor. This aggregate base would have a modulus of subgrade reaction of 200 pci. If crushed sotne was not used, the compacted cohesive soil subgrade would have a subgrade modulus of 120 pci.

RETAINING WALLS

Lateral earth pressures will be dependent on the type of backfill as well as the amount of movement which can be tolerated in the retaining wall.

Basement wall design should be based on a non-yielding wall which is fixed both at the top and bottom of the wall. Free-draining granular backfill should be placed behind the basement wall. It is recommended that a minimum 4 to 5 ft. wide blanket be placed behind the wall to minimize lateral earth pressures. Granular backfill which is compacted to at least 95% Standard Proctor Density would result in a uniform lateral earth pressure of 30H (psf). The bankrun sand and gravel should be placed concurrent with structural fill. Field control should be provided such that hand operated vibratory plate or hand operated vibratory roller equipment is used within 4 ft. of basement walls. The use of heavy self-propelled compaction equipment immediately against basement walls should not be permitted as it will exert lateral earth pressure significantly higher than those recommended for design.

Cantilever retaining walls which are free to move at the top would have a lower lateral earth pressure. It is recommended that cantilever retaining walls be designed for an equivalent fluid pressure of 40 pcf provided a minimum of 4 ft. of free-draining granular backfill as placed behind the wall. Further, lateral pressures acting on the wall due to surcharge should be calculated based on ⅓ of the surcharge load acting horizontally.

Specific recommendations can be provided for conditions which develop during final design.

SUBSURFACE DRAINAGE

It is recommended that perimeter drainage systems be constructed for any below grade construction. The drainage system should consist of 4" diameter perforated or slotted rigid PVC pipe which is placed on the outside wall and is drained in a positive fashion. The purpose of this drain would be collect surface water which travels along the outside of the building wall during snow melt or wet weather. The quantity of flow is expected to be minimal, but positive relief is recommended to avoid hydrostatic pressures acting on the basement or retaining wall.

LIMITATIONS OF LIABILITY

OUR WARRANTY

We warrant that the services performed by The H. C. Nutting Company are conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions. NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, ARE MADE. While the services of The H. C. Nutting Company are a valuable and integral part of the design and construction teams, we do not warrant, guarantee, or insure the quality or completeness of services provided by other members of those teams, the quality, completeness, or satisfactory performance of construction plans and specifications which we have not prepared, nor the ultimate performance of building site materials.

SUBSURFACE EXPLORATION

Subsurface exploration is normally accomplished by test borings; test pits are sometimes employed. The method of determining the boring location and the surface elevation at the boring is noted in the report. This information is represented on a drawing or on the boring log. The location and elevation of the boring should be considered accurate only to the degree inherent with the method used.

The boring log includes sampling information, description of the materials recovered, approximate depth of boundaries between soil and rock strata and groundwater data. The log represents conditions specifically at the location and time the boring was made. The boundaries between different soil strata are indicated at specific depths; however, these depths are in fact approximate and dependent upon the frequency of sampling. The transition between soil strata is often gradual. Water level readings are made at the times and under conditions stated on the boring logs. Water levels change with time and season. The borehole does not always remain open sufficiently long for the measured water level to coincide with the groundwater table.

LABORATORY AND FIELD TESTS

Tests are performed in accordance with specific ASTM Standards unless otherwise indicated. All determinations included in a given ASTM Standard are not always required and performed. Each test report indicates the measurements and determinations actually made.

ANALYSIS AND RECOMMENDATIONS

The geotechnical report is prepared primarily to aid in the design of site work and structural foundations. Although the information in the report is expected to be sufficient for these purposes, it is not intended to determine the cost of construction or to stand alone as a construction specification.

Report recommendations are based primarily on data from test borings made at the locations shown on a boring location drawing included. Soil variations may exist between borings and these variations may not become evident until construction. If significant variations are then noted, the geotechnical engineer should be contacted so that field conditions can be examined and recommendations revised if necessary.

The geotechnical report states our understanding as to the location, dimensions and structural features proposed for the site. Any significant changes in the nature, design, or location of the site improvements MUST be communicated to the geotechnical engineer so that the geotechnical analysis, conclusions, and recommendations can be appropriately adjusted.

The geotechnical engineer should be given the opportunity to review all drawings that have been prepared based on his recommendations.

CONSTRUCTION MONITORING

Construction monitoring is a vital element of complete geotechnical services. The field engineer / inspector is the owner's "representative" observing the work of the contractor, performing tests as required in the specifications, and reporting data developed from such tests and observations. THE FIELD ENGINEER OR INSPECTOR DOES NOT DIRECT THE CONTRACTOR'S CONSTRUCTION MEANS, METHODS, OPERATIONS OR PERSONNEL. He does not interfere with the relationship between the owner and the contractor and, except as an observer, does not become a substitute owner on site. He is responsible for his own safety but has no responsibility for the safety of other personnel at the site. He is an important member of a team whose responsibility is to watch and test the work being done and report to the owner whether that work is being carried out in general conformance with the plans and specifications.

APPENDIX

TEST BORING TERMINOLOGY

SOIL CLASSIFICATION

TEST BORING LOGS - BORINGS 95-1 THRU 95-6A, 77-4, 77-7 THRU 77-10, 84-1, 84-2, 84-3, 84-5

LABORATORY TEST DATA

SMITH-MILLER ISOMETRIC VIEW OF CONSTRUCTION

TEST BORING LOCATION PLAN (ON FOUNDATION PLAN)

TEST BORING LOCATION PLAN (ARUP PLAN)

PLATE 3 - GLASS CENTER FOUNDATION PLAN - SEPTEMBER, 1950

SUMMARY OF GEOTECHNICAL DATA

A description of terminology and symbols used in the logs of test borings, and a copy of ASTM D 2487, "Classification of Soils for Engineering Purposes", are included in the following two pages.

Readers of this report who wish an in-depth discussion on the basis for geotechnics, including procedures used in subsurface exploration, laboratory testing, and geotechnical analyses are referred to the H. C. Nutting Geotechnical and Test Engineering Manual. Those readers not having a copy of this manual may obtain one at nominal cost by contacting the H. C. Nutting Company at (513) 321-5816.

LOG OF TEST BORING: TERMINOLOGY AND SYMBOLS

STANDARD PENETRATION TEST†

THE PENETRATION RESISTANCE, OR N-VALUE AS IT IS COMMONLY REFERRED TO, IS THE SUMMATION OF THE NUMBER OF BLOWS REQUIRED TO EFFECT TWO SUCCESSIVE 6" PENETRATIONS OF THE 2" SPLIT BARREL SAMPLER. THE SAMPLER IS DRIVEN WITH A 140 LB. WEIGHT FALLING 30" AND IS SEATED TO A DEPTH OF 6" BEFORE COMMENCING THE STANDARD PENETRATION TEST.

THE STANDARD PENETRATION TEST IS PERFORMED IN COMPLIANCE WITH PROCEDURES AS SET FORTH IN ASTM D-1586.

TERMINOLOGY

GRAIN SIZE

SOIL FRACTION		PARTICLE SIZE	U.S. STANDARD SIEVE SIZE
BOULDERS		LARGER THAN 12"	LARGER THAN 12"
COBBLES		3/4" TO 3"	3/4" TO 3"
GRAVEL:	COARSE	3/4" TO 12"	3/4" TO 12"
	FINE	4.75 mm TO 3/4"	# 4 to 3/4"
SAND:	COARSE	2.00 mm TO 4.75 mm	# 10 TO #4
	MEDIUM	0.425 mm TO 2.0 mm	# 40 TO #10
	FINE	0.075 mm TO 0.425 mm	# 200 TO #40
FINES:	(SILTS & CLAYS)	SMALLER THAN 0.075 mm	SMALLER THAN NO. 200

PLASTICITY CHARACTERISTICS DIFFERENTIATE BETWEEN SILTS AND CLAYS

RELATIVE DENSITY

TERM*	"N" VALUE
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

* THESE ARE USUALLY BASED ON AN EXAMINATION OF SOIL SAMPLES, PENETRATION RESISTANCE AND SOIL DENSITY DATA.

RELATIVE PROPORTIONS OF COHESIONLESS SOILS

PROPORTIONAL TERM	DEFINING RANGE BY PERCENTAGE OF WEIGHT
TRACE	8 % - 14 %
WITH	15 % - 29 %
MAJOR CONSTITUENT	GREATER THAN 30 %

CONSISTENCY

TERM	INDENTIFICATION PROCEDURE
SOFT	EASILY PENETRATED SEVERAL INCHES BY THUMB
MEDIUM STIFF	PENETRATED SEVERAL INCHES BY THUMB WITH MODERATE EFFORT
STIFF	READILY INDENTED BY THUMB, BUT PENETRATED ONLY WITH GREAT EFFORT
VERY STIFF	READILY INDENTED BY THUMBNAIL
HARD	INDENTED WITH DIFFICULITY BY THUMBNAIL

RELATIVE MOISTURE DESCRIPTION

DRY	APPROPRIATE FOR SOIL WHICH IS NOTICEABLY BELOW OPTIMUM MOISTURE
MOIST	SOIL NEAR OPTIMUM MOISTURE BUT OBVIOUSLY LESS THAN THE LIQUID LIMIT
WET	MOISTURE CONTENT NEAR OR EXCEEDING THE LIQUID LIMIT
SATURATED	APPROPRIATE FOR SOIL WHICH LIES BELOW THE WATER TABLE

NOTE: WATER LEVEL MEASUREMENTS SHOWN ON THE BORING LOGS REPRESENT CONDITIONS AT THE TIME INDICATED AND MAY NOT REFLECT STATIC LEVELS, ESPECIALLY IN COHESIVE SOILS.

SYMBOLS

DRILLING AND SAMPLING

RC - ROCK CORING: SIZE AW, BW, NW, NX, 2" W
RQD - ROCK QUALITY DESIGNATOR
FT - FISH TAIL
DC - DROVE CASING
C - CASING: SIZE 2-1/2", NW, 4", HW
CW - CLEAR WATER
DM - DRILLING MUD
HSA - HOLLOW STEM AUGER
FA - FLIGHT AUGER
HA - HAND AUGER
COA - CLEAN-OUT AUGER
SS - 2" DIAMETER SPLIT BARREL SAMPLE
ST - 3" DIAMETER THIN-WALLED TUBE SAMPLE
PT - 3" DIAMETER PISTON TUBE SAMPLE
AS - AUGER SAMPLE
WS - WASH SAMPLE
PTS - PEAT SAMPLE
PS - PITCHER SAMPLE
NR - NO RECOVERY
S - SOUNDING
PMT - BOREHOLE PRESSUREMETER TEST
VS - VANE SHEAR TEST
WPT - WATER PRESSURE TEST
ATV - ALL TERRAIN VEHICLE
R - REFUSAL CONDITION

LABORATORY TESTS

PP - PENETROMETER READING, TONS/SQ. FT.
QC - UNCONFINED STRENGTH TONS/SQ. FT.
W - MOISTURE CONTENT, %
LL - LIQUID LIMIT, %
PL - PLASTIC LIMIT, %
SL - SHRINKAGE LIMIT, %
LL - LOSS ON IGNITION, %
D - DRY UNIT WEIGHT, LBS./CU. FT.
PH - MEASURE OF SOIL ALKALINITY OR ACIDITY

WATER LEVEL MEASUREMENT

NW - NO WATER ENCOUNTERED
WD - WHILE DRILLING
BCR - BEFORE CASING REMOVAL
ACR - AFTER CASING REMOVAL
CM - CAVED AND MOIST
BF - BACKFILLED UPON COMPLETTON

CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES

ASTM Designation: D 2487 - 83

(Based on Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name[B]
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3^E$	GW	Well graded gravel[F]
			$Cu < 4$ and/or $1 > Cc > 3^E$	GP	Poorly graded gravel[F]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel[F,G,H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3^E$	SW	Well-graded sand[I]
			$Cu < 6$ and/or $1 > Cc > 3^E$	SP	Poorly graded sand[I]
		Sands with Fines More than 12% fines[D]	Fines classify as ML or MH	SM	Silty sand[G,H,I]
			Fines classify as CL or CH	SC	Clayey sand[G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K,L,M]
		organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay[K,L,M,N] Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic silt[K,L,M]
		organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay[K,L,M,P]
					Organic silt[K,L,M,Q]
Highly organic soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols:
- GW-GM well-graded gravel with silt
- GW-GC well-graded gravel with clay
- GP-GM poorly graded gravel with silt
- GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12% fines require dual symbols:
- SW-SM well-graded sand with silt
- SW-SC well-graded sand with clay
- SP-SM poorly graded sand with silt
- SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥30% plus no. 200, predominantly sand, add "sandy" to to group name.

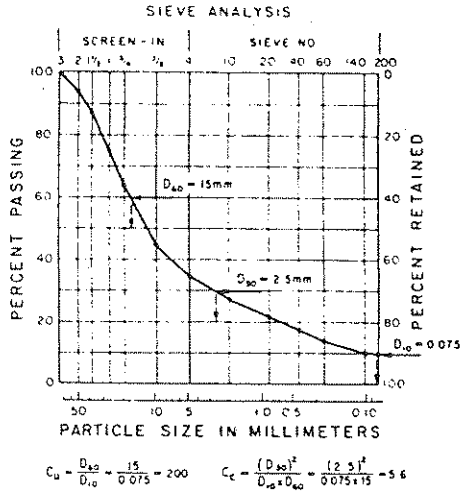
[M] If soil contains ≥30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

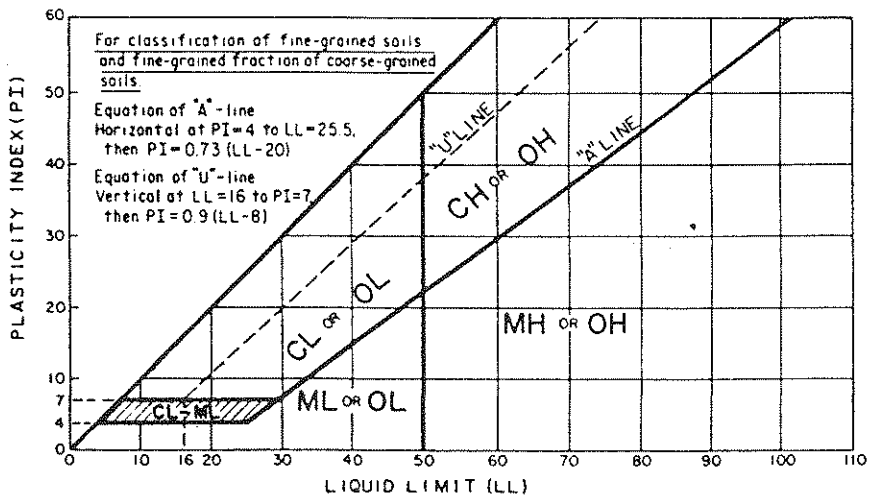
[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



$C_u = \frac{D_{60}}{D_{10}} = \frac{15}{0.075} = 200$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = \frac{(2.5)^2}{0.075 \times 15} = 5.6$



Reorder No. 106-0253

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FAX: (614) 863-0475

LOG OF TEST BORING

CLIENT:	Corning, Inc.	BORING NO.:	95-1
PROJECT:	Corning 2000 Project (Glass Center Addition)	DATE STARTED:	9-7-95
BORING LOCATION:	As shown on plan	DATE COMPLETED:	9-7-95
ELEVATION REFERENCE:	Evans Survey dated December 1994 (1' contour interval)	WORK ORDER NO.:	02092.200

ELEV (Feet)	DEPTH (Feet)	DESCRIPTION OF MATERIALS	SAMPLE #	SAMPLE TYPE	SAMPLE DEPTH (Feet)	BLOW PER 6 INCHES	RECOVERY (Inches)	SOIL PROPERTIES W (%)	SOIL PROPERTIES LL/PL (%)	SOIL PROPERTIES PP* (tsf)
921.9	0.0	1.0' Concrete slab	1	SS	0.0-1.0					
920.9	1.0	2.0' Brown silty fine to coarse sand and gravel (fill), moist-dense	1a	SS	1.0-3.0	9-21-22-19	24			
918.9	3.0	1.5' Brownish gray SILTY CLAY, moist-very stiff	2	SS	3.0-4.5	19-8-9	18			4
917.4	4.5	1.5' Brown and gray silty fine to coarse SAND AND GRAVEL, moist-dense	3	SS	4.5-6.0	14-15-17	18			
915.9	6.0	5.0' Brown fine to coarse SAND AND GRAVEL, moist-medium dense	4	SS	6.0-7.5	14-12-12	18			
			5	SS	7.5-9.0	11-8-10	18	9		
			6	SS	9.0-11.0	7-8-10-7	24			
910.9	11.0	1.5' Brown and gray fine to coarse SAND AND GRAVEL, little silt, wet-medium dense	7	SS	11.0-12.5	10-14-14	18			
909.4	12.5	3.5' Brown fine to coarse SAND AND GRAVEL, moist-very dense to dense	8	SS	12.5-14.0	24-30-27	18			
			9	SS	14.0-16.0	18-20-14-16	24	8		
905.9	16.0	1.5' Brown fine to coarse SAND AND GRAVEL, saturated-medium dense	10	SS	16.0-17.5	8-12-10	18			
904.4	17.5	1.5' Gray fine to medium GRAVEL with coarse SAND, wet-medium dense	11	SS	17.5-19.0	9-11-13	18	11		
902.9	19.0	7.5' Gray fine to medium GRAVEL with coarse SAND, saturated-dense	12	SS	19.0-21.0	8-12-12-19	18			
			13	SS	25.0-26.5	22-18-22	18			
895.4	26.5	TEST BORING COMPLETED								

* Pocket Penetrometer Reading - Unconfined Compressive Strength, Tons/Sq. Ft.

General Notes

Driller	R. Rager, K. Goss - CMT
Rig No.	MU-2
Rig Type	Truck
Method	4" HSA
Sampling	2" SS
jg	

Remarks

Drilling performed by CMT Laboratories, State College, Pa.

Water Level Observations

Immediate	19 Ft.
At Completion	19 Ft.
After 24 Hours	BF Ft.
Water Used in drilling	None Ft.

(Measured from ground surface)

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LOG OF TEST BORING

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CENTRAL OHIO REGION
790 MORRISON ROAD
COLUMBUS, OH 43004
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FAX: (614) 863-0475

CLIENT:	Corning, Inc.	BORING NO.:	95-2
PROJECT:	Corning 2000 Project (Glass Center Addition)	DATE STARTED:	9-7-95
BORING LOCATION:	As shown on plan	DATE COMPLETED:	9-7-95
ELEVATION REFERENCE:	Evans Survey dated December 1994 (1' contour interval)	WORK ORDER NO.:	02092.200

ELEV (Feet)	DEPTH (Feet)	DESCRIPTION OF MATERIALS	SAMPLE #	SAMPLE TYPE	SAMPLE DEPTH (Feet)	BLOW PER 6 INCHES	RECOVERY (Inches)	SOIL PROPERTIES W (%)	SOIL PROPERTIES LL/PL (%)	SOIL PROPERTIES PP* (tsf)
922.0	0.0	1.0' Concrete slab	1	SS	0.0-1.0					
921.0	1.0	2.0' Brown silty fine to coarse sand and gravel (fill), moist-dense	1a	SS	1.0-3.0	18-21-20-15	24			
919.0	3.0	3.0' Brown fine to coarse SAND AND GRAVEL, medium dense to loose	2	SS	3.0-4.5	11-6-8	18			
			3	SS	4.5-6.0	6-4-4	18			
916.0	6.0	3.0' Brown and gray silty fine to coarse SAND AND GRAVEL, medium dense	4	SS	6.0-7.5	4-4-8	18	13		
			5	SS	7.5-9.0	8-9-8	18			
913.0	9.0	2.0' Brown and gray silty fine to coarse SAND AND GRAVEL, wet-medium dense	6	SS	9.0-11.0	8-9-10-8	24			
911.0	11.0	5.0' Grayish brown silty fine to coarse SAND AND GRAVEL, dark gray, medium stiff lean clay seam noted at 13.5' and 14.5'	7	SS	11.0-12.5	8-10-11	18	20	26/20	
			8	SS	12.5-14.0	15-15-11	18			
			9	SS	14.0-16.0	8-14-11-11	24			
906.0	16.0	3.0' Gray fine to coarse GRAVEL with SAND, wet-medium dense	10	SS	16.0-17.5	11-5-8	18			
			11	SS	17.5-19.0	10-12-10	18			
903.0	19.0	7.5' Gray fine to coarse GRAVEL with coarse SAND, dense	12	SS	19.0-21.0	17-12-16-17	24	10		
				SS	21.0-25.0					
			13	SS	25.0-26.5	33-22-16	18			
895.5	26.5	TEST BORING COMPLETED								

* Pocket Penetrometer Reading - Unconfined Compressive Strength, Tons/Sq. Ft.

General Notes

Driller	R. Rager, K. Goss - CMT
Rig No.	MU-2
Rig Type	Truck
Method	4" HSA
Sampling	2" SS
jg	

Remarks

Drilling performed by CMT Laboratories, State College, Pa.

Water Level Observations

Immediate	16	Ft.
At Completion	16	Ft.
After 24 Hours	BF	Ft.
Water Used in drilling	None	Ft.

(Measured from ground surface)

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CENTRAL OHIO REGION
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COLUMBUS, OH 43004
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FAX: (614) 863-0475

LOG OF TEST BORING

CLIENT:	Corning, Inc.	BORING NO.:	95-3
PROJECT:	Corning 2000 Project (Glass Museum Addition)	DATE STARTED:	9-5-95
BORING LOCATION:	As shown on plan	DATE COMPLETED:	9-5-95
ELEVATION REFERENCE:	Evans Survey dated December 1994 (1' contour interval)	WORK ORDER NO.:	02092.200

ELEV (Feet)	DEPTH (Feet)	DESCRIPTION OF MATERIALS	SAMPLE #	SAMPLE TYPE	SAMPLE DEPTH (Feet)	BLOW PER 6 INCHES	RECOVERY (Inches)	SOIL PROPERTIES W (%)	SOIL PROPERTIES LL/PL (%)	SOIL PROPERTIES PP* (tsf)
928.2	0.0									
	3.0	Brown to dark brown lean clay to silty clay, trace roots hairs, (Fill), dry to moist-stiff	1	SS	0.0-1.5	9-8-10	18			
			2	SS	1.5-3.0	6-5-8	18			2.0
925.2	3.0		3	SS	3.0-5.0	9-6-6-7	24	21		1.75
	2.5'	Brown LEAN CLAY, trace sand, moist-stiff								
923.2	5.5		4	SS	5.5-7.0	5-5-5	18			
	2.0'	Brown silty fine to medium SAND, trace gravel, occasional silty clay seams, medium dense								
921.2	7.5		5	SS	7.5-9.0	5-12-10		12		
	1.0	Brown and gray silty fine to coarse SAND AND GRAVEL, wet-medium dense	6	SS	9.5-11.0	9-11-14	18			
			7	SS	11.5-13.0	6-6-8	18			
			8	SS	13.5-15.0	8-11-11	18			
			9	SS	15.5-17.0	14-10-10				
911.2	17.5		10	SS	17.5-19.0	16-16-9	18	9		
	4.6'	Fine to medium GRAVEL with coarse SAND, wet-medium dense to very dense	11	SS	19.5-21.0	4-7-22	18			
			12	SS	21.5-21.6	50/0.1'				
			13	SS	22.0-22.1	50/0.1'				
906.6	22.1									
		TEST BORING COMPLETED AUGER REFUSAL AT 22.0'								

* Pocket Penetrometer Reading - Unconfined Compressive Strength, Tons/Sq. Ft.

General Notes

Driller	J. R. Woodring - CMT
Rig No.	MU-2
Rig Type	Truck
Method	4" HSA
Sampling	2" SS
jg	

Remarks

Drilling performed by CMT Laboratories, State College, Pa.

Water Level Observations

Immediate	NW	Ft.
At Completion	NW	Ft.
After 24 Hours	BF	Ft.
Water Used in drilling	None	Ft.

(Measured from ground surface)

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LOG OF TEST BORING

CLIENT:	Corning, Inc.	BORING NO.:	95-4
PROJECT:	Corning 2000 Project (Glass Center Addition)	DATE STARTED:	9-6-95
BORING LOCATION:	As shown on plan	DATE COMPLETED:	9-6-95
ELEVATION REFERENCE:	Evans Survey dated December 1994 (1' contour interval)	WORK ORDER NO.:	02092.200

ELEV (Feet)	DEPTH (Feet)	DESCRIPTION OF MATERIALS	SAMPLE #	SAMPLE TYPE	SAMPLE DEPTH (Feet)	BLOW PER 6 INCHES	RECOVERY (Inches)	SOIL PROPERTIES W (%)	SOIL PROPERTIES LL/PL (%)	SOIL PROPERTIES PP* (tsf)
930.0	0.0	1.5' Dark brown lean clay, trace root hairs (topsoil), dry to moist-stiff	1	SS	0.0-1.5	12-15-25	18			
928.5	1.5	1.5' Brown and gray silty fine to coarse sand and gravel, (fill), moist-dense	2	SS	1.5-3.0	21-19-16	18			
927.0	3.0	3.0' Brown silty fine SAND, moist-medium stiff	3	SS	3.0-5.0	11-11-9-9	24			
924.0	6.0	2.5' Gray to brownish gray SILTY CLAY, moist, medium stiff	4	SS ST	6.0-7.5 8.0-9.5 *	4-5-4	18			1.0
921.5	8.5	1.5' Gray and brown LEAN CLAY, moist-stiff	5	SS	8.5-10.0	5-4-6	18	25	29/21	2.75
920.0	10.0	2.5' Brown silty fine to medium SAND, moist-loose	6	SS	10.0-11.5	5-4-4	18			
917.5	12.5	5.0' Brown and gray silty fine to coarse SAND AND GRAVEL, medium dense	7 8	SS SS	12.5-14.0 15.0-16.5	10-14-12 15-12-12		9		
912.5	17.5	4.5' Brown and gray silty fine to coarse SAND AND GRAVEL, dense	9 10	SS SS	17.5-19.0 20.0-21.5	14-15-15 15-16-16	18 18	10		
908.0	22.0	TEST BORING COMPLETED AUGER REFUSAL at 22.0' * offset borehole 5' north and pushed Shelby Tube								

* Pocket Penetrometer Reading - Unconfined Compressive Strength, Tons/Sq. Ft.

General Notes

Driller	J. R. Woodring - CMT
Rig No.	MU-2
Rig Type	Truck
Method	4" HSA
Sampling	2" SS
jg	

Remarks

Drilling performed by CMT Laboratories, State College, Pa.

Water Level Observations

Immediate	NW	Ft.
At Completion	NW	Ft.
After 24 Hours	BF	Ft.
Water Used in drilling	None	Ft.

(Measured from ground surface)

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LOG OF TEST BORING

CLIENT:	Corning, Inc.	BORING NO.:	95-5
PROJECT:	Corning 2000 Project (Glass Center Addition)	DATE STARTED:	9-6-95
BORING LOCATION:	As shown on plan	DATE COMPLETED:	9-6-95
ELEVATION REFERENCE:	Evans Survey dated December 1994 (1' contour interval)	WORK ORDER NO.:	02092.200

ELEV (Feet)	DEPTH (Feet)	DESCRIPTION OF MATERIALS	SAMPLE #	SAMPLE TYPE	SAMPLE DEPTH (Feet)	BLOW PER 6 INCHES	RECOVERY (Inches)	SOIL PROPERTIES W (%)	SOIL PROPERTIES LL/PL (%)	SOIL PROPERTIES PP* (tsf)
928.7	0.0	0.6' Brown topsoil (fill)	1	SS	0.0-1.5	9-30-5	18			
928.1	0.6	0.9' Light brown lean clay, trace root hairs dry (fill),								
927.2	1.5	1.5 Dark gray lean clay with gravel (fill), moist-very stiff	2	SS	1.5-3.0	8-8-10	18			4.25
925.7	3.0	9.5' Gray and brown LEAN CLAY, trace organic matter, moist-very stiff	3	SS	3.0-5.0	8-6-6-7	18	23		2.5
			4	SS	6.0-7.5	8-8-11	18			3.0
			5	SS	8.5-10.0	3-4-5	18			2.0
			6	SS	10.0-11.5	5-5-6	18	22		2.75
916.2	12.5	9.8' Brown fine to coarse SAND AND GRAVEL, medium dense	7	SS	12.5-14.0	14-11-12	18			
			8	SS	15.0-16.5	14-11-15				
			9	SS	17.5-19.0	11-14-10	18	8		
			10	SS	20.0-21.5	11-8-10	18			
906.4	22.3	TEST BORING COMPLETED AUGER REFUSAL AT 22.3'								

* Pocket Penetrometer Reading - Unconfined Compressive Strength, Tons/Sq. Ft.

General Notes

Driller	J. R. Woodring - CMT
Rig No.	MU-2
Rig Type	Truck
Method	4" HSA
Sampling	2" SS
jg	

Remarks

Drilling performed by CMT Laboratories, State College, Pa.

Water Level Observations

Immediate	NW	Ft.
At Completion	NW	Ft.
After 24 Hours	BF	Ft.
Water Used in drilling	None	Ft.

(Measured from ground surface)

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LOG OF TEST BORING

CLIENT:	Corning, Inc.	BORING NO.:	95-6
PROJECT:	Corning 2000 Project (Glass Center Addition)	DATE STARTED:	9-6-95
BORING LOCATION:	As shown on plan	DATE COMPLETED:	9-6-95
ELEVATION REFERENCE:	Evans Survey dated December 1994 (1' contour interval)	WORK ORDER NO.:	02092.200

ELEV (Feet)	DEPTH (Feet)	DESCRIPTION OF MATERIALS	SAMPLE #	SAMPLE TYPE	SAMPLE DEPTH (Feet)	BLOW PER 6 INCHES	RECOVERY (Inches)	SOIL PROPERTIES W (%)	SOIL PROPERTIES LL/PL (%)	SOIL PROPERTIES PP* (tsf)
927.3	0.0	0.9' Topsoil	1	SS	0.0-1.5	4-8-8	18			
926.4	0.9	2.1' Brown silty clay, trace sand (fill), dry-stiff	2	SS	1.5-3.0	8-9-12	18			
924.3	3.0		3	SS	3.0-5.0	18-18-11-8	24	15		
		4.5' Dark brown CLAYEY SILT, moist-very stiff	4	SS	6.0-7.5	11-7-7	18			4.5+
919.8	7.5									
		5.0' Brown LEAN CLAY, trace root hairs, moist-very stiff	5	SS	8.5-10.0	8-10-10	18			3.0
			6	SS	10.0-11.5	14-27-43	18			3.25
914.8	12.5		7	SS	12.5-14.0	26-15-15	18	7		
		10.5' Brown fine to coarse SAND AND GRAVEL, moist-medium dense to very dense	8	SS	15.0-16.5	12-12-42				
			9	SS	17.5-19.0	11-11-11	18	7		
			10	SS	20.0-21.5	10-11-9	18			
904.3	23.0	TEST BORING COMPLETED AUGER REFUSAL AT 23.0'								
		Moved boring 10' east of staked location due to trees and overhead								

* Pocket Penetrometer Reading - Unconfined Compressive Strength, Tons/Sq. Ft.

General Notes

Driller	J. R. Woodring - CMT
Rig No.	MU-2
Rig Type	Truck
Method	4" HSA
Sampling	2" SS
jg	

Remarks

Drilling performed by CMT Laboratories, State College, Pa.

Water Level Observations

Immediate	NW	Ft.
At Completion	NW	Ft.
After 24 Hours	BF	Ft.
Water Used in drilling	None	Ft.

(Measured from ground surface)

H.C. NUTTING COMPANY
CORPORATE CENTER - 4120 AIRPORT ROAD
CINCINNATI, OH 45226 (513) 321-5816
FAX: (513) 321-0294
EMPLOYEE OWNED
GEOTECHNICAL, ENVIRONMENTAL AND TESTING ENGINEERS SINCE 1921

APPALACHIAN REGION
912 MORRIS STREET
CHARLESTON, WV 25831
(304) 344-0821
FAX: (304) 342-4711

BLUEGRASS REGION
3940 OLYMPIC BLVD, STE 350
ERLANGER, KY 41018
(606) 283-9914
FAX: (606) 282-6415

CENTRAL OHIO REGION
790 MORRISON ROAD
COLUMBUS, OH 43004
(614) 863-3113
FAX: (614) 863-0475

LOG OF TEST BORING

CLIENT:	Corning, Inc.	BORING NO.:	95-6A
PROJECT:	Corning 2000 Project (Glass Center Addition)	DATE STARTED:	9-6-95
BORING LOCATION:	As shown on plan	DATE COMPLETED:	9-6-95
ELEVATION REFERENCE:	Evans Survey dated December 1994 (1' contour interval)	WORK ORDER NO.:	02092.200

ELEV (Feet)	DEPTH (Feet)	DESCRIPTION OF MATERIALS	SAMPLE #	SAMPLE TYPE	SAMPLE DEPTH (Feet)	BLOW PER 6 INCHES	RECOVERY (Inches)	SOIL PROPERTIES W (%)	SOIL PROPERTIES LL/PL (%)	SOIL PROPERTIES PP* (tsf)
928.6	0.0	0.7' Topsoil (fill)	1	SS	0.0-1.5	3-5-11	18			
927.9	0.7	3.0' Light brown to dark brown lean clay, trace root hairs, occasional brick fragments (fill), dry-stiff	2	SS	1.5-3.0	12-14-18	18			
925.6	3.0	3.0' Brown lean clay to SILTY CLAY, occasional, root hairs, stiff	3	SS	3.0-5.0	7-5-4-8	24			2.25
922.6	6.0	6.5' Brown LEAN CLAY, moist-stiff	4	SS	6.0-7.5	5-5-7	18	17		2.25
			5	SS	8.5-10.0	9-14-12	18			
			6	SS	10.0-11.5	7-10-12	18			
916.1	12.5	2.5' Brown and gray silty fine to coarse SAND AND GRAVEL, moist-dense	7	SS	12.5-14.0	15-15-17	18	8		
913.6	15.0	2.5' Brown and gray silty fine to coarse SAND AND GRAVEL, very dense	8	SS	15.0-16.5	14-16-16	18			
911.1	17.5	4.2' Brown and gray silty fine to coarse SAND AND GRAVEL, very dense	9	SS	17.5-19.0	20-22-24	18	9		
			10	SS	20.0-21.5	22-31-50	18			
906.9	21.7	TEST BORING COMPLETED AUGER REFUSAL AT 21.7'								
		Moved boring 10.5' east of staked location due to hedges								

* Pocket Penetrometer Reading - Unconfined Compressive Strength, Tons/Sq. Ft.

General Notes

Driller	J. R. Woodring - CMT
Rig No.	MU-2
Rig Type	Truck
Method	4" HSA
Sampling	2" SS
jg	

Remarks

Drilling performed by CMT Laboratories, State College, Pa.

Water Level Observations

Immediate	NW	Ft.
At Completion	NW	Ft.
After 24 Hours	BF	Ft.
Water Used in drilling	None	Ft.

(Measured from ground surface)

THE H. C. NUTTING COMPANY
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6-28-77 js

TEST BORING REPORT

CLIENT The Corning Museum of Glass ORDER No. 8693.1

PROJECT Proposed Corning Museum of Glass
Corning, New York HOLE No. 4

LOCATION As shown on plan

DRILLER J. Martin DRILL No. 29 DATE STARTED 5-10-77

ELEVATION REFERENCE DATE COMPLETED 5-10-77
CASING: DIAMETER 3.25" I.D. Augers HAMMER WT. 140# FALL 30"
SAMPLER: DIAMETER & TYPE 2.0" O.D. Split Spoon HAMMER WT. FALL
DEPTH TO WATER: IMMEDIATE 10' UPON COMPLETION 7
DEPTH TO WATER DAYS AFTER COMPLETION caved dry 8 WATER USED IN DRILLING from 12

ELEVATION	DEPTH		DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
922.1	0'							
		2.5'	Dark brown topsoil with fine gravel (fill), moist - loose	1	0-1.5	SS	4-4-5	15"
919.6	2.5'			2	2.5-3	SS	5	6"
		0.5'	Dark brown clayey silt with organics, moist - medium stiff					
919.1	3.0'			3	3-4	SS	5-5	12"
		3.0'	Brown silty clay, moist - stiff	S1	4-6	ST	PUSHED	20"
916.1	6.0'			4	6-7.5	SS	6-6-7	10"
		4.0'	Brown fine to coarse sand and gravel, very moist - medium dense					
912.1	10.0'			5	10-11.5	SS	15-25-17	7"
		2.5'	Brown fine to coarse sand and gravel, wet -dense					
909.6	12.5'							

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretations made by others of load bearing, stability, excavating or other physical characteristics of materials penetrated in the boring.

Respectfully submitted,
THE H. C. NUTTING CO.
By John L. Boyce

PROJECT Proposed Corning Museum of Glass
Corning, New York

HOLE No. 4

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
909.6	12.5'						
		16.0' Brown sandy fine to coarse gravel, wet - medium dense	6	12.5-14	SS	12-10-14	9"
			7	15-16.5	SS	18-18-10	10"
			8	17.5-19	SS	6-8-7	7"
			9	20-21.5	SS	6-7-14	8"
			10	25-26.5	SS	8-10-13	11"
893.6	28.5'		11	28.5-30	SS	45-35-50	16"
		1.5' Gray silty fine to coarse sand and shale fragments very moist - very dense					
892.1	30.0'						
		BORING COMPLETED					

THE H. C. NUTTING COMPANY
GEOTECHNICAL AND TESTING ENGINEERS SINCE 1921
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TEST BORING REPORT

CLIENT The Corning Museum of Glass ORDER No. 8693.1

PROJECT Proposed Corning Museum of Glass HOLE No. 7
Corning, New York

LOCATION As shown on plan

DRILLER J. Martin DRILL No. 29 DATE STARTED 5-10-77

ELEVATION REFERENCE _____ DATE COMPLETED 5-10-77

CASING: DIAMETER 3.25" I.D. Augers HAMMER WT. 140# FALL 30"

SAMPLER: DIAMETER & TYPE 2.0" O.D. Split Spoon HAMMER WT. _____ FALL _____

DEPTH TO WATER: IMMEDIATE 10' UPON COMPLETION caved dry 6.5

DEPTH TO WATER _____ DAYS AFTER COMPLETION Backfill WATER USED IN DRILLING from 15

ELEVATION	DEPTH		DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
921.9	0'							
		1.0'	Dark brown topsoil with fine gravel, (fill), moist - loose	1	0-1	SS	3-4	10"
920.9	1.0'			2	1-1.5	SS	6	4"
		1.5'	Brown silty sandy fine to coarse gravel, (fill), moist - loose					
919.4	2.5'			3	2.5-4	SS	10-16-14	12"
		7.5'	Brown fine to coarse sand and gravel, moist to very moist - medium dense	4	5-6.5	SS	8-9-9	10"
				5	7.5-9	SS	10-10-8	7"
911.9	10.0'			6	10-11.5	SS	15-30-19	8"
		5.0'	Brown fine to coarse sand and gravel, wet - dense	7	12.5-14	SS	11-15-30	7"
906.9	15.0'			8	15-16.5	SS	15-10-12	10"
		10.0'	Brown fine to coarse sand and gravel, wet - medium dense	9	17.5-19	SS	11-10-10	9"
				10	20-21.5	SS	10-14-12	8"
896.9	25.0'			11	25-26.5	SS	7-10-13	10"
		3.5'	Brown sandy fine to coarse gravel, wet - medium dense					
893.4	28.5'							

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretations made by others of load bearing, stability, excavating or other physical characteristics of materials penetrated in the boring.

Respectfully submitted,
THE H. C. NUTTING CO.
By John P. Joyce

PROJECT Proposed Corning Museum of Glass HOLE No. 7
Corning, New York

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
893.4	28.5'						
	1.5'	Brown fine to coarse sand and gravel, wet - very dense	12	28.5-30	SS	24-50-58	8"
891.9	30.0'						
		BORING COMPLETED					

THE H. C. NUTTING COMPANY
GEOTECHNICAL AND TESTING ENGINEERS SINCE 1921
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6-29-77 js

TEST BORING REPORT

CLIENT The Corning Museum of Glass ORDER No. 8693.1

PROJECT Proposed Corning Museum of Glass HOLE No. B-8
Corning, New York

LOCATION As shown on plan

DRILLER J. Martin DRILL No. 29 DATE STARTED 5-8-77

ELEVATION REFERENCE DATE COMPLETED 5-8-77

CASING: DIAMETER 3.25" I.D. Augers HAMMER WT. 140# FALL 30"

SAMPLER: DIAMETER & TYPE 2.0" O.D. Split Spoon HAMMER WT. FALL

DEPTH TO WATER: IMMEDIATE 15' UPON COMPLETION caved dry 11

DEPTH TO WATER 2 DAYS AFTER COMPLETION caved dry 11 WATER USED IN DRILLING 17.5

ELEVATION	DEPTH		DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
928.1	0'							
		3.0'	Dark gray sandy silt with glass fragments, cinders and fine gravel (fill), moist - medium dense to loose	1	0-1.5	SS	2-4-8	18"
				2	2.5-3	SS	5	6"
925.1	3.0'			3	3-4	SS	4-5	10"
		3.0'	Brown clayey silt, moist - medium stiff to stiff	S1	5-7	ST	PUSHED	14"
922.1	6.0'							
		9.0'	Brown fine to coarse sand and gravel, moist to very moist - medium dense	4	7-8.5	SS	7-7-10	11"
				5	10-11.5	SS	15-14-14	6"
				6	12.5-14	SS	11-9-6	8"
913.1	15.0'			7	15-16.5	SS	9-4-4	6"
		2.5'	Brown fine to coarse sand and gravel, wet - loose					
910.6	17.5'			8	17.5-19	SS	15-14-12	10"
		2.5'	Brown fine to coarse sand and gravel, wet - medium dense					
908.1	20.0'			9	20-21.5	SS	20-13-21	12"
		1.5'	Brown fine to coarse sand and gravel, wet - dense					
906.6	21.5'		BORING COMPLETED					

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretations made by others of load bearing, stability, excavating or other physical characteristics of materials penetrated in the boring.

Respectfully submitted,
THE H. C. NUTTING CO.
By John L. Thayer

THE H. C. NUTTING COMPANY
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TEST BORING REPORT

CLIENT The Corning Museum of Glass ORDER No. 8693.1

PROJECT Proposed Corning Museum of Glass HOLE No. 9
Corning, New York

LOCATION As shown on plan

DRILLER J. Martin DRILL No. 29 DATE STARTED 5-10-77

ELEVATION REFERENCE DATE COMPLETED 5-10-77

CASING: DIAMETER 3.25" I.D. Augers HAMMER WT. 140# FALL 30"

SAMPLER: DIAMETER & TYPE 2.0" O.D. Split Spoon HAMMER WT. FALL

DEPTH TO WATER: IMMEDIATE 10' UPON COMPLETION caved dry 6'

DEPTH TO WATER DAYS AFTER COMPLETION Backfill WATER USED IN DRILLING 12.5'

ELEVATION	DEPTH		DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
928.9	0'							
		0.5'	Blacktop					
926.4	0.5'			1	0.5-2	SS	12-8-6	4"
		2.0'	Brown silty fine to coarse sand and gravel, (fill), moist - medium dense					
924.4	2.5'			2	2.5-3.5	SS	5-6	10"
		1.0'	Brown clayey silt, moist - stiff					
923.4	3.5'			3	3.5-4	SS	10	4"
		6.5'	Brown silty fine to coarse sand and gravel, moist - medium dense	4	5-6.5	SS	11-11-11	10"
				5	7.5-9	SS	10-10-9	7"
916.9	10.0'			6	10-11.5	SS	7-8-12	7"
		2.5'	Brown fine to coarse sand and gravel, wet - medium dense					
914.4	12.5'			7	12.5-14	SS	3-3-3	4"
		1.5'	Brown fine to coarse sand and fine gravel, wet - loose					
912.9	14.0'							

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretations made by others of load bearing, stability, excavating or other physical characteristics of materials penetrated in the boring.

Respectfully submitted,
THE H. C. NUTTING CO.
By John L. Payne

PROJECT Proposed Corning Museum of Glass
Corning, New York

HOLE No. 9

ELEVATION	DEPTH	DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
912.9	14.0'						
		6.0' Brown sandy fine to coarse gravel, wet - medium dense	8	15-16.5	SS	7-7-10	5"
			9	17.5-19	SS	13-12-15	18"
906.9	20.0'		10	20-21.5	SS	18-50-20	10"
		10.0' Brown fine to coarse sand and gravel, wet - very dense to dense	11	25-26.5	SS	26-18-25	12"
			12	28.5-30	SS	13-30-21	15"
896.9	30.0'						
		BORING COMPLETED					

THE H. C. NUTTING COMPANY
GEOTECHNICAL AND TESTING ENGINEERS SINCE 1921
4120 AIRPORT ROAD · CINCINNATI, OHIO 45226 · TEL. 513-321-5816

6-29-77 js

TEST BORING REPORT

CLIENT The Corning Museum of Glass ORDER No. 8693.1

PROJECT Proposed Corning Museum of Glass HOLE No. 10
Corning, New York

LOCATION As shown on plan

DRILLER J. Martin DRILL No. 29 DATE STARTED 5-8-77

ELEVATION REFERENCE DATE COMPLETED 5-8-77

CASING: DIAMETER 3.25" I.D. Augers HAMMER WT. 140# FALL 30"

SAMPLER: DIAMETER & TYPE 2.0" O.D. Split Spoon HAMMER WT. FALL

DEPTH TO WATER: IMMEDIATE 15' UPON COMPLETION caved dry 12

DEPTH TO WATER 2 DAYS AFTER COMPLETION caved dry 12 WATER USED IN DRILLING from 17.5

ELEVATION	DEPTH		DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
927.9	0'							
		2.5'	Dark brown topsoil with fine gravel and organic (fill), moist - medium dense	1	0-1.5	SS	4-7-11	15"
924.9	2.5'			2	2.5-4	SS	4-6-6	18"
		3.5'	Brown clayey silt, moist-medium stiff	S1	5-6	ST	PUSHED	15"
921.4	6.0'			3	6.0-7.5	SS	11-17-17	6"
		4.0'	Brown silty fine to coarse sand and gravel moist - dense					
917.4	10.0'			4	10-11.5	SS	10-12-12	9"
		5.0'	Brown fine to coarse sand and gravel, moist to very moist - medium dense	5	12.5-14	SS	9-11-7	7"
912.4	15.0'			6	15-16.5	SS	9-10-7	7"
		2.5'	Brown fine to coarse sand and gravel, wet - medium dense					
909.9	17.5'			7	17.5-19	SS	5-5-4	6"
		2.5'	Brown sandy fine to coarse gravel, wet - loose					
907.4	20.0'							

Samples recovered from this test boring are available for inspection, which is strongly recommended. The company assumes no responsibility for interpretations made by others of load bearing, stability, excavating or other physical characteristics of materials penetrated in the boring.

Respectfully submitted,
THE H. C. NUTTING CO.
By John L. Payne

PROJECT Proposed Corning Museum of Glass
Corning, New York

HOLE No. 10

ELEVATION	DEPTH		DESCRIPTION OF MATERIALS	SAMPLE No.	SAMPLE DEPTH	TYPE OF SAMPLE	BLOWS PER 6" ON SAMPLER or % Core Rec.	Recovery
907.4	20.0'							
		5.0'	Brown fine to coarse gravel, wet - medium dense	8	20-21.5	SS	20-31-32	15"
902.4	25.0'			9	25-26.5	SS	10-10-15	9"
		3.5'	Brown sandy fine to coarse gravel, wet - medium dense					
898.9	28.5'			10	28.5-30	SS	14-14-21	10"
		1.5'	Brown fine to coarse sand and gravel, wet - dense					
897.4	30.0'							
			BORING COMPLETED					

DATE
STARTED 2-27-84
FINISHED 2-27-84
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. B-1
SURF. ELEV. 927.0
G. W. DEPTH See Note #1

PROJECT Steuben Glass Expansion
LOCATION Corning Glass Works, Corning, NY

DEPTH	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0								TOPSOIL 0.5'	Note #1: Groundwater first encountered @ 15.5'. At completion water @ 21.3' inside 35' of augers. Auger out, water @ 15.8'
		1	4	4	5	9		FILL: Dark Brown coarse-fine SAND, GRAVEL & SILT, trace of cinders (Damp-Loose) -Similar w/wood, glass & coal (Moist-Loose) 8.5'	
5		2	5	4	4	8			
10		3	5	5	5	10		Brown SILT & CLAY (Moist-Medium) 12.5'	
15		4	7	10	10	20		Brown fine GRAVEL & coarse-fine SAND, little to trace silt (Wet-Firm)	
20		5	8	7	7	14			
25		6	21	24	23	47		-Compact 28.0'	
30		7	24	32	32	64		Brown coarrse-fine SAND & GRAVEL, little to Some Silt (Wet-Very Compact)	
35		8	47	58	64	122		-Similar w/weathered Rock fragments	
40								Boring Terminated @ 36.5'	

N = No. blows to drive 2 " spoon 12 " with 140 lb pin wt. falling 30 "per blow
C = No. blows to drive _____ " casing _____ " with _____ lb weight falling _____ "per blow
METHOD OF INVESTIGATION 3 3/4" ID Hollow Stem Auger Casing & Standard Penetration Test

CLASSIFICATION Visual by Driller & Engineering Technician

DATE
STARTED 2-27-84
FINISHED 2-27-84
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. B-2
SURF. ELEV. 921.5
C. W. DEPTH ~~See Note~~

PROJECT Steuben Glass Expansion

LOCATION Corning Glass Works
Corning, NY

DEPTH-FT.	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0								ASPHALT-0.4' Crushed Stone 1.2'	Note #1 - Groundwater first encountered @ 9.7'. At completion water @ 10.2' inside 25' of augers
		1	11	11	27	38		Brown coarse-fine SAND & GRAVEL, little silt, cobbles (Damp-Compact) 4.5'	
5		2	4	5	6	11		Brown SILT & CLAY (Damp-Medium) 7.6'	
10		3	8	11	10	21		Brown coarse-fine GRAVEL & SANDS, little to trace silt, cobbles (Wet-Firm)	
15		4	9	54	52	106		-Very Compact 18.5'	
20		5	29	46	53	99		Gray coarse-fine SAND & GRAVEL, Some Silt (weathered)	
25		6	29	48	72	120		(Wet-Very Compact)	
								Boring Terminated @ 26.5'	
30									

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow

C = No. blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow

CLASSIFICATION Visual by Driller & Engineering Technician

METHOD OF INVESTIGATION 3 3/4" ID Hollow Stem Auger Casing & Standard Penetration Test

DATE
STARTED 2-27-84
FINISHED 2-27-84
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC SUBSURFACE LOG

HOLE NO. B-3
SURF. ELEV. 926.1
G. W. DEPTH ~~See Note~~

PROJECT Steuben Glass Expansion

LOCATION Corning Glass Works
Coring, NY

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0								TOPSOIL 0.6'	Note #1: First encountered groundwater @ 15'. At completion water @ 15.3' inside 30' of augers. Augers out, water @ 14.9'
								FILL: Dark Brown SILT (partially organic), little sand, fine gravel	
		1	3	4	4	8		(Moist-Loose) 5.0'	
5		2	4	5	6	11		Dark Brown Organic SILT (Damp-Firm) 7.0'	
								Brown SILT, little sand, trace fine gravel (Moist) 10.5'	
10		3A	7	11	11	22		Brown coarse-fine GRAVEL & SAND, little to trace silt, cobbles (Wet-Firm)	
		3B							
15		4	6	6	7	13			
20		5	4	9	7	16			
								25.5'	
25		6	29	30	36	66		Brown coarse-fine SAND & GRAVEL, little silt, cobbles (weathered coarse Gravels & Cobbles)	
30		7	28	44	51	95		(Wet-Very Compact)	
								Boring Terminated @ 31.5'	
35									

N = No. blows to drive 2" spoon 12" with 140 lb. pin wt. falling 30" per blow

C = No. blows to drive ____" casing ____" with ____ lb. weight falling ____" per blow

CLASSIFICATION Visual by Driller & Engineering Technician

METHOD OF INVESTIGATION 3 3/4" ID Hollow Stem Auger Casing & Standard Penetration Test

DATE
STARTED 2-24-84
FINISHED 2-24-84
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. B-5
SURF. ELEV. 921.7
G. W. DEPTH ~~See Note #1~~

PROJECT Steuben Glass Expansion
LOCATION Corning Glass Works, Corning, NY

DEPTH FT.	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0								ASPHALT 0.3' Crushed Stone 1.1'	Note Groundwater first encountered @ 9.2'. At completion water @ 9.6' inside 25' of augers. Augers out, hole caved to 7.7'-no free water
		1A						FILL: Brown medium-fine SAND, little gravel, trace silt (Damp) 3.5'	
		1B	8	8	9	17			
5		2	6	13	16	29		Layer of dark Brown organic SILT, roots changing to Brown SILT & fine SAND, trace gravel (Damp-Firm) 5.5	
10		3	12	13	10	23		Brown coarse-fine SAND & GRAVEL, little silt, cobbles (Damp to Wet-Firm)	
15		4	16	15	11	26		18.5'	
20		5	24	31	45	76		Gray coarse-fine SAND & GRAVEL, little to Some Silt, cobbles (Weathered Gravels) (Wet-Very Compact)	
25		6	47	92	71	163		Boring Terminated @ 26.5'	

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow
C = No. blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

CLASSIFICATION Visual by Driller & Engineering Technician

METHOD OF INVESTIGATION 3 3/4" ID Hollow Stem Auger Casing & Standard Penetration Test

H.C. Nutting Company
4120 Airport Road

Cincinnati, Ohio 45226

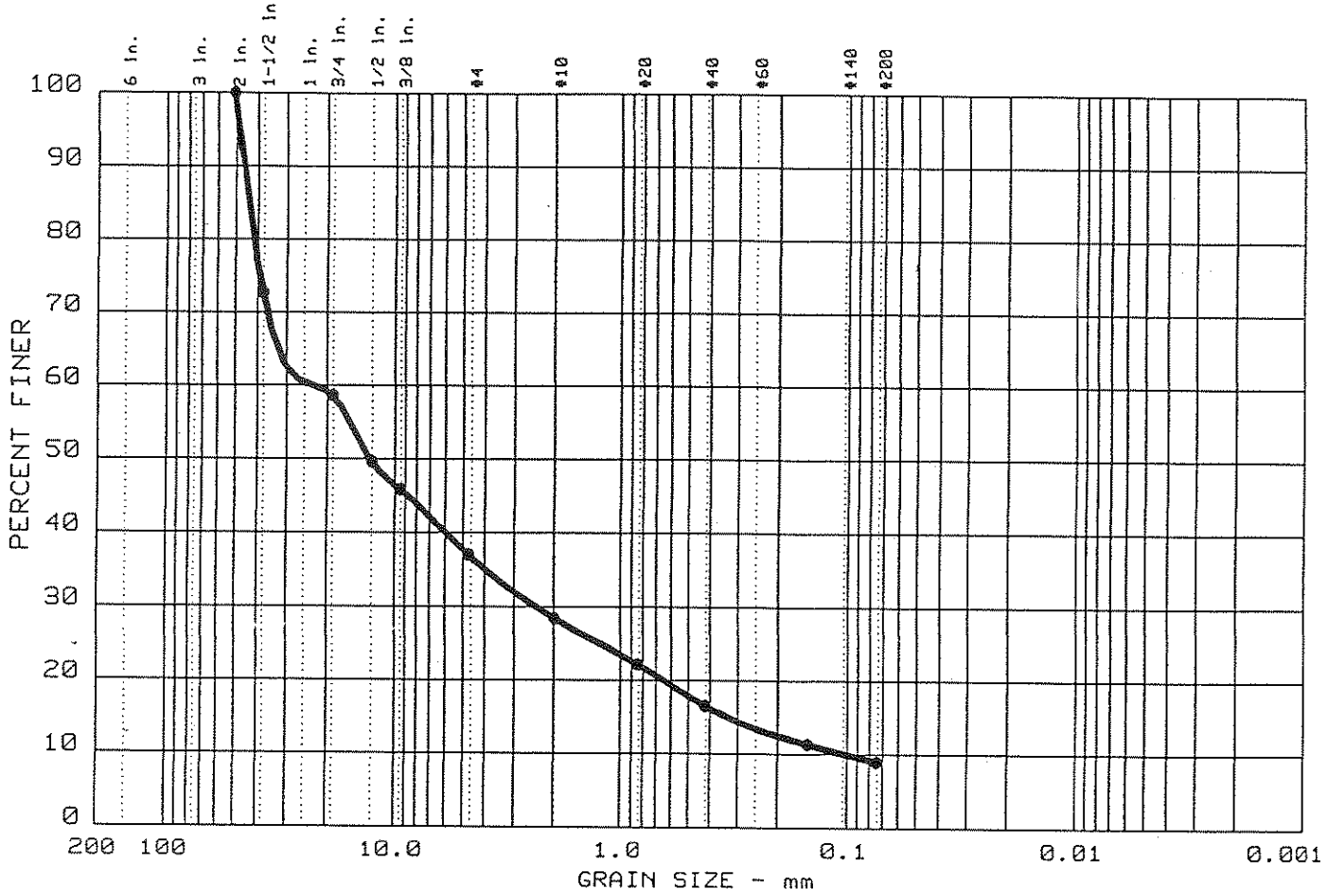
Corning, Inc.
Corning 2000 Project (Glass Center Addition)
Corning, New York
HCN W.O. # 02092.200 jg

TABLE I

CLASSIFICATION TEST DATA

Boring No.	Sample No.	Depth (Ft.)	Moisture Content (%)	Atterberg Limits		
				Liquid Limit (%)	Plastic Limit (%)	Plasticity Index
95-1	5	7.5-9	8.8			
	9	14-16	7.6			
	12	19-21	11.4			
95-2	4	6-7.5	13.3			
	7	11-12.5	19.9	26	20	6
	12	19-21	10.1			
95-3	3	3-5	21.2			
	5	7.5-9	12.0			
	10	17.5-19	9.1			
95-4	5	8.5-10	24.6	29	21	8
	7	12.5-14	9.4			
	10	20-21.5	10.2			
95-5	3	3-5	22.8			
	6	10-11.5	22.0			
	9	17.5-19	8.1			
95-6	3	3-5	14.8			
	7	12.5-14	6.5			
	9	17.5-19	7.2			
95-6A	4	6-7.5	17.1			
	7	12.5-14	7.8			
	9	17.5-19	8.8			

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY
●	0.0	63.0	28.1	8.9	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			43.95	23.07	12.94	2.410	0.3327	0.1016	2.48	227.0

MATERIAL DESCRIPTION	USCS	AASHTO
● WELL GRADED GRAVEL WITH SILT AND SAND	GW-GM	

Project No.: 02092.200
Project: Glass Museum Addition-Coring, NY
● Location: Boring:95-4 Depth:12.5-14' Samp:7

Date: 10-2-95

GRAIN SIZE DISTRIBUTION TEST REPORT

H. C. NUTTING COMPANY

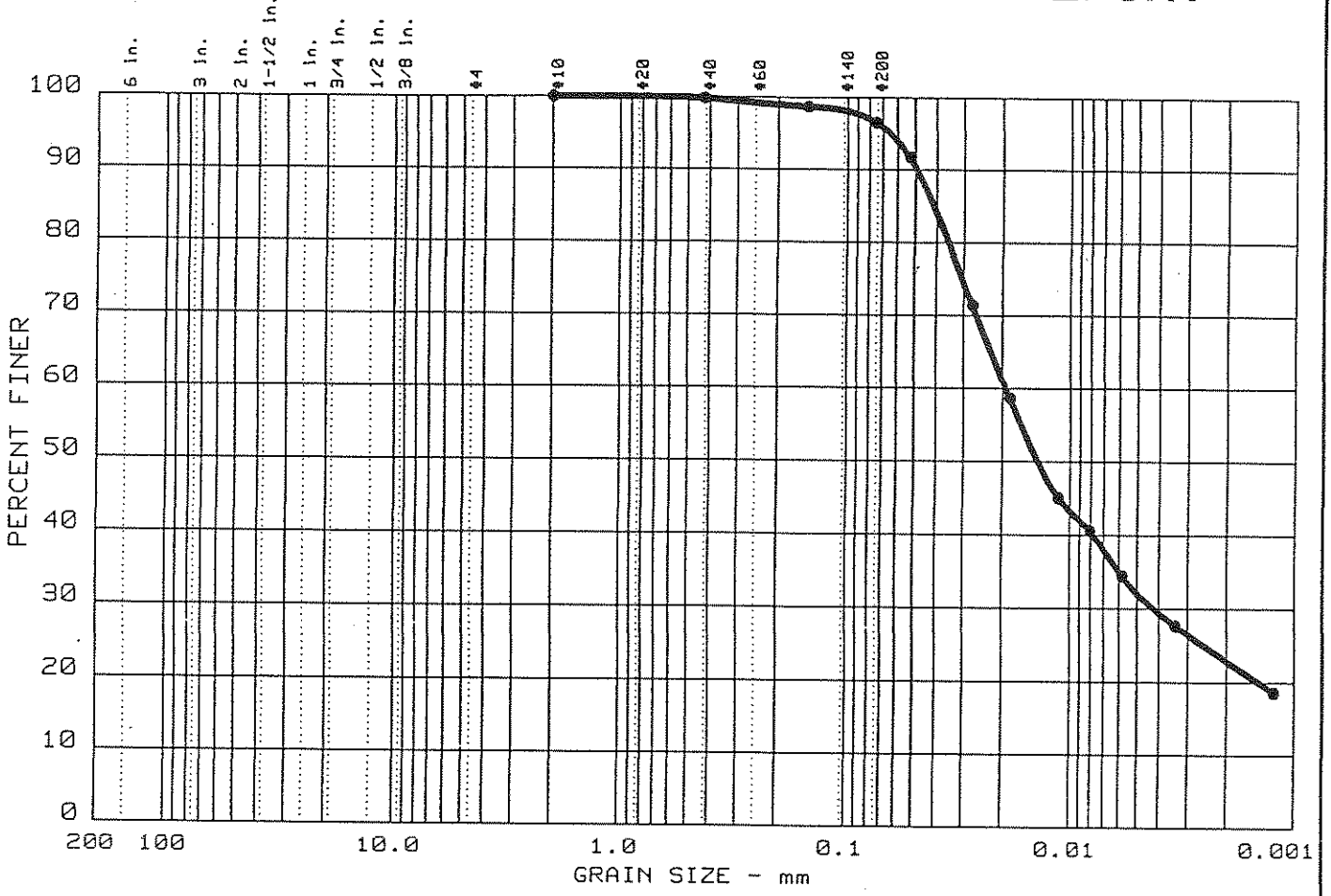
Remarks:

Client: Coring, Inc.

Lab No. 6191

Figure No. _____

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY
●	0.0	0.0	3.5	64.5	32.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.04	0.02	0.01	0.004				

MATERIAL DESCRIPTION	USCS	AASHTO
● SILT	ML	

Project No.: 02092.200
Project: Glass Museum Addition-Corning, NY
● Location: Boring:95-5 Depth:10-11.5' Samp:6

Date: 10-2-95

Remarks:

Client: Corning, Inc.

Lab No. 6194

GRAIN SIZE DISTRIBUTION TEST REPORT

H. C. NUTTING COMPANY

Figure No. _____

THE H. C. NUTTING COMPANY
TESTING ENGINEERS AND SOIL CONSULTANTS • SINCE 1921
4120 AIRPORT ROAD • CINCINNATI, OHIO 45226 • TEL. 513-321-5816

CONSOLIDATION TEST

DATE: 7-12-77

THE CORNING MUSEUM OF GLASS — CLIENT

PROPOSED CORNING MUSEUM OF GLASS - CORNING, NEW YORK. — PROJECT

BORING NO. 3
SAMPLE NO. S-1
DEPTH (FT.) 4.0-6.0

	INITIAL	FINAL
WATER CONTENT, %	27.5	24.0
DRY DENSITY, PCF	88.2	
VOID RATIO	.8837	.6387
SATURATION, %	82.7	100.0

LAB NO. 3825
SAMPLE HEIGHT .99 IN.
SAMPLE DIAMETER 2.50 IN.
SPECIFIC GRAVITY 2.66

OVERBURDEN PRESSURE, P_o _____ TSF
PRECONSOLIDATION PRESSURE, P_c _____ TSF
COMPRESSION INDICES, C_c _____
C_R _____

DESCRIPTION OF MATERIAL: LL= 31.5 % PL= 21.6 % PI= 9.9 %
Dark brown silty clay, loamy, moist - medium stiff (Blockey Structure)

STRESS TSF	VOID RATIO
0.00	.8837
0.20	.8801
0.40	.8770
0.80	.8654
1.60	.8372
3.20	.7671
6.40	.6955
12.80	.6193
25.60	.5396
6.40	.5473
1.60	.5615
0.40	.5718
0.00	.6387

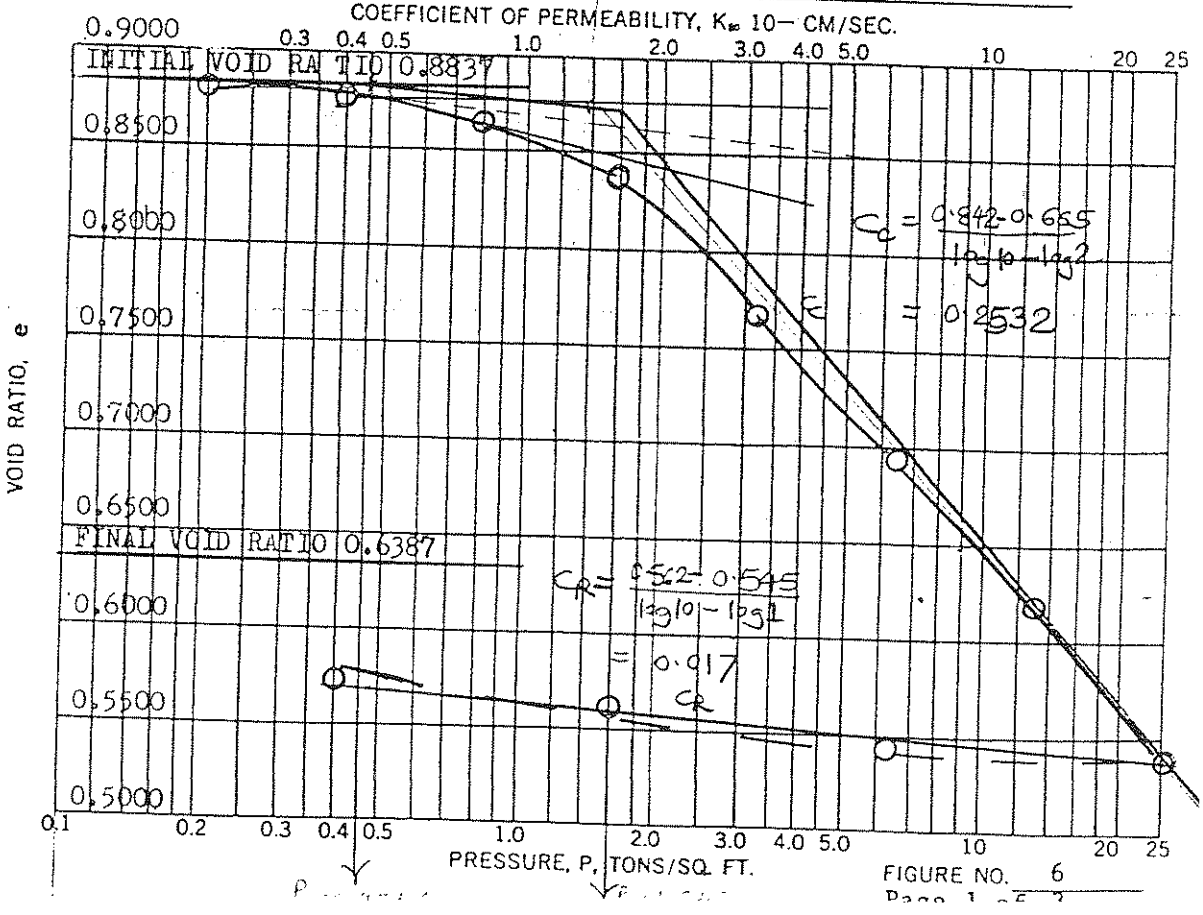


FIGURE NO. 6

Main Office
2380 Commercial Blvd.
State College, PA 16801
Phone: (814) 231-8845
Fax: (814) 231-8846

Branch Office
RD #5, Box 220-63
Montoursville, PA 17754
Phone: (717) 368-8607
Fax: (717) 368-8664

REPORT OF TRIAXIAL TESTING

Standard Test Method for:
Unconsolidated, Undrained Compressive Strength of Soils in Triaxial Compression

Project: Corning Glass Museum
File Number: 95874

Location: Corning, New York
Date: 21-Sep-95

Client: Mr. George Webb, P. E. / H.C. Nutting
Boring Number: TB - 95 - 4

Sample Description: Gray Silt
Sample Depth: 8.0 - 9.5 feet

ASTM Designation: D 2850
Recovery: 1.2 feet

Sample Source: Undisturbed Sample from Shelby Tube Extract

Specimen Data:

Average Height:	5.87	inches	Specific Gravity:	2.68	
Average Diameter:	2.78	inches	Moisture Content:	16.2	percent
Height/Diameter Ratio:	2.1		Wet Unit Weight:	115.8	pounds per cubic foot
Average Area:	6.07	sq. in.	Dry Unit Weight:	99.7	pounds per cubic foot
Degree of Saturation:	64.1	percent	Void Ratio:	0.6781	

Test Data:

Confinement Pressure:	8.0	psi	Axial Strain at Failure:	7.48	percent
Average Rate of Axial Strain to Failure	1.14	% / minute	Minor Stress at Failure:	8.0	psi
Type of Failure:	Bulge		Major Stress at Failure:	22.7	psi
Compressive Strength:	14.7	psi	Undrained Shear Strength:	7.0	psi

Notes:
1.) Several gravel particles, approximately 3/8 inch, were present within test specimen.
2.) Moisture Content obtained from sample trimmings.
3.) Some sample patching was required.

James P. Thompson Jr.
CMT Laboratories, Inc.

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Fax: (814) 231-8846

Branch Office
RD #5, Box 220-63
Montoursville, PA 17754
Phone: (717) 368-8607
Fax: (717) 368-8664

Unconsolidated - Undrained Triaxial Test

Project: Corning Glass Museum File Number: 95874

Description: Gray Silt Date: 21-Sep-95

Boring: TB - 95 - 4 Depth: 10 - 12 feet

Sample Number 1 Length 5.87 inches Area 6.07 sq. in.

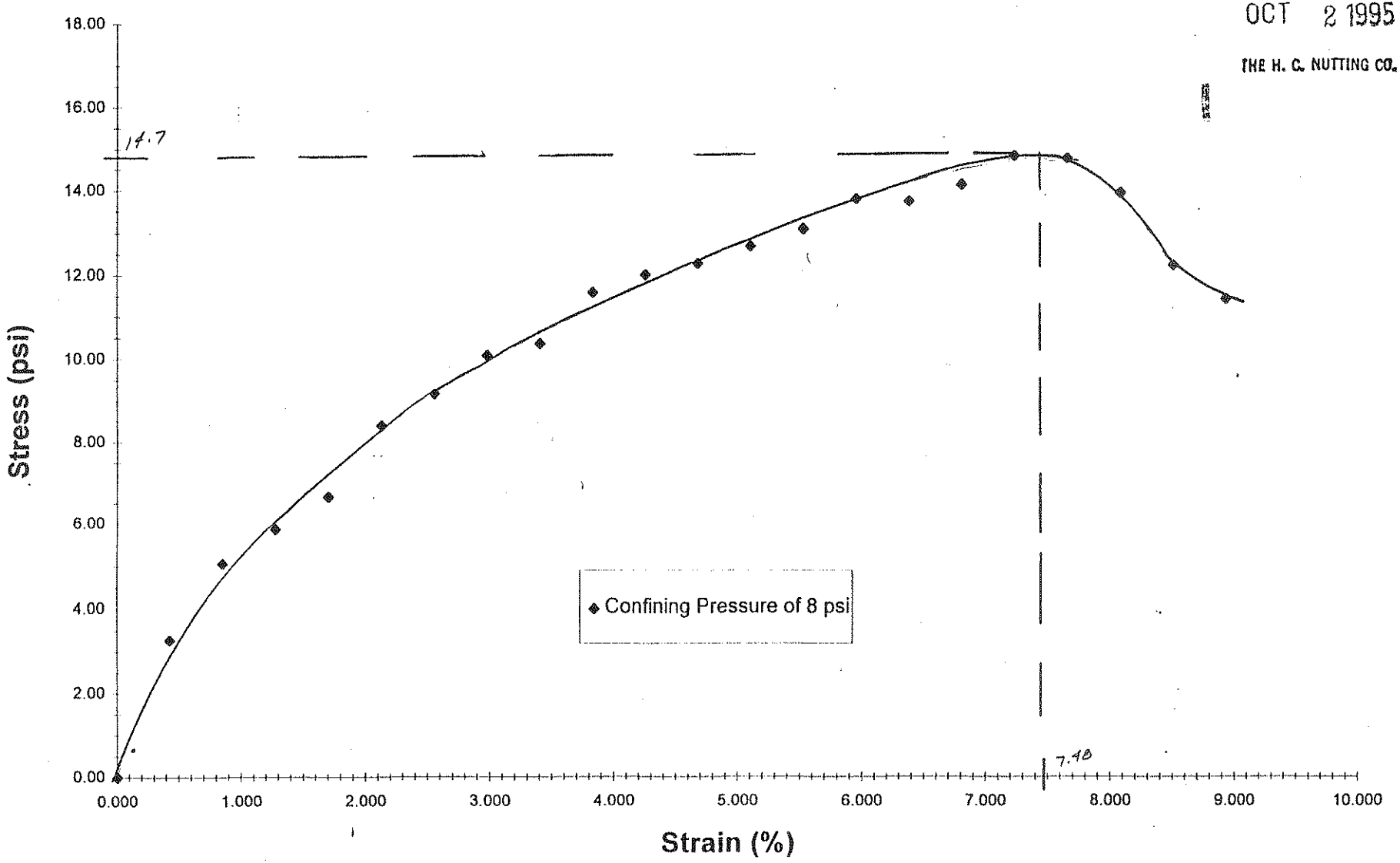
Confining Pressure 8 psi Diameter 2.78 inches

Specimen Deformation (in)	Vertical Strain (in/in)	Load (# of div.)	Corected load (pounds)	Corected Area (sq. in.)	Axial Strain (%)	Deviatory Stress (psi)
0.000	0.000	0	0	6.070	0.000	0.00
0.025	0.004	5	20	6.096	0.426	3.28
0.050	0.009	9	31	6.122	0.852	5.06
0.075	0.013	11	36	6.148	1.278	5.86
0.100	0.017	13	41	6.175	1.704	6.64
0.125	0.021	17	52	6.202	2.129	8.38
0.150	0.026	19	57	6.229	2.555	9.15
0.175	0.030	21	63	6.256	2.981	10.07
0.200	0.034	22	65	6.284	3.407	10.34
0.225	0.038	25	73	6.312	3.833	11.57
0.250	0.043	26	76	6.340	4.259	11.99
0.275	0.047	27	78	6.368	4.685	12.25
0.300	0.051	28	81	6.397	5.111	12.66
0.325	0.055	29	84	6.426	5.537	13.07
0.350	0.060	31	89	6.455	5.963	13.79
0.375	0.064	31	89	6.484	6.388	13.73
0.400	0.068	32	92	6.514	6.814	14.12
0.425	0.072	34	97	6.544	7.240	14.82
0.450	0.077	34	97	6.574	7.666	14.76
0.475	0.081	32	92	6.604	8.092	13.93
0.500	0.085	28	81	6.635	8.518	12.21
0.525	0.089	26	76	6.666	8.944	11.40

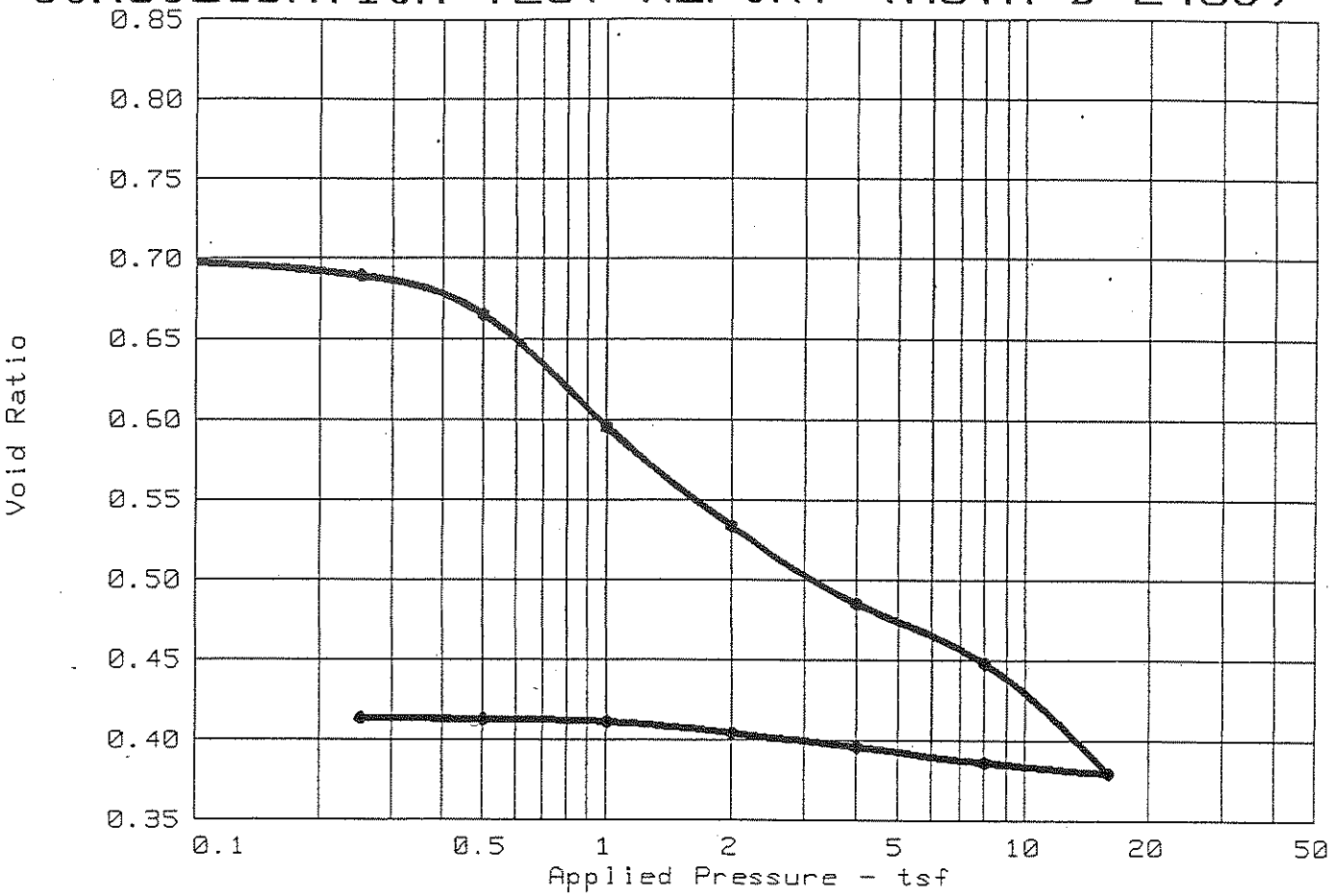
CMT Laboratories, Inc..
2380 Commercial Blvd.
State College, PA 16801
Phone (814) 231-8845
FAX (814) 231-8846

File Number: 95874
Boring: TB-95-4
Depth: 8 to 9.5 feet

Plot of Triaxial Test Results



CONSOLIDATION TEST REPORT (ASTM D 2435)



Coefficients of Consolidation (sq. in./min.)								
No.	Load	Cv	No.	Load	Cv	No.	Load	Cv
1	0.25	0.027						
2	0.50	0.046						
3	1.00	0.032						
4	2.00	0.046						
5	4.00	0.051						
6	8.00	0.025						
7	16.00	0.065						

Natural Saturation	Natural Moisture	Dry Dens. (pcf)	LL	PI	Sp.Gr.	Precons. (tsf)	C_c	e_o
62.2 %	16.2 %	98.6	---	---	2.680	0.48	0.19	0.6974

TEST RESULTS

C_v at 2.00 tsf applied = 0.046 sq. in./min.
C_v at 16.00 tsf applied = 0.065 sq. in./min.

MATERIAL DESCRIPTION

Gray Silt

Project No.: 95874
Project: Corning Glass Museum
Location: Corning, New York
Test Boring 95-4
Date: 13 Sept. 1995

CONSOLIDATION TEST REPORT (ASTM D 2435)

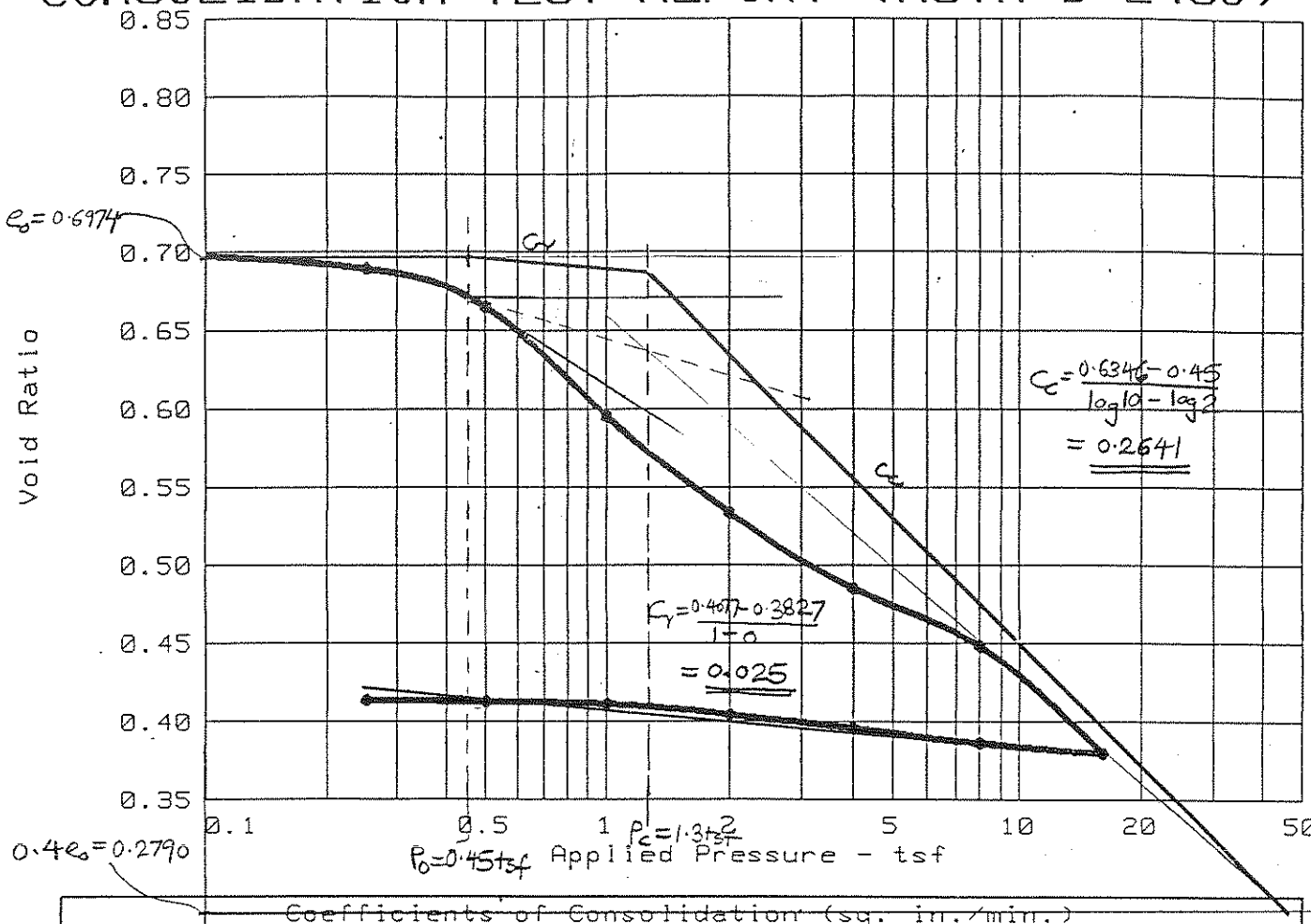
CMT Laboratories

Remarks:

Depth of 8.0 - 9.5 feet
Shelby Tube Sample
1.2 feet of recovery
Client: H.C. Nuttig
Attn: Mr. George Webb

Fig. No. 1

CONSOLIDATION TEST REPORT (ASTM D 2435)



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MATERIAL DESCRIPTION

Gray Silt

Project No.: 95874
Project: Corning Glass Museum
Location: Corning, New York
Test Boring 95-4
Date: 13 Sept. 1995

CONSOLIDATION TEST REPORT (ASTM D 2435)

CMT Laboratories

Remarks:

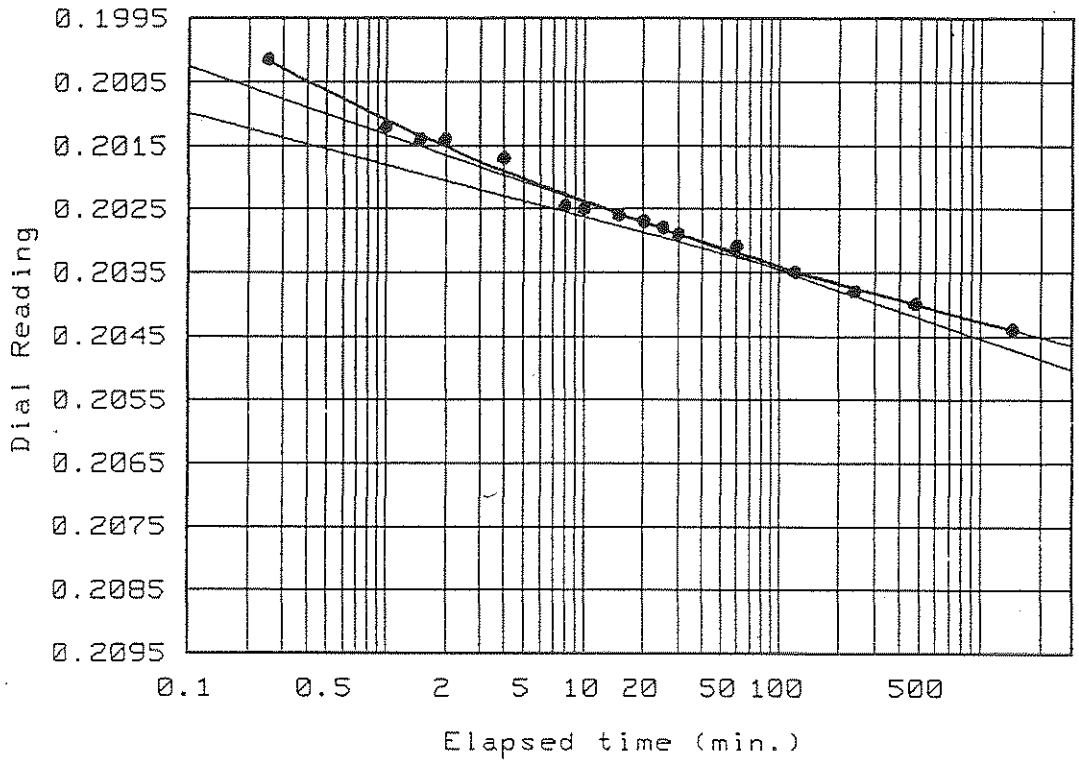
Depth of 8.0 - 9.5 feet
Shelby Tube Sample
1.2 feet of recovery
Client: H.C. Nuttig
Attn: Mr. George Webb

Fig. No. 1

Samuel P. Shaughnessy Jr.

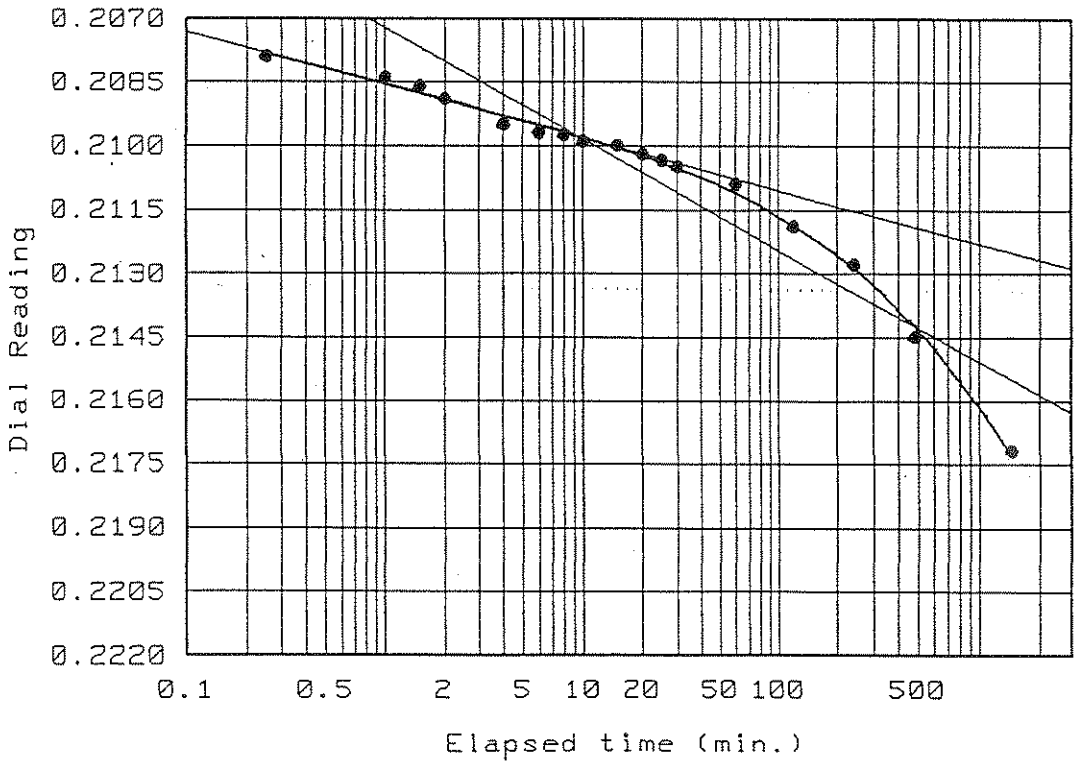
Dial Reading vs. Time

Project No.: 95870
Project: Corning Glass Museum
Location: Corning, New York
Test Boring 95-4
Date: 13 Sept. 1995



Load No.= 1
Load= 0.25 tsf
D_0 = 0.1992
D_{50} = 0.2013
D_{100} = 0.2034
T_{50} = 1.41 min.

C_v @ T_{50} =
.027 $in.^2/min.$

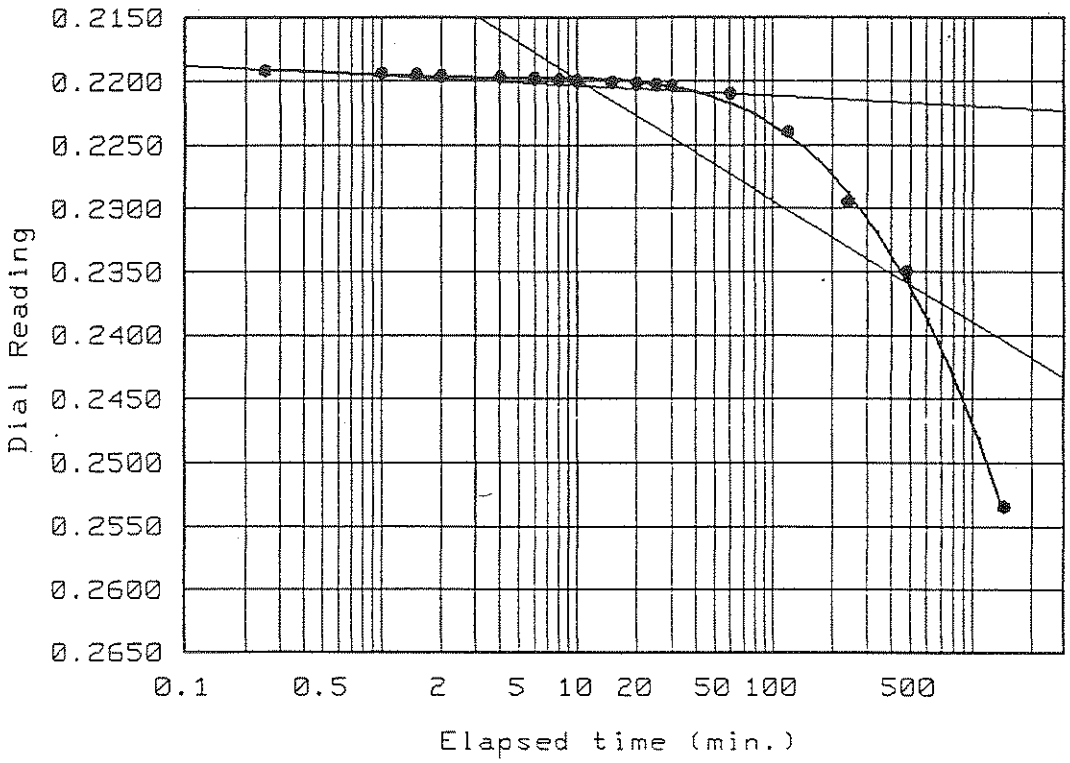


Load No.= 2
Load= 0.50 tsf
D_0 = 0.2071
D_{50} = 0.2084
D_{100} = 0.2098
T_{50} = 0.82 min.

C_v @ T_{50} =
.046 $in.^2/min.$

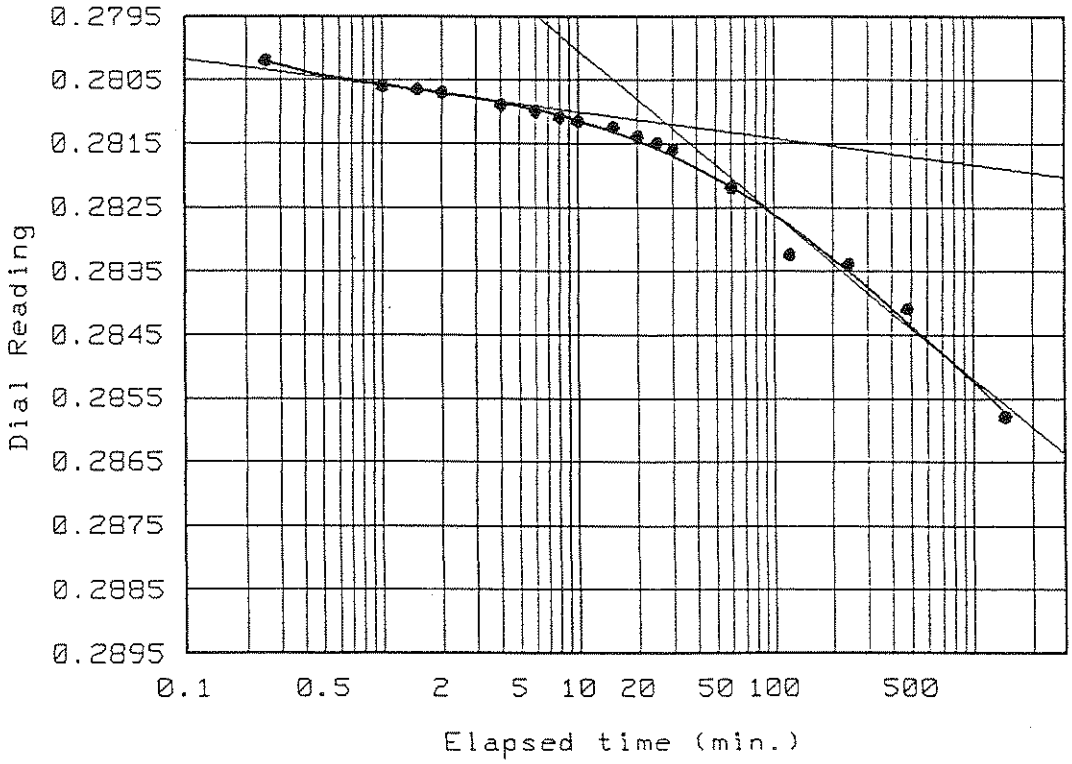
Dial Reading vs. Time

Project No.: 95870
Project: Corning Glass Museum
Location: Corning, New York
Test Boring 95-4
Date: 13 Sept. 1995



Load No.= 3
Load= 1.00 tsf
D_0 = 0.2187
D_{50} = 0.2195
D_{100} = 0.2204
T_{50} = 1.12 min.

C_v @ T_{50} =
.032 $in.^2/min.$

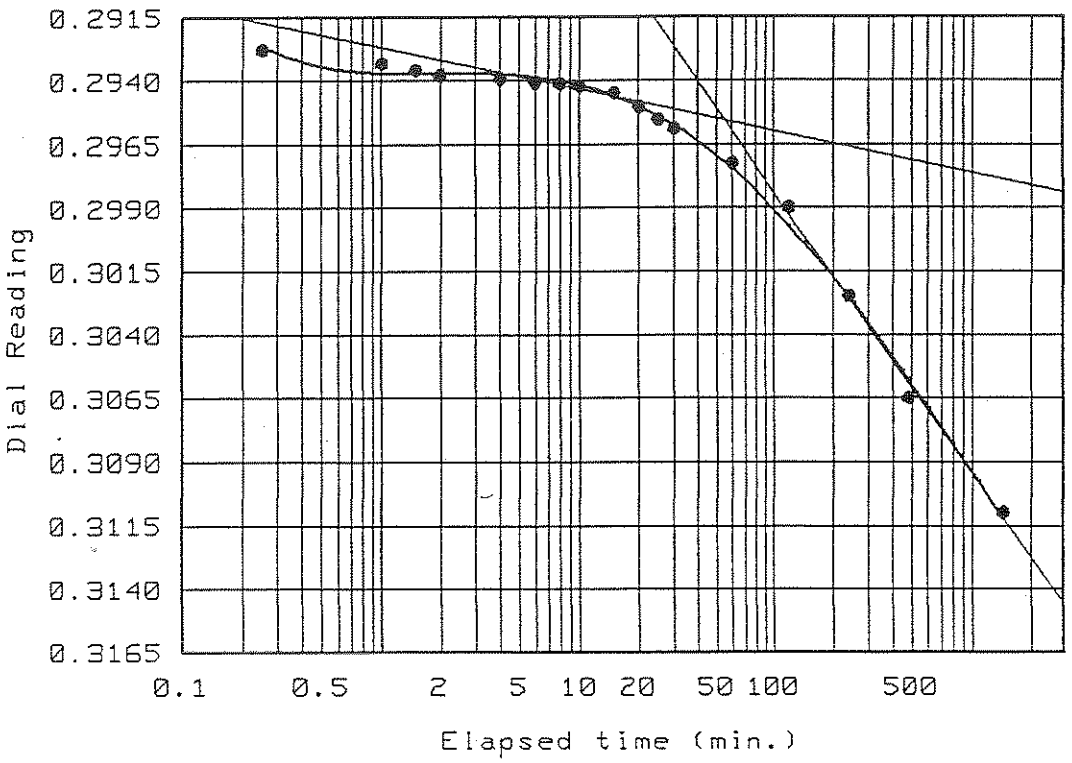


Load No.= 4
Load= 2.00 tsf
D_0 = 0.2798
D_{50} = 0.2805
D_{100} = 0.2812
T_{50} = 0.71 min.

C_v @ T_{50} =
.046 $in.^2/min.$

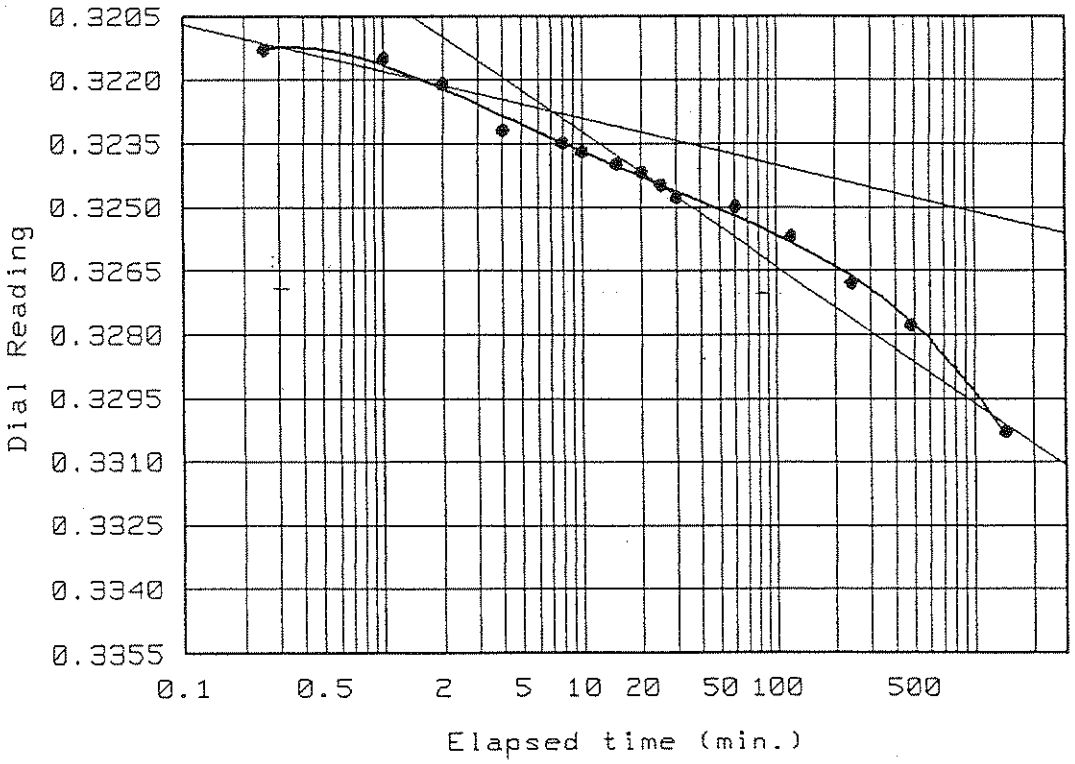
Dial Reading vs. Time

Project No.: 95870
Project: Corning Glass Museum
Location: Corning, New York
Test Boring 95-4
Date: 13 Sept. 1995



Load No.= 5
Load= 4.00 tsf
D_0 = 0.2916
D_{50} = 0.2936
D_{100}= 0.2955
T_{50}= 0.60 min.

C_v @ T_{50} =
.051 $in.^2/min.$

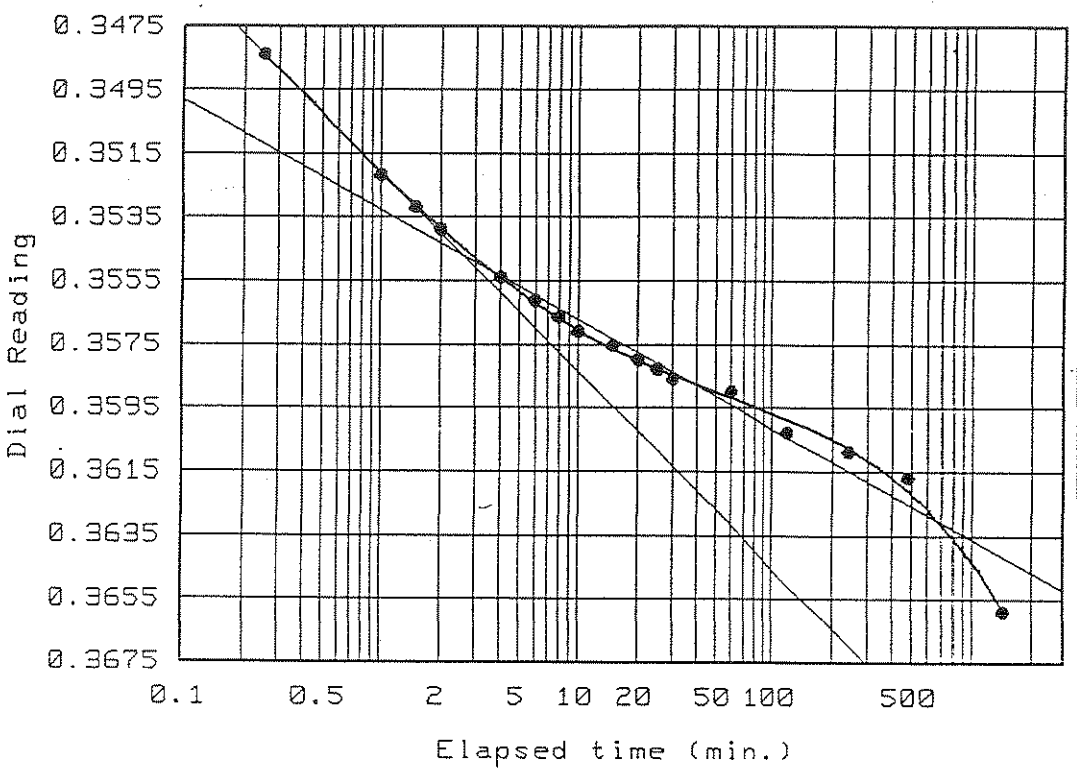


Load No.= 6
Load= 8.00 tsf
D_0 = 0.3208
D_{50} = 0.3218
D_{100}= 0.3227
T_{50}= 1.17 min.

C_v @ T_{50} =
.025 $in.^2/min.$

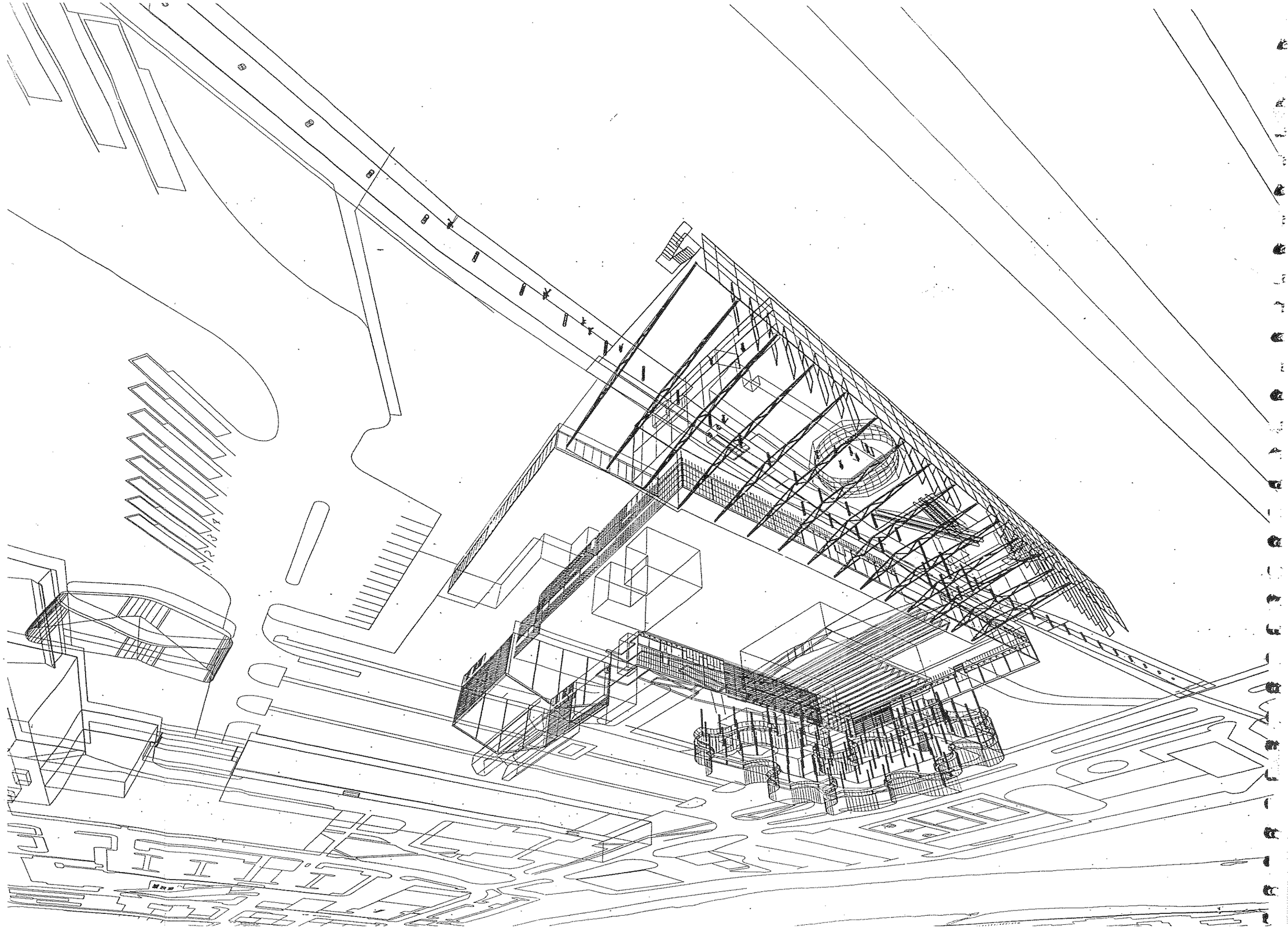
Dial Reading vs. Time

Project No.: 95870
Project: Corning Glass Museum
Location: Corning, New York
Test Boring 95-4
Date: 13 Sept. 1995



Load No.= 7
Load= 16.00 tsf
D_0 = 0.3448
D_{50} = 0.3497
D_{100} = 0.3547
T_{50} = 0.41 min.

C_v @ T_{50} = .065 $in.^2/min.$



77-2

77-3

TEST BORINGS DRILLED IN 1977
FOR CORNING MUSEUM OF GLASS (TYP.)

77-5

77-4

77-6

77-7

77-8

77-10

95-1

95-2

95-3

95-4

95-5

95-6

95-6A

84-1

84-2

84-3

84-4

84-5

TEST BORINGS DRILLED
IN 1984 FOR STUBEN
GLASS EXPANSION (TYP.)

TEST BORINGS DRILLED IN 1995
FOR CORNING 2000 PROJECT (TYP.)

0 40 80
SCALE–FEET

N

CORNING GLASS CENTER
Corning New York

FOUNDATION PLAN

JOB NO.	DATE	SCALE	DRAWING NO.
30444	06/30/95		S1.10
DRAWN	CHECKED	APPROVED	8110
SL	CF	CF	

SMITH-MILLER + HAWKINSON ARCHITECTS
305 CANAL STREET NEW YORK NEW YORK 10013

H.C. NUTTING COMPANY
CORPORATE CENTER – 4120 AIRPORT RD
CINCINNATI, OHIO 45226
(513) 321-5816
EMPLOYEE OWNED
GEOTECHNICAL, ENVIRONMENTAL AND TESTING ENGINEERS

TEST BORING LOCATION PLAN

CORNING INCORPORATED
PROPOSED CORNING 2000 PROJECT
CORNING, N.Y.

SCALE: 1" = 40' | DATE: Sept. 95 | DWG 02092.200 A

Notes:

Fin. Ground Floor Elev. +22'0" refers to elev. +922.0' with top step of N.Y. State Armory used as datum at elev. +333.16'. Elevs. shown thus (19'0") are to bottom of footings.

SCALE: 1" = 20'

0 20 40

SCALE-FEET

FIN. FLOOR ELEV. +22'0"
6" Slabs Poured in Alternate 20'-20' Sections See Det. Drg. S-10

Construction Joint

FINISHED GROUND FLOOR ELEVATION +22'0"

Pocket in Slab for Billets

TELEPHONE JOINT WORKS PIERS

(+15'-6") (+15'-6")

—GLASS CENTER—

FOR THE
CORNING GLASS WORKS
CORNING, N.Y.

FOUNDATION PLAN

SEPT., 1950

DWG. NO. S-1

301'-2"

PLATE 3

PROJECT NORTH

ARUP
155 Avenue of the Americas
New York NY 10013
Telephone 212 229 2669
Ove Arup & Partners Consulting Engineers PC

BORING PLAN

Project	CORNING 2000		
Dm	CFF	Date 04.04.95	Scales .
Job No	5009/24	Dwg No	BP-1

77-1
77-2
77-3
77-4
77-5
77-6
77-7
77-8
77-9
77-10
95-1
95-2
95-3
95-4
95-5
95-6
95-6A
84-1
84-2
84-3
84-4
84-5

TEST BORINGS DRILLED IN 1977 FOR CORNING MUSEUM OF GLASS (TYP.)

WEST BRIDGE (NEW)

STEUBEN

TEST BORINGS DRILLED IN 1984 FOR STUBEN GLASS EXPANSION (TYP.)

BIRKERTS BUILDING (MUSEUM)

SCIENCE CENTER

NEW STRUCTURE ABOVE ROOF

20' TYP

TEST BORINGS DRILLED IN 1995 FOR CORNING 2000 PROJECT (TYP.)

SLOPE DOWN

UTILITIES TRENCH

NEW VISITORS CENTER

JITNEY RAMP

SCALE: 1" = 50'

0 50 100

FEET

H.C. NUTTING COMPANY
CORPORATE CENTER – 4120 AIRPORT RD
CINCINNATI, OHIO 45226
(513) 321-5816
EMPLOYEE OWNED
GEOTECHNICAL, ENVIRONMENTAL, AND TESTING ENGINEERS

TEST BORING LOCATION PLAN

CORNING INCORPORATED
PROPOSED CORNING 2000 PROJECT
CORNING, N.Y.

SCALE: 1" = 50' | DATE: Sept. 95 | DWG 02092.200 B