ADDENDUM NO. 1

FC-6487
ATLANTA-FULTON COUNTY WATER TREATMENT PLANT
PHASE 1.0 PLATE SETTLER REPLACEMENT AND
STREAM RELOCATION

ATLANTA-FULTON COUNTY WATER RESOURCES COMMISSION
JOHNS CREEK, GEORGIA

May 14, 2013

This Addendum No. 1 forms a part of the Invitation to Bid and modifies the original solicitation package and is issued to incorporate the following:

1. Revised last date to submit questions: Friday, May 17, 2013
2. Attachment A: Geotechnical Reports
3. Replace Appendix B in its entirety, Insurance and Bonding Requirements

All questions and inquiries concerning this project should be directed in writing to Jill Watkins, Contracting Officer, Department of Procurement, 55 Trinity Avenue, S.W., City Hall South, Suite 1900, Atlanta, Georgia 30303 or questions may be e-mailed to jewatkins@atlantaga.gov or by efax to (404) 739-4683. The last day for questions is Friday, May 17, 2013 at 12:00 noon.

Addendum No. 1 for **FC-6487, Fulton County Water Treatment Plant Phase 1.0 Plate Settler Replacement and Stream Relocation** is available for pick-up in the Plan Room: City Hall, 55 Trinity Avenue, Suite 1900; Fulton County Department of Purchasing and Contract Compliance, 130 Peachtree Street, Suite 1168, Atlanta, Georgia 30303 and at Jacobs: 6801 Governors Lake Parkway, Bldg. 200, Norcross, Georgia, 30071.

Bids are due on Wednesday, May 29, 2013 and should be time stamped in no later than 1:59 p.m. and delivered to the address listed below:

Atlanta-Fulton County Water Resources Commission
9750 Spruill Road,
Johns Creek, Georgia 30022

****All other pertinent information is to remain unchanged****

Bidder Must Acknowledge Receipt of this Addendum on Bid Form

ATLANTA-FULTON COUNTY WATER RESOURCES COMMISSION
Kathy Crews, General Manager

ATTACHMENT A

GEOTECHNICAL REPORT

REPORT OF SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION

Atlanta Fulton County WTP Expansion
Fulton County, Georgia

WILLMER ENGINEERING INC.
Willmer Project No. 171-3238

Prepared For

JORDAN, JONES & GOULDING
Norcross, Georgia

Prepared By

WILLMER ENGINEERING INC.
3772 Pleasantdale Road
Suite 165
Atlanta, Georgia 30340

770.939.0089

WILLMER ENGINEERING INC. | WE

July 12, 2007

VIA U.S. MAIL

Matt Bracewell, PE
Jordan, Jones & Goulding
6801 Governors Lake Parkway
Building 200
Norcross, Georgia 30071

SUBJECT: **Report of Subsurface Exploration and Geotechnical Engineering Evaluation**
Atlanta Fulton County WTP Expansion
Fulton County, Georgia
Willmer Project No. 171-3238

Dear Mr. Bracewell:

Willmer Engineering Inc. (Willmer) is pleased to provide this report of the subsurface exploration and geotechnical engineering evaluation for the Atlanta Fulton County WTP Expansion in Fulton County, Georgia. This work was performed in general accordance with our contract with Jordan, Jones & Goulding (JJ&G) May 22, 2007.

The following report presents our understanding of the proposed design and construction, methods of exploration, site and subsurface conditions, and our conclusions and recommendations related to site preparation, earthwork, and foundation design.

We appreciate the opportunity to be of service on this project. If you have any questions concerning this report or require further assistance, please call.

Sincerely,

WILLMER ENGINEERING INC.

Edmond Leo, PE
Senior Geotechnical Engineer

James L. Willmer, PE
Vice President/Principal Consultant

EL/JLW:kas

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GEORGIA REGISTERED No. 10780 PROFESSIONAL 7-12-07 ENGINEER JAMES L. WILLMER

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Executive Summary

The following summary highlights significant aspects of the geotechnical exploration. Readers are cautioned that this summary provides a brief overview of our findings, conclusions, and recommendations. It is very important that the full report be reviewed to comprehend the design recommendations.

- A geotechnical investigation was performed at the Atlanta Fulton County WTP for proposed clearwell, filters building, flocculation tank, and settling basin structures. A previous site investigation for Clearwells 5 and 6 was provided for our use.
- Eleven soil test borings were drilled and shear wave velocity measurements were obtained to investigate subsurface conditions for the proposed structures.
- Subsurface conditions consist of topsoil, fill soils, alluvium, residual soils, partially weathered rock (PWR), and weathered rock/rock. Ground water was encountered in all borings with the exception of two. Ground water levels varied from 16 to 38 feet below existing grade.
- Mat foundations may be considered for support of the proposed structures. For initial mat analysis, a subgrade modulus of 150 pci may be used. Structure settlements are estimated to be less than 1-inch.
- Dewatering will be required to permit structure excavations to be performed in the dry. The proposed structures will need to be designed for uplift pressures from the present ground water levels. Uplift forces may be accounted for by increasing the dead weight of the structures, installing soil anchors to resist the loads, or providing underdrain systems.
- Temporary excavation shoring will be required for all the proposed structures to retain an existing slope and/or to protect existing structures and/or utilities.
- A permanent retaining wall will be required on the east and south side of Clearwell No. 6 to retain an existing slope and to protect the neighboring Fulton County library complex property. In lieu of a retaining wall, a soil nail wall excavation may be considered to serve both as excavation shoring and a permanent wall. A geotechnical specialty contractor should be consulted to evaluate the feasibility and cost of a soil nail wall.
- The site seismic class was evaluated to be Site Class D per IBC 2006 Code definition.

1.0 Project Information

1.1 Proposed Construction

The existing Atlanta Fulton County WTP in Fulton County, Georgia will be expanded to process more drinking water. The site location is shown on Figure 1, Site Location Map. The proposed structures are listed below:

Proposed Structures

Proposed Structure	Structure Dimensions	Foundation Subgrade Base Slab Elevation (feet)	Foundation Pressure (psf)
Clearwell No. 5 & No. 6	220 feet x 220 feet ±	915.5 ±	2200
Filter Building No. 3	189 feet by 102 feet	925 to 935.5	1800
Flocculation Tank No. 3	173 feet x 47 feet ±	919 to 922.5 ±	1800
Settling Basin No. 3	173 feet x 47 feet ±	927 to 929 ±	1800

The proposed structures are anticipated to be of reinforced concrete construction.

Based on drawings provided by JJ&G, the bottom slab for the clearwells will be 2 feet thick. A series of column pedestals on roughly 20 foot spacing center-to-center each way will be doweled into the slab to support drop panels to support the clearwell roof. Overall height of the clearwell will be approximately 21 feet. A 2 foot cover consisting of soil, No. 57 stone, protection board, and lean concrete will cover the roof structure.

Filter Building No. 3 slab thicknesses are expected to vary from 15 inches to 2 feet. The structure will have various levels with thickened slabs to transition to levels and columns/walls doweled into the various slab levels.

The flocculation/settling basin structure will be a combined structure sharing a common structural wall along the building length. The flocculation structure will consist of four 40-foot diameter circular structures with a sloping tank bottom to a circular pit opening. Bottom-most expected foundation subgrade for the flocculation tanks is EL 919 feet. The settling basin will consist of a series of square chambers roughly 20 feet by 20 feet in dimension formed by concrete walls. The walls will be dowelled into the floor slab. Slab thickness for the combined structure is expected to vary from 2 to 2.5 feet.

1.2 Site Description

The existing water treatment plant is located at 9750 Spruill Road in Alpharetta, Fulton County, Georgia. The plant layout is shown on Figure 2, Existing Plant Site. The proposed expansion will be in the northern and southern portions of the site. Plant grade in the area of the clearwells

varies from Elevation 952 to about Elevation 926 feet. A drainage feature/creek crosses the proposed footprint of the two new clearwells, 5 and 6. Site grade in the area of the new filters building, settling basin and flocculation tank varies from Elevation 942 to 956 feet. The area is presently covered with gravel and was formerly used for construction trailer offices and materials storage.

2.0 Methods of Exploration and Laboratory Testing

2.1 Field Exploration

The subsurface exploration consisted of drilling eleven (11) soil test borings at locations selected by Willmer. The borings were located in the field by JJ&G surveyors with ground surface elevations provided on the boring location stake. The boring locations as drilled by Willmer are shown on Figures 3 and 3A, Boring Location Plan. Boring B-1 was drilled later after the existing chain link fence was removed allowing the drill rig to cross a small creek. At boring B-2, shallow auger refusal was encountered in rocky fill. The boring was offset and boring B-2A drilled.

In addition to the soil test borings, seismic shear wave measurements were obtained at the two locations to define the shear wave velocities of the underlying soil. The work was performed by GeoWave Solutions, Inc. working under subcontract to Willmer. Their report is attached as Appendix II to our report and describes the procedures used.

Drilling of the soil test borings was accomplished using a rubber tire mounted CME 45 ATV rotary drill rig to advance continuous flight hollow-stem augers in general accordance with ASTM D 6151. Boring B-1 was drilled by a rubber tracked GeoProbe 6600DT drill rig. Standard Penetration Resistance Testing (SPT) and split-spoon sampling were performed in general accordance with ASTM D 1586 at generally 2.5-foot intervals in the upper 10 feet and 5-foot intervals thereafter. The split-spoon sampler was first seated six inches to penetrate any loose cuttings and then driven an additional foot by blows from a 140-pound hammer falling 30 inches. The number of blows required to advance the sampler the final foot was recorded and is designated the Standard Penetration Resistance (N-value). When properly evaluated, the results of standard penetration resistance testing provide an indication of the relative consistency of the soil being sampled, the potential for difficult excavation, and the soil's ability to support loads.

A relatively undisturbed soil sample was obtained by hydraulically pushing a 3-inch diameter thin-walled Shelby tube into the soil at boring B-11. The sample was used for evaluation of soil compressibility at the location of the new flocculation tank/settling basin No. 3 and Filter Building No. 3.

Ground water observations were noted during the time of drilling, at the completion of each boring, and at 24 hours after drilling (where possible). These levels are shown on the individual Soil Boring Records. Actual ground water levels at the site may vary from those shown in the Soil Boring Records due to variation in rainfall. Borings were backfilled with soil cuttings after obtaining readings.

2.2 Laboratory Testing

Laboratory testing was performed on the Shelby tube sample obtained during the field investigation. Natural moisture content (ASTM D 2216), grain size analyses (ASTM D 422) and one-dimensional consolidation (ASTM D 2435) tests were performed. Results of the completed laboratory testing are presented in the Appendix of the report.

3.0 Site Geology, Subsurface Conditions, and Laboratory Testing Results

3.1 Site Geology

Based on published geological maps and descriptions, the site is located in the metagraywacke and schist of the Factory Shoals Formation within the Southern Piedmont Physiographic Province of Georgia. The Southern Piedmont is composed of metamorphic rocks with localized igneous intrusions (mica schist/gneiss/amphibolite). The residual soils encountered in the Southern Piedmont are the product of in-situ chemical and physical weathering of the underlying parent rock. Typically, weathering is most advanced near the surface and decreases with depth.

Below the residual soils, partially weathered rock is usually encountered as a transition zone to the underlying bedrock. Partially weathered rock is locally defined as a material with standard penetration resistance (N-value) in excess of 50 blows per 6 inches, to as low as 50 blows per 1 inch. Hollow-stem auger refusal or a SPT N-value of 50 blows for 0 inches of penetration generally defines the rock interface (weathered or hard rock conditions) where diamond rock coring techniques are required to further advance the boring. Rock coring was not in our scope of work.

An important aspect of the Southern Piedmont subsurface profile is that highly variable conditions can exist over relatively short horizontal distances. This is caused by variation in mineral composition of the parent rock and the intensity of fractures and joints within the rock. Zones of partially weathered rock can be encountered in residual soils, and lenses of soil can occur in the rock mass. This profile may be altered by man, by excavating or filling, or by effects of water through the process of erosion or alluvial deposition.

3.2 Subsurface Conditions

3.2.1 General

The generalized soil stratigraphy discussed in the following paragraphs and those presented in the Soil Boring Records in the Appendix represent an estimate of the soil conditions based on interpretation of the boring data using normally accepted geotechnical engineering judgments. The lines which are used to denote strata breaks on the Soil Boring Records are approximate because the actual subsurface strata changes are typically more gradual than the abrupt changes shown, or may occur between sample intervals. In the absence of foreign substances, it is also difficult to distinguish between virgin residual soils and clean soil fill.

Although individual test borings are representative of the subsurface conditions at the precise boring locations on the dates shown, they are not necessarily indicative of the subsurface

conditions at other locations or at other times. Subsurface profiles are presented in Figures 4 to 4C.

3.2.2 Clearwells No. 5 and No. 6

Six borings (B-1, B-2, B-2A, B-3, B-4, and B-5) were drilled north of the deep drainage feature, within the proposed footprints of the two clearwells inside the fenced area of the plant. Boring CW-4, drilled by others in 2001, was used to estimate the soil conditions in the vicinity of boring B-1. Man-made fill soils, possible alluvium, residual soils, partially weathered rock (PWR), and auger refusal (weathered rock/rock) were encountered by the borings. South of the drainage feature, CW-4 found residual soil overlying PWR, with refusal at 45 feet. Boring B-1 encountered conditions similar to CW-4, however, refusal conditions were not encountered at boring B -1. Topsoil was encountered in all borings.

Fill soil consisting of silty sand with varying amounts of gravel/rock fragments was encountered in all the borings with the exception of B-1 and CW-4. Fill thickness varied from 8 to 10+ (B-2) feet. An obstruction was encountered within the fill at 10 feet at boring B-2 which prevented further advancement of the hollow stem augers. The boring was offset to B-2A and the boring re-drilled. SPT N-values in the fill varied from 4 to 28 blows per foot (bpf),

Underlying the fill, possible alluvium was encountered in boring B-2A consisting of silty fine sand with organics. Layer thickness is 5 feet with a SPT N-value of 12 bpf.

Underlying alluvium and/or fill, residual soils consisting of silty to clayey sands were encountered. Layer thickness varied from 18+ to 30.5+ feet. SPT N-values varied from 10 to 81 bpf.

PWR was encountered beneath residuum in borings B-1, CW-4, B-2A, and B-4 and was sampled as very dense silty sand. Layer thickness varied from 2+ to 26 feet. SPT N-values varied from 50 blows for 6-inches to 50 blows for 0-inches.

Auger refusal indicating the top of weathered rock/rock was only encountered in boring CW-4 at a depth of 45 feet below existing grade. No other boring within the clearwell footprints encountered auger refusal with the exception of boring B-2 which refused on an obstruction within the fill.

Ground water was encountered in four of the borings (CW-4, B-2A, B-3, and B-4) and varied from 16 to 38 feet below existing grade measured 24 hours after drilling (Elevation 912 to 914).

3.2.3 Filters Building, Flocculation Tank, Settling Basin

Six borings (B-6 to B-11) were drilled within the footprints for the new filters building, flocculation tank, and settling basin. Man-made fills and residual soils were encountered in these borings.

Six to ten inches of graded aggregate base (GAB) were encountered in four of the borings (B-8 to B-11). Underlying the GAB or at the surface, fill soil consisting of silty sand was encountered. Fill thickness varied from 7 to 13 feet with SPT N-values varying from 4 to 24 bpf.

Underlying the fill, residual soils consisting of silty sand were encountered to boring termination depths. Residual soil thickness varied from 27+ to 33+ feet with SPT N-values varying from 5 to 67 bpf.

No PWR or auger refusal conditions were encountered by these borings.

Measurable ground water was encountered by all six borings and varied from 16 to 21 feet below existing grade measured 24 hours after drilling (Elevation 924 to 940).

3.3 Laboratory Testing Results

Classification tests consisting of natural moisture content, particle size analysis, and Atterberg limits were performed on the Shelby tube sample from B-11. A consolidation test was performed on an undisturbed sample to evaluate soil compressibility in the area of the proposed Filter Building No. 3 (boring B-11).

The results of all laboratory tests are presented in the Appendix.

4.0 Geotechnical Conclusions and Recommendations

The following conclusions and recommendations are based on the soil boring data gathered during this exploration, our understanding of the proposed construction, our experience with similar site and subsurface conditions, and generally accepted principles and practices of geotechnical engineering. This report and the conclusions and recommendations provided herein are intended for the sole use of Jordan, Jones & Goulding and their designated consultants for use in the design of the proposed facilities. We request that we be advised of any significant changes to the proposed development from that described in this report so that we may amend our recommendations accordingly. In addition, we request the opportunity to review the geotechnically-related portions of the project documents. This report should not be relied upon by other third parties.

4.1 Site Preparation

Site preparation will consist of the removal of existing chain link fence, all trees, brush, grass, and other vegetation in the proposed clearwell areas. The existing creek in the area of the clearwells will need to be diverted and the flow from the onsite pond entering the creek will need to be routed elsewhere on a permanent basis. In addition, other existing stormwater run-off pipes emptying into the creek will need to be re-routed. The GAB in the area of the filters building, flocculater, and settling basin should be salvaged and stockpiled for reuse at the site.

4.2 Potential Difficult Excavation

Excavations for the proposed structures are expected to vary from 14 to 31 feet below existing grades. For the most part, excavated materials will consist of existing fill, alluvium, and residual soils. PWR is anticipated along the southeast corner of Clearwell No. 6. No difficult excavation is anticipated for the filters building, flocculation tank, settling basin, and the clearwells with the exception of the southeast corner of Clearwell No. 6. However, with high ground water levels, dewatering will be required to allow these excavations to be made. In addition, temporary shoring will be required for these excavations.

Partially weathered rock will require excavation after removal of residual overburden soil in the area of borings B-1 and CW-4 within the Clearwell No. 6 excavation. We believe that most of the PWR within the excavation can be removed with a large backhoe-trackhoe and/or by pre-loosening with a single tooth ripper pulled behind a large dozer. Blasting may be required for any rock that might be encountered, if it cannot be broken by a ram hoe attachment to a trackhoe excavator.

We recommend the following definitions be used for excavation in the project specifications:

- The soil overburden with penetration resistances less than 50 blows per 6 inches can be removed by conventional excavation equipment, such as pans, front-end loaders, or large backhoes. On our boring records, this is the material overlying the partially weathered rock.

- Partially weathered rock is defined as residual soil with penetration resistances in excess of 50 blows per 6 inches. This material will require prior loosening with rippers pulled by large dozers (D-10 or greater) prior to removal with conventional equipment. Large loaders or power shovels will typically be able to remove this material, with only minor difficulty. For extensive thicknesses of the partially weathered rock or for unusually hard material (50 blows = 1 inch), light blasting may be required. In confined areas such as trenches and/or structure excavations, removal of partially weathered rock will require use of a heavy power shovel or pre-loosening with hand pneumatic spade equipment.

- Refusal to drilling procedures indicates material so hard that diamond core drilling is required for further penetration. Refusal materials were not encountered by the widely spaced borings but may be anticipated intermediate of borings.

  Although excavation below refusal levels often requires hard rock drilling and blasting procedures to loosen the material before removal, we believe that ripping with large equipment or jack hammering using a ram hoe attachment on a large track hoe excavator may be successful at this site for the weathered rock. If these methods cannot remove the rock, then controlled blasting techniques will be required especially in confined trench excavations.

In order to aid in identification of rock for pay purposes, we suggest a performance specification. Such a specification could refer to rock as being material which cannot be removed with a crawler tractor equal to a D-10 caterpillar, equipped with a single-tooth ripper, or by an excavator trackhoe (CAT 225) rated 3/4 yard capacity, with a bucket curling pullout capacity of 25,000 pounds.

As an alternate, we suggest that you consider an "unclassified" grading specification for this project. Grading contractors with prior experience with excavations within the Piedmont geology will very likely price some excavation of partially weathered rock without blasting, compared to contractors without experience in this geologic setting. The cost differential between different grading contractors may be substantial.

Stability of both temporary and permanent excavation slopes is very much dependent on the soil and rock properties. Any temporary excavations required during construction of 15 feet or less height should be made at slopes no steeper than 1(H):1(V). Steeper slopes may be

generally stable, but localized failures of blocks and slabs of rock are likely. All excavations should be performed in accordance with OSHA regulations for Occupational Safety and Health Standards - Excavations (29 CFR Part 1926).

4.3 Temporary Excavation Shoring

Excavation shoring will be required for the clearwell excavation. A soldier pile and lagging system with pre-stressed tie back tendons is recommended. This shoring system is recommended for the east and south edge of Clearwell No. 6, where the area will be excavated into the existing slope to achieve design grades. There is insufficient room to permit a stable sloped excavation since it will impact the Fulton County library property. A permanent retaining wall will have to be built to provide the required grade change for Clearwell No. 6. A sheet pile shoring system will need to be considered to protect existing Clearwells 2, 3, and 4 and adjacent buried utilities while excavation proceeds for the new clearwells. The actual shoring system should be selected and designed by the contractor.

Temporary excavation shoring will also be required for the filters building, flocculation tank, and settling basin. Temporary sloped excavations are not feasible since there is insufficient room to allow a 2 to 1 sloped excavation before impacting existing structures, buried piping, and the downstream slope for the Reservoir No. 1 embankment. An anchored sheetpile shoring system is recommended. A dewatering system will have to be installed in conjunction with the sheetpile shoring system to prevent hydrostatic forces from developing on the wall and to maintain a stable excavation bottom. A qualified shoring contractor should be consulted to design the system.

Temporary excavation shoring will be required for the installation of new utilities if the proposed utilities are deep. Trench boxes or similar devices in conjunction with sloped cuts could be considered if there are deep trench excavations proposed, in lieu of soldier pile and timber lagging. All temporary excavations should be in accordance with OSHA regulations for Occupational Safety and Health Standards – Excavations (29 CFR Part 1926).

4.4 Drainage and Ground Water Management

Good site drainage must be provided during the construction phase. All ground surfaces must be sloped to prevent the ponding of surface water adjacent to proposed excavations.

Ground water was encountered in all the borings at the time of drilling with the exception of three borings (B-1, B-2 and B-5). Dewatering will have to be performed to permit excavation and construction of the structures in the dry. We recommend that the ground water be lowered a minimum of 3 feet below proposed bottom structure foundation level. Dewatering may be accomplished by pumping from sumps within the excavation or by a well point system. It should also be noted that ground water levels are subject to seasonal and climatic changes. The project area is currently in a historic drought condition. Placement of a concrete mud mat on exposed soil subgrade surfaces is recommended to protect the bearing surface from degradation from the elements and construction traffic.

4.5 Engineered Fill Placement

Structural fill includes materials used to replace undercut materials, achieve finished grades, backfill around the proposed structures or backfill of utility trenches. All structural fill used on site should be free of significant organic matter or debris, have a low to moderate plasticity (PI ≤ 20, LL ≤ 50), exhibit relatively uniform composition, and be free of rock fragments greater than three inches in diameter. Soils selected for use as engineered fill material should also have a standard Proctor (ASTM D 698) maximum dry density of at least 90 pounds per cubic foot (pcf).

The engineered fill must be brought to the proposed subgrade elevation by placing and compacting only approved fill materials upon a subgrade approved by the geotechnical engineer. Compaction of engineered fill must be accomplished by placing the fill material in horizontal lifts of eight inches maximum loose thickness and mechanically compacting each lift to at least the specified dry density.

The newly placed engineered fill must be uniformly compacted to a dry density that corresponds to at least 95% of the standard Proctor maximum dry density (ASTM D698) of the fill soil. The upper 12 inches of fill beneath any slab-on-grade and pavement areas should be compacted to at least 98% of the standard Proctor maximum dry density. Scarification and recompaction of the upper fill soils **immediately prior to** slab and/or pavement construction should be specified.

The backfill placed in excavations for new utility lines and against structures should be considered as structural fill, and should also be uniformly compacted to at least 95 percent of the standard Proctor maximum dry density of the fill soil. In confined areas, such as utility trenches and adjacent to structures, portable compaction equipment, and the use of thinner lifts (four inches), will be necessary to achieve the specified compaction and prevent excessive stress on the walls.

In addition to the requirement for dry density, the engineered fill should be placed at a moisture content that corresponds to ±3% of the optimum moisture content, as determined by the standard Proctor moisture-density relationship test. During wet and rainy periods, aeration (drying) is often necessary to reduce the fill materials to the required moisture condition. During dry periods, water may need to be added to achieve the proper moisture content for compaction. Silty soils, which are wet, may require aeration prior to compaction even during dry periods. We recommend that all fill placements be witnessed by a qualified soils technician and that density and moisture tests be performed to verify that the specified compaction is achieved.

4.6 Foundation Recommendations

4.6.1 General

Based on the boring results, the site contains generally medium dense sandy soils suitable for foundation support of the proposed structures provided estimated settlements are acceptable. Uplift on structures due to high ground water conditions will need to be considered in the design.

4.6.2 Clearwells No. 5 and No. 6

The footprint of Clearwells No. 5 and No. 6 will span over the existing creek and will encroach into the existing slope to the east and south of the structure. Possible alluvial soils encountered

in the borings and any other water softened soils extending below proposed grade of 915.5 will require over-excavation and replacement with stone. We recommend this alluvial soil removal extend to 5 feet beyond the footprint of the clearwells.

At the proposed foundation level, the clearwell foundation bottoms will be bearing on generally medium dense silty sand soils or replacement stone fill. For the proposed embedment depth, an allowable soil bearing pressure of 3 ksf may be used in foundation design. For preliminary mat design, we recommend an initial modulus of subgrade reaction of 150 pci be assumed in initial analysis of the mat. The actual modulus may be lower after an iterative process is performed by the structural engineer to achieve an optimum design slab thickness, steel reinforcement, and acceptable mat deflection.

Excavations of 13.5 to 38.5 feet will be required for the new clearwells. The estimated structural loading is 2.2 ksf. The proposed structural loading will vary from 0.2 to 0.7 ksf more than the excavated weight of soil to less than the weight of soil removed, depending on existing grade. We anticipate as the structure is built and initially loaded, the underlying soils will recompress from the effects of soil removal. We estimate recompression settlement to be less than 1-inch.

We recommend placement of a concrete mud mat on the foundation subgrade shortly after it is exposed to protect the bearing surface from degradation from the elements and construction traffic.

4.6.3 Filters Building, Flocculation Tank, Settling Basin

The proposed new structures will be built north of the existing facilities and south of the embankment toe for Reservoir No. 1. Anticipated foundation base slab elevation for the structures will vary from Elevation 919 feet to 935.5 feet. Anticipated structural loading will be 1.8 ksf.

At the proposed foundation level, the structures will be bearing on predominantly medium dense silty sand soils. Some loose soil conditions were encountered in borings B-10 and B-11 for the Filters Building. The proposed bearing levels will also be below the recorded water levels at the site. Dewatering will need to be performed in advance of excavation such that the ground water is lowered a minimum of 3 feet below proposed foundation subgrade levels to prevent unstable conditions from developing. In addition, with the proximity of existing structures/utilities and the toe of the existing reservoir nearby, there does not appear to be sufficient room to perform an open cut excavation. A sheet pile shoring system with soil anchor tie-backs and walers appears to be the most suitable in order to protect adjacent existing structures and piping.

For the proposed embedment depth, we recommend an allowable soil boring pressure of 3 ksf be used in foundation design. For initial mat design, we recommend a modulus of subgrade reaction of 150 pci be used in initial analysis of the mat. The actual modulus may be lower after an iterative process is performed by the structural engineer to achieve an optimum design slab thickness, steel reinforcement, and acceptable mat deflection. The proposed structural loading will be less than the weight of soil removed. We anticipate as the structures are built and initially loaded, the underlying soils will recompress from the effects of soil excavation removal. We estimate recompression settlement to be less than 1-inch.

We recommend placement of a concrete mud mat on the foundation subgrade shortly after it is exposed to protect the bearing surface from degradation from the elements and construction traffic.

4.7 Design Hydrostatic and Lateral Earth Pressures

Generally, we assume that permanent walls, associated with the buried structural walls of the clarifiers, aeration basin, digester and other below grade walls, will not accommodate yielding. Therefore, at-rest lateral earth pressures should be utilized for design of these walls.

For such walls, we recommend that granular soils be used as backfill with a minimum angle of internal friction, $\varnothing = 28°$. Based on previous experience with similar soils and construction, we recommend the earth pressure coefficients and equivalent fluid pressures above the water table shown in the following table for design of structure walls:

Lateral Earth Pressure Design Values

Earth Pressure Conditions	Coefficient	Recommended Equivalent Fluid Pressure (pcf)	
		Above Water Table	Below Water Table
Active (K_a)	0.30	36	80
Active (K_a) 2 to 1 Slope Conditions	0.70	84	100
At-Rest (K_o)	0.50	60	95
Passive (K_p)	3.00	360*	240*
* An appropriate safety factor should be applied to this ultimate value.			

A permanent concrete retaining wall will be required along the east and south side of Clearwell No. 6 to provide the grade change. Assuming that the retaining wall will be able to accommodate some yielding, and with a 2 to 1 slope above the wall, the active pressure coefficient for 2 to 1 slope conditions may be used for design. A drain system should be installed behind the retaining wall to prevent build-up of hydrostatic pressures. A composite geo-drain or perforated drain pipe with a stone backfill section may be considered.

In lieu of a concrete retaining wall, a soil nail wall with applied gunite concrete facing may be considered for temporary shoring and as a permanent retaining structure. In this process, the slope is excavated in tiers. At each tier, soil nails are installed and grouted into the exposed cut slope face. A wire mesh is installed and a gunite concrete facing is applied. The process is repeated until the slope is excavated to grade. A geotechnical specialty contractor should be consulted to evaluate the feasibility and cost of a soil nail wall.

Ground water was encountered in all the borings with the exception of three locations (B-1, B-2 and B-5). Recorded water levels in the area of the clearwells indicate a variation from Elevation

915 to 913 feet. These water levels are very close to the proposed base slab elevation for the clearwells. For uplift and lateral water pressure loading on the clearwells, we recommend a design water level of Elevation 925 feet be used in design. Uplift loads will need to be resisted by increasing the dead weight of the empty structure and/or installing anchors into the underlying soil. Based on the soils encountered, an ultimate bond resistance between the grout and surrounding soil of 2 ksf may be used to estimate anchor length. All anchors should be at least 10 feet long. An appropriate factor of safety will need to be applied to this number. We suggest a factor of safety of 2 be used. If anchors are used, each anchor should be load tested to 2 times the design load. Failed anchors should be replaced.

The drawings provided by JJ&G indicate under-drain systems for the proposed structures. This may be considered as an alternative if gravity drainage is provided. Otherwise, collected seepage will have to be pumped.

Recorded water levels in the area of the flocculation tank vary from Elevation 940 to 931 feet. We recommend a design water level of at least Elevation 945 feet be used for this structure. In the area of the settling basin and filters building, recorded water levels vary from Elevation 930 to 924 feet. We recommend a design water level of at least 935 feet be used for these structures. As noted above, the uplift load can be resisted by increasing the dead weight of the structures, installing soil anchors as recommended above, or providing under-drain systems.

4.8 Seismic Site Classification

The Atlanta Fulton County WTP project site in Fulton County, Georgia was classified with respect to Seismic Site Class definition in accordance with Section 1615 of the 2006 Standard Building Code/International Building Code and the revised January 1, 2007 Georgia State Amendments. In particular, Sections 1615.1.1, 1615.1.2, 1615.1.3 and 1615.1.5 were used. The current code site class definitions available range from A (hard rock) to F (very soft soil profile).

Shear wave velocity measurements were performed at the areas of proposed construction. A shear wave velocity profile was developed extending to a depth of 100 feet below existing grade and the average shear wave velocity calculated according to procedures presented in Section 1615.1.5 of the code.

Based on the proposed foundation subgrade elevations, the structures will be founded on replaced compacted fill overlying residual soils/PWR or residual soils overlying PWR. Based on the foundation supported on these materials identified in the borings, the site will classify as seismic site Class D using the calculated average shear wave velocity.

4.9 Design Spectral Response Acceleration Parameters

The project site is classified as Site Class D. The design spectral response acceleration parameters for short period and 1-second periods for the site classes, as calculated per the code, are presented below.

Site Class D

Short period acceleration, S_{DS}	**= 0.267g**
One second period acceleration, S_{D1}	**= 0.144g**

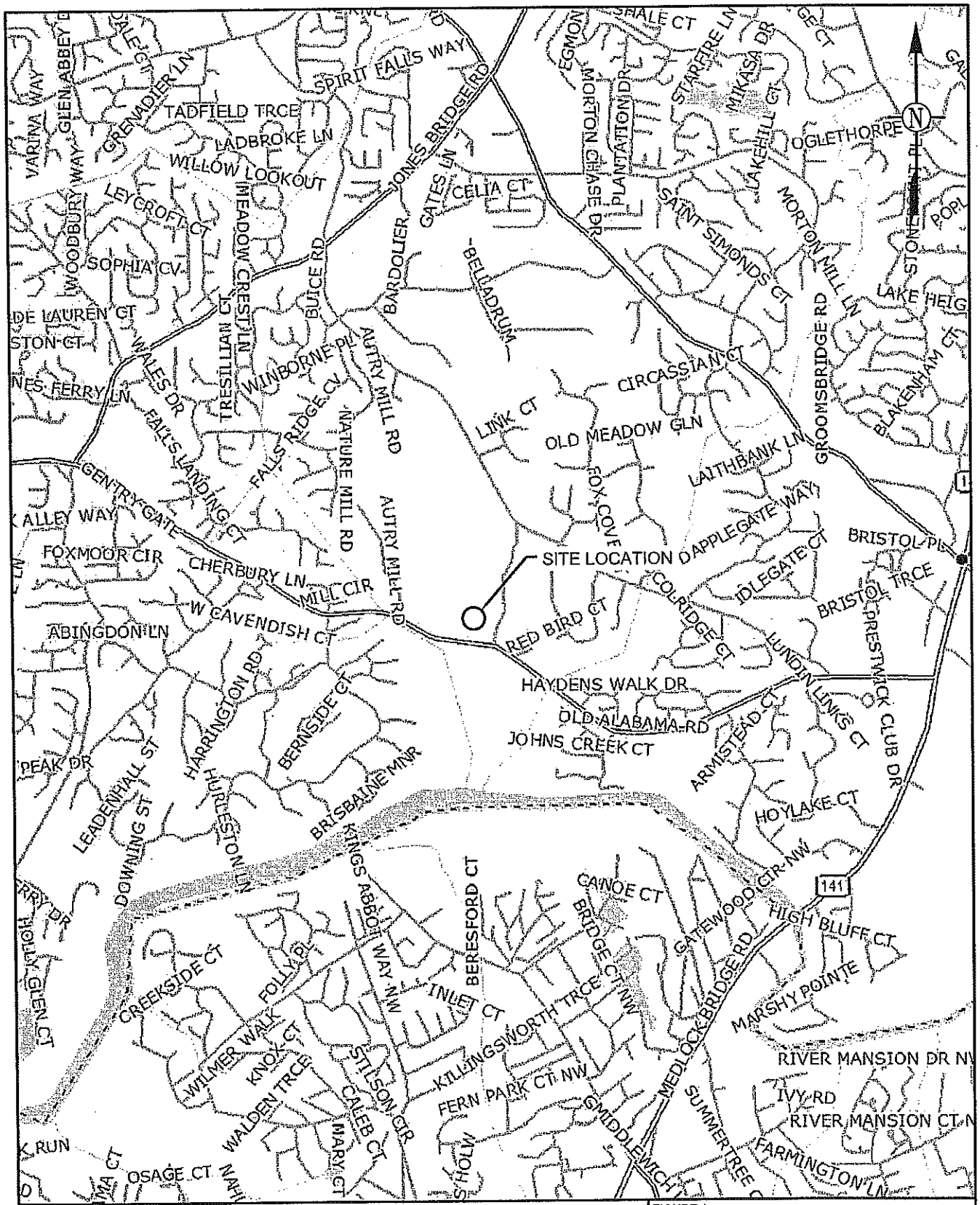
4.10 Liquefaction Potential

Soil liquefaction is a phenomenon in which there is a sudden loss of soil strength due to pore water pressure build up caused by the shaking from an earthquake event. This sudden but temporary increase of pore water pressure causes a cohesionless soil to behave as a fluid. The most susceptible soils are saturated clean fine sands (less than 5 percent minus No. 200 material) with a near surface ground water table. The soils at the site do not appear to be liquefiable.

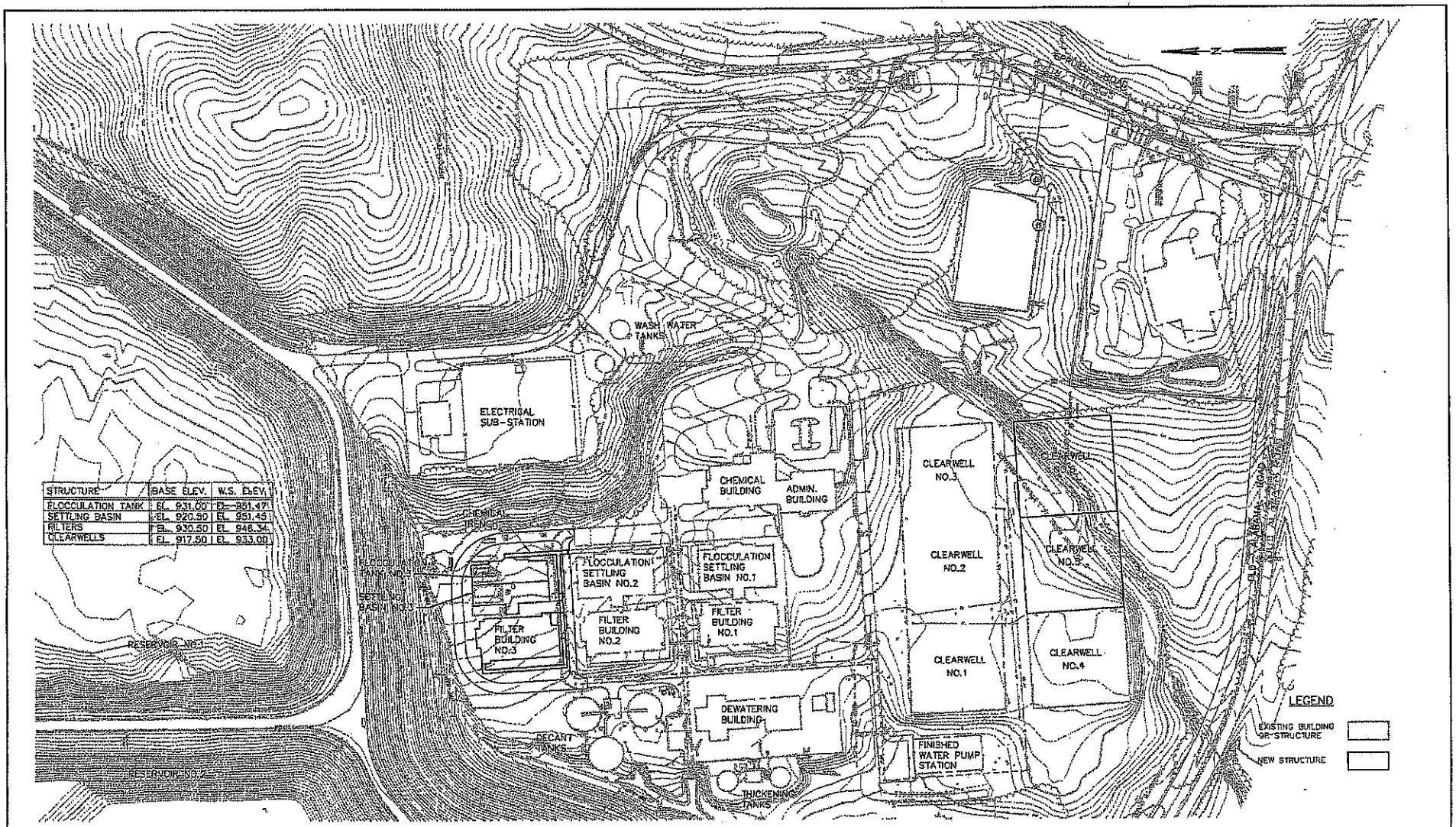
5.0 Construction Quality Control

Our technical staff should work closely with you throughout the site preparation, foundation, building and pavement construction phases of the construction. It is particularly important for our personnel to monitor placement and compaction of all engineered fills, and to witness the stripping and proofrolling of subgrade soils. Additionally, all foundation excavations should be evaluated by our technical representative in order to compare conditions with those found by our borings. Such inspections should be made after the foundation subgrade soils are exposed and again immediately prior to placement of the concrete mud mat. We look forward to providing these services as well as routine construction monitoring and materials testing.

FIGURES



SCALE: 1" = 0.5 MILE		GEOTECHNICAL ENGINEERING CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 1 SITE LOCATION PLAN ATLANTA-FULTON CO. WTP FULTON COUNTY, GA WILLMER PROJECT No. ATL-171-3238
DATE: 6/12/2007	WE		
DRAWN BY: TJS			
REVIEWED BY: EL			



STRUCTURE	BASE ELEV.	W.S. ELEV.
FLOCCULATION TANK	EL. 931.00	EL. 951.47
SETTLING BASIN	EL. 920.50	EL. 951.45
FILTERS	EL. 930.50	EL. 948.34
CLEARWELLS	EL. 917.50	EL. 933.00

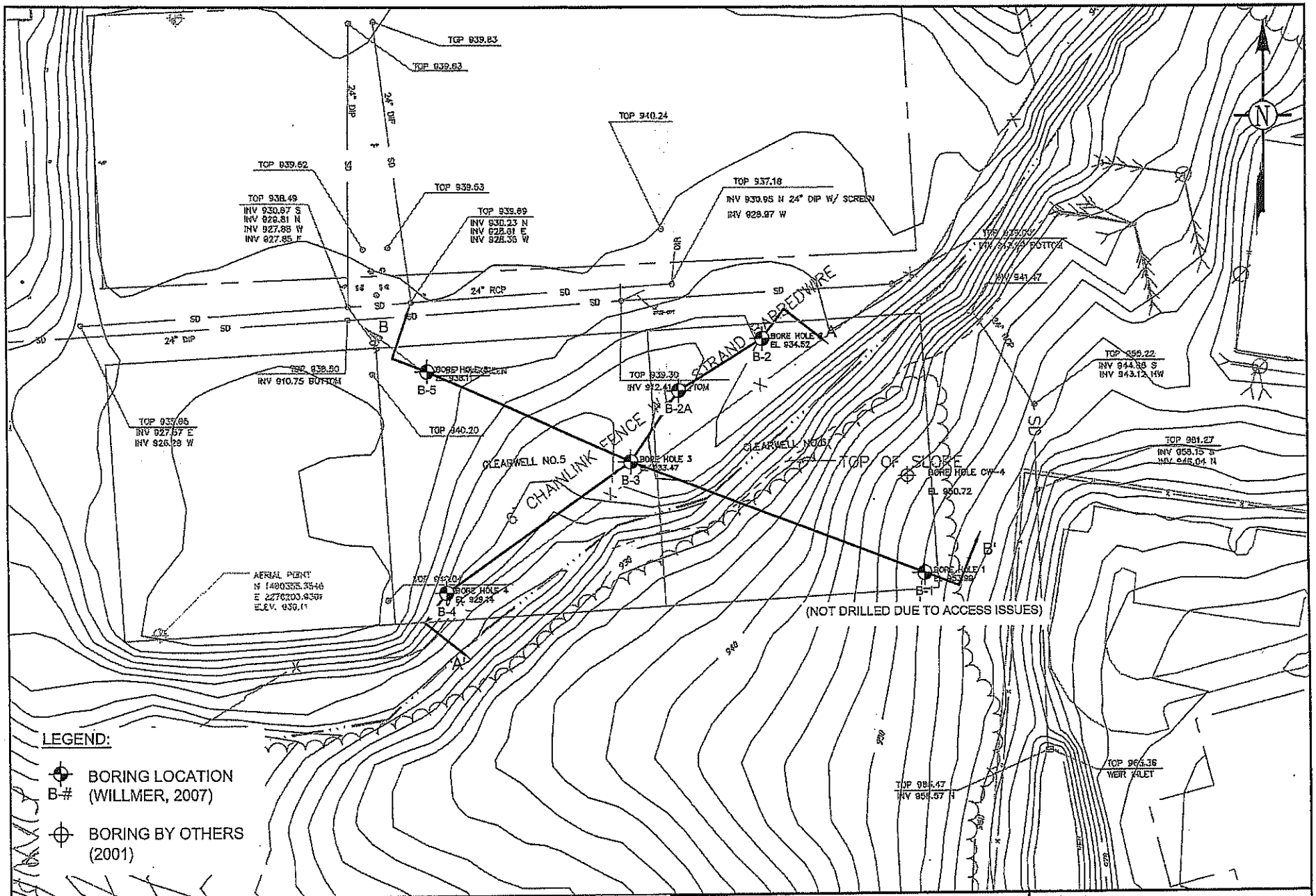
SCALE: 1" = 200'	
DATE: 7/3/2007	
DRAWN BY: TJS	
REVIEWED BY: EL	

WILLMER ENGINEERING, LLC

GEOTECHNICAL ENGINEERING ▫ CONSTRUCTION SERVICES
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 165
ATLANTA, GA 30340-4270

FIGURE 2

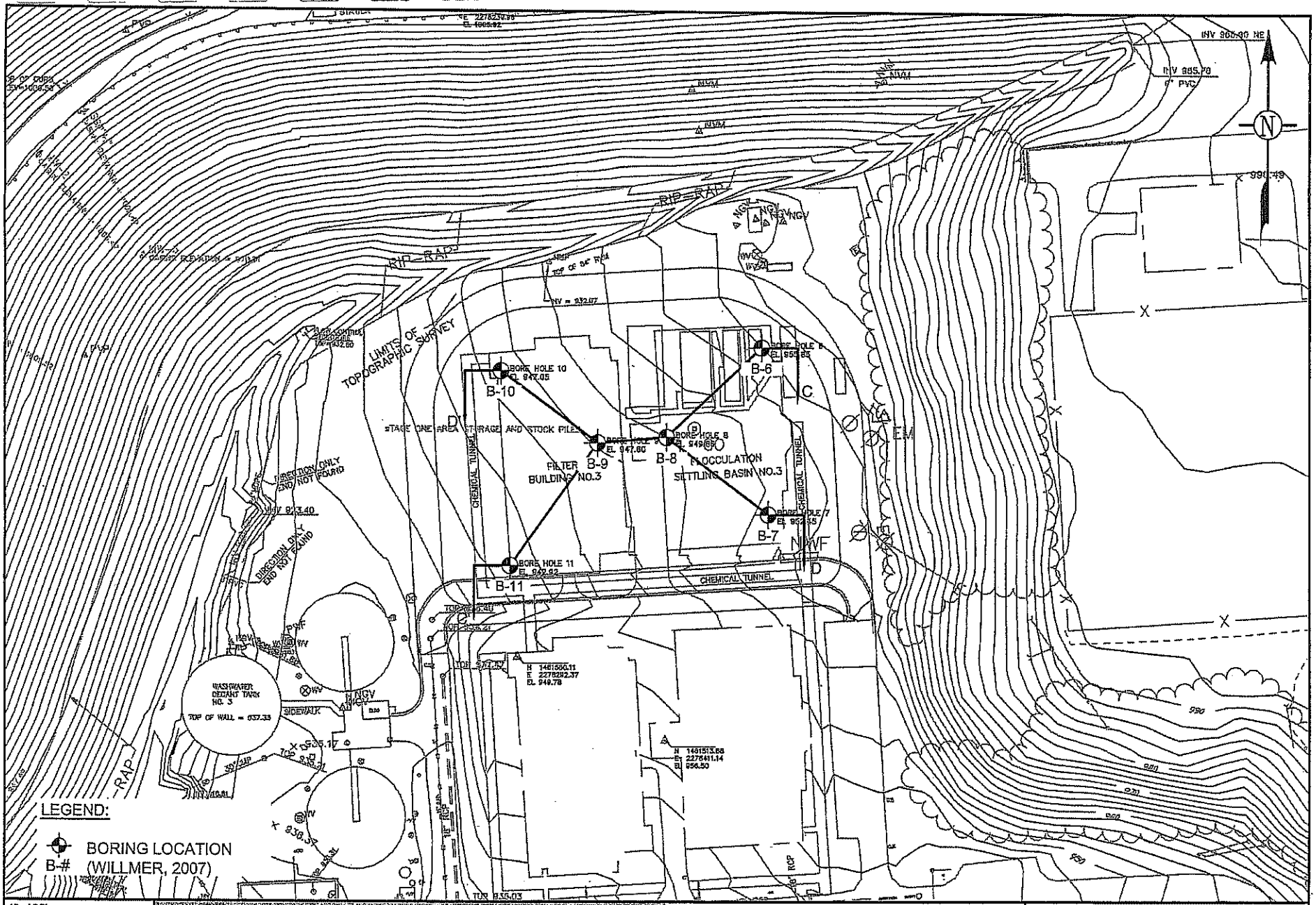
EXISTING PLANT SITE
ATLANTA-FULTON CO. WTP
FULTON COUNTY, GA
WILLMER PROJECT No. ATL-171-3238



SCALE: 1"=100'	WILLMER ENGINEERING GMBH	GEOTECHNICAL ENGINEERING ▫ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270
DATE: 7/12/2007	WE	
DRAWN BY: TJS		
REVIEWED BY: EL		

FIGURE 3

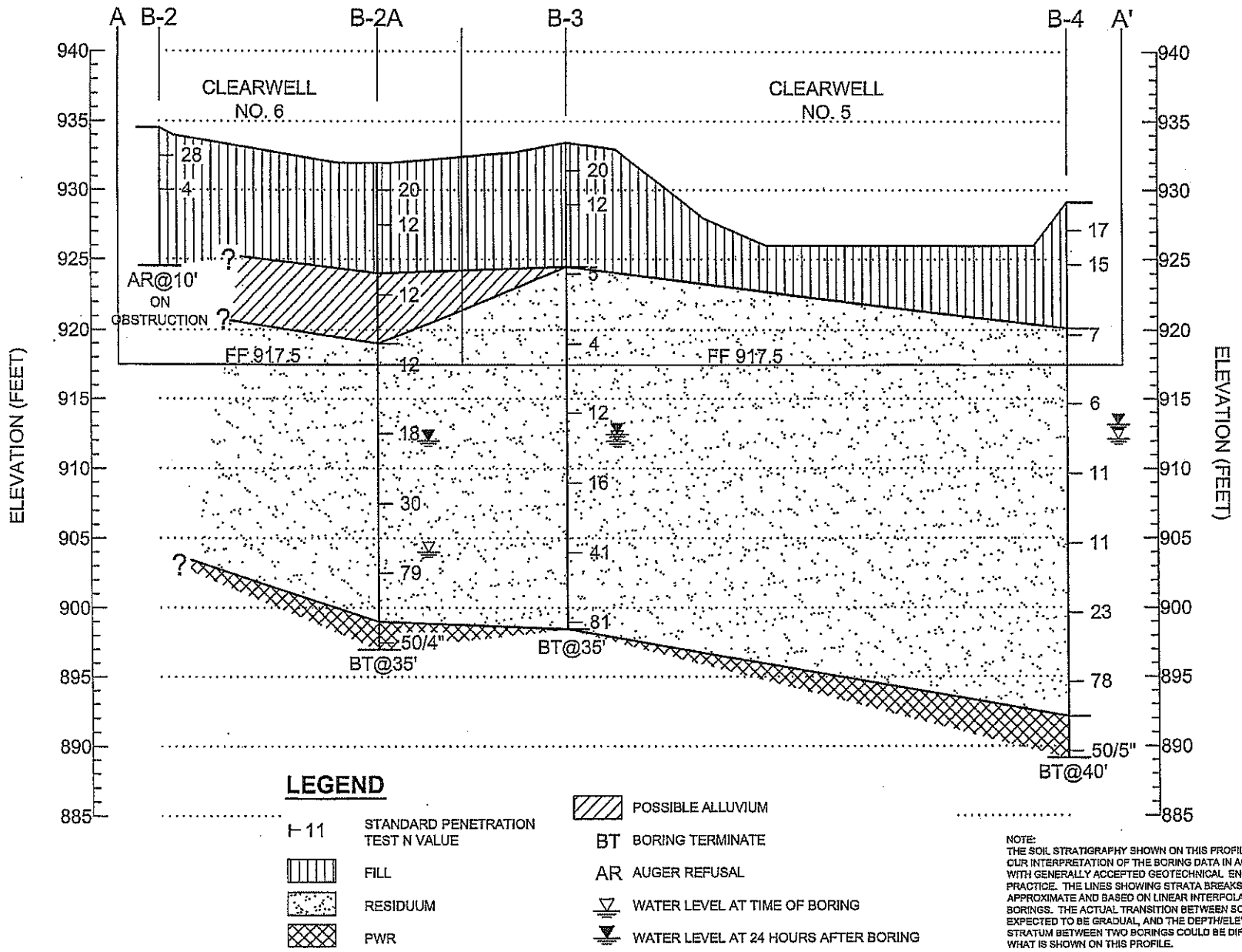
BORING LOCATION PLAN
ATLANTA-FULTON CO. WTP
FULTON COUNTY, GA
WILLMER PROJECT No. ATL-171-3238



1"=100'	WILLMER ENGINEERING INC.	GEOTECHNICAL ENGINEERING = CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270
DATE: 6/29/2007		
DRAWN BY: TJS		
REVIEWED BY: EL		

FIGURE 3A

BORING LOCATION PLAN
ATLANTA-FULTON CO. WTP
FULTON COUNTY, GA
WILLMER PROJECT No. ATL-171-3238



LEGEND

- 11 — STANDARD PENETRATION TEST N VALUE
- FILL
- RESIDUUM
- PWR
- POSSIBLE ALLUVIUM
- BT — BORING TERMINATE
- AR — AUGER REFUSAL
- WATER LEVEL AT TIME OF BORING
- WATER LEVEL AT 24 HOURS AFTER BORING

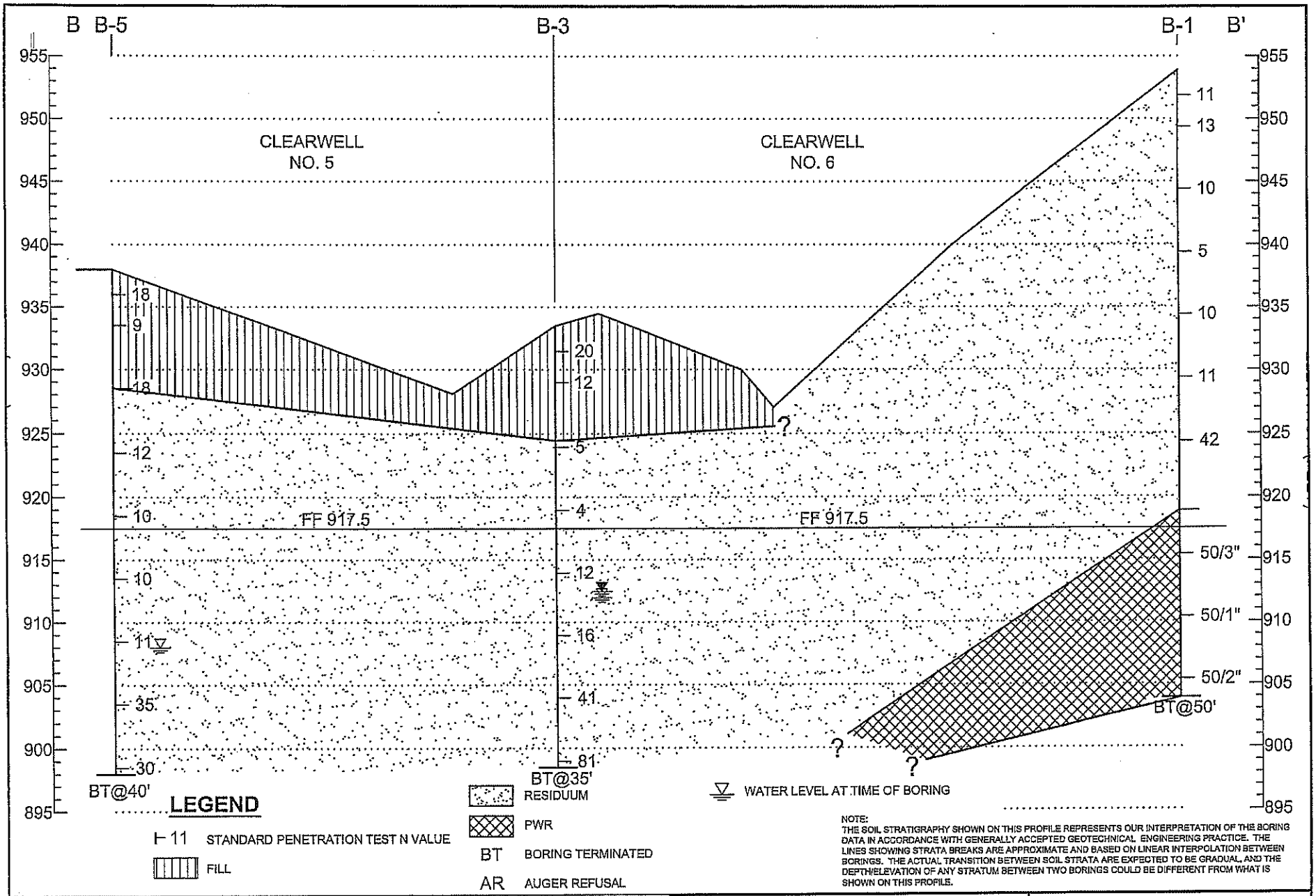
NOTE:
THE SOIL STRATIGRAPHY SHOWN ON THIS PROFILE REPRESENTS OUR INTERPRETATION OF THE BORING DATA IN ACCORDANCE WITH GENERALLY ACCEPTED GEOTECHNICAL ENGINEERING PRACTICE. THE LINES SHOWING STRATA BREAKS ARE APPROXIMATE AND BASED ON LINEAR INTERPOLATION BETWEEN BORINGS. THE ACTUAL TRANSITION BETWEEN SOIL STRATA ARE EXPECTED TO BE GRADUAL, AND THE DEPTH/ELEVATION OF ANY STRATUM BETWEEN TWO BORINGS COULD BE DIFFERENT FROM WHAT IS SHOWN ON THIS PROFILE.

VERT. SCALE:	1"=10'
HORIZ. SCALE:	1"=50'
DATE:	6/29/2007
DRAWN BY:	TJS
REVIEWED BY:	EL

WILLMER ENGINEERING, INC. WE

GEOTECHNICAL ENGINEERING ▫ CONSTRUCTION SERVICES
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 155
ATLANTA, GA 30340-4270

FIGURE 4A
SECTION A-A'
SUBSURFACE PROFILE
ATLANTA-FULTON CO. WTP
FULTON COUNTY, GA
WILLMER PROJECT No. ATL-171-3238



VERT. SCALE: 1"=10'	
HORIZ. SCALE: 1"=50'	
DATE: 7/3/2007	
DRAWN BY: TJS	
REVIEWED BY: EL	

WILLMER ENGINEERING, INC.

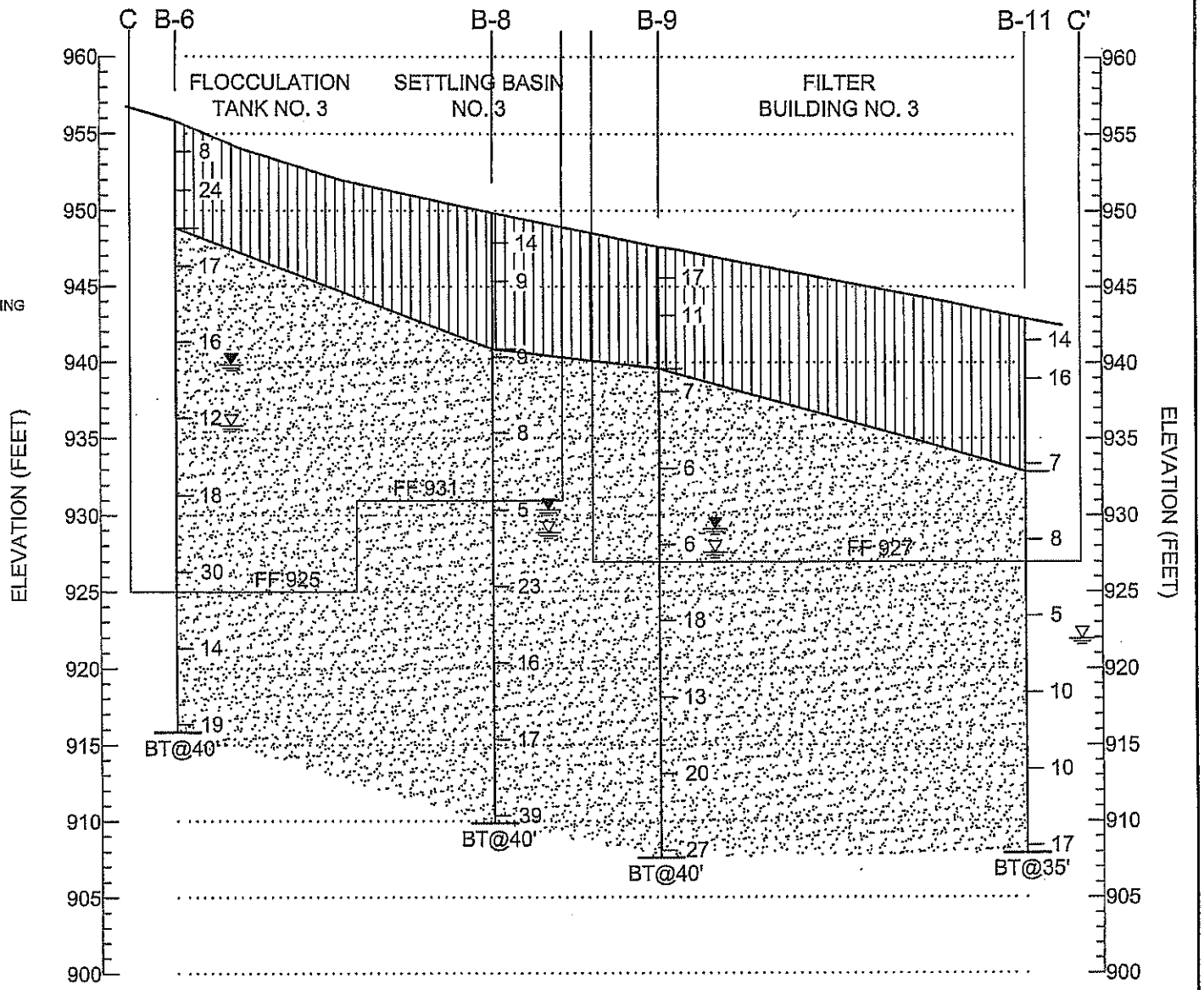
WE

GEOTECHNICAL ENGINEERING ▫ CONSTRUCTION SERVICES
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 155
ATLANTA, GA 30340-4270

FIGURE 4B
SECTION B-B'
SUBSURFACE PROFILE
ATLANTA-FULTON CO. WTP
FULTON COUNTY, GA
WILLMER PROJECT No. ATL-171-3238

LEGEND

- ⊢11 — STANDARD PENETRATION TEST N VALUE
- FILL
- RESIDUUM
- BT — BORING TERMINATED
- AR — AUGER REFUSAL
- WATER LEVEL AT TIME OF BORING
- WATER LEVEL AT 24 HOURS AFTER BORING



NOTE:
THE SOIL STRATIGRAPHY SHOWN ON THIS PROFILE REPRESENTS OUR INTERPRETATION OF THE BORING DATA IN ACCORDANCE WITH GENERALLY ACCEPTED GEOTECHNICAL ENGINEERING PRACTICE. THE LINES SHOWING STRATA BREAKS ARE APPROXIMATE AND BASED ON LINEAR INTERPOLATION BETWEEN BORINGS. THE ACTUAL TRANSITION BETWEEN SOIL STRATA ARE EXPECTED TO BE GRADUAL, AND THE DEPTH/ELEVATION OF ANY STRATUM BETWEEN TWO BORINGS COULD BE DIFFERENT FROM WHAT IS SHOWN ON THIS PROFILE.

VERT. SCALE: 1"=10'	
HORIZ. SCALE: 1"=50'	
DATE: 6/29/2007	
DRAWN BY: TJS	
REVIEWED BY: EL	

WILLMER ENGINEERING, INC.

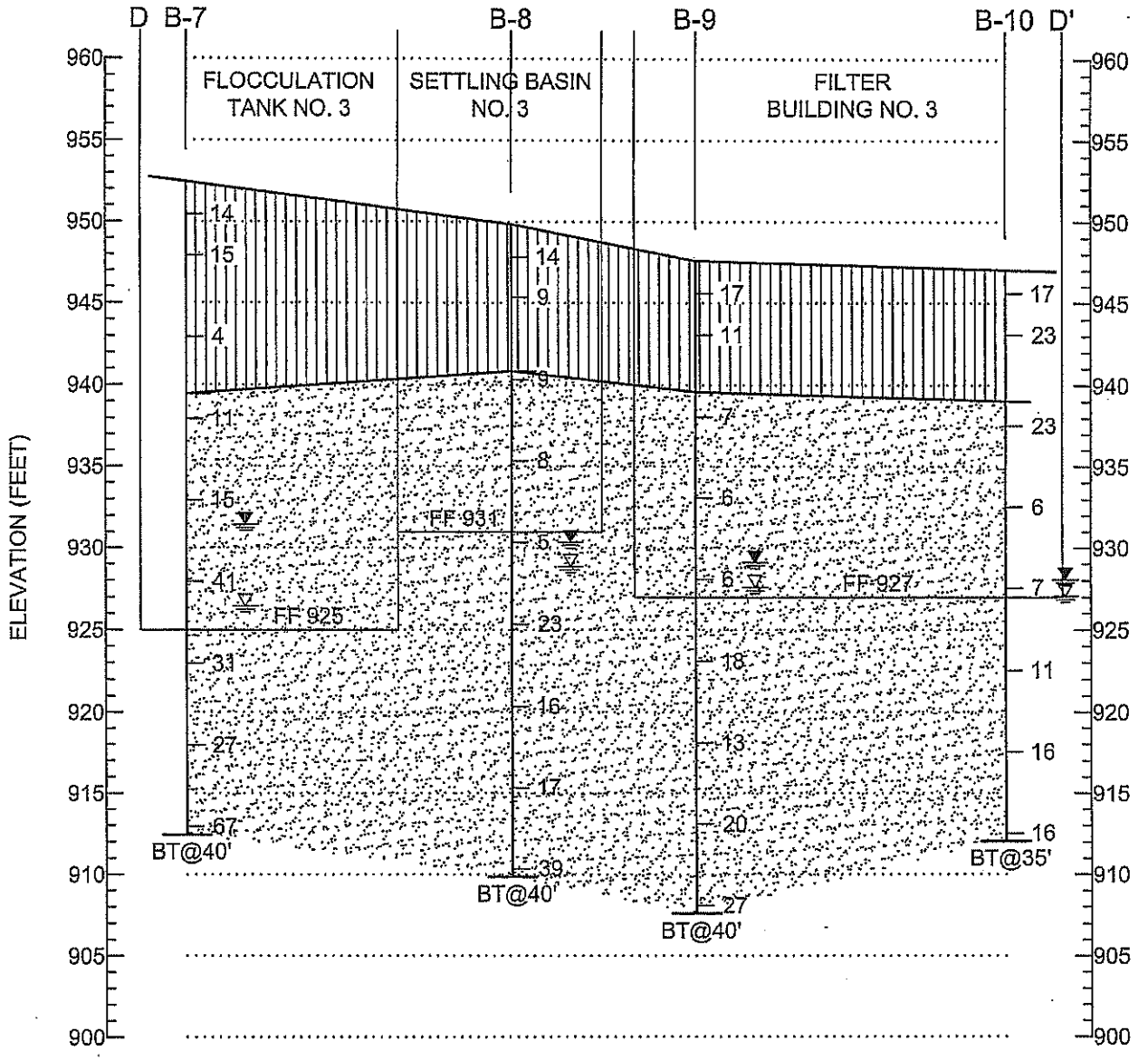
WE

GEOTECHNICAL ENGINEERING ▪ CONSTRUCTION SERVICES
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 155
ATLANTA, GA 30340-4270

FIGURE 4C
SECTION C-C'
SUBSURFACE PROFILE
ATLANTA-FULTON CO. WTP
FULTON COUNTY, GA
WILLMER PROJECT No. ATL-171-3238

LEGEND

- ⊢11 — STANDARD PENETRATION TEST N VALUE
- FILL
- RESIDUUM
- BT — BORING TERMINATED
- AR — AUGER REFUSAL
- WATER LEVEL AT TIME OF BORING
- WATER LEVEL AT 24 HOURS AFTER BORING



NOTE:
THE SOIL STRATIGRAPHY SHOWN ON THIS PROFILE REPRESENTS OUR INTERPRETATION OF THE BORING DATA IN ACCORDANCE WITH GENERALLY ACCEPTED GEOTECHNICAL ENGINEERING PRACTICE. THE LINES SHOWING STRATA BREAKS ARE APPROXIMATE AND BASED ON LINEAR INTERPOLATION BETWEEN BORINGS. THE ACTUAL TRANSITION BETWEEN SOIL STRATA ARE EXPECTED TO BE GRADUAL, AND THE DEPTH/ELEVATION OF ANY STRATUM BETWEEN TWO BORINGS COULD BE DIFFERENT FROM WHAT IS SHOWN ON THIS PROFILE.

VERT. SCALE: 1"=10'	
HORIZ. SCALE: 1"=50'	
DATE: 6/29/2007	
DRAWN BY: TJS	
REVIEWED BY: EL	

WILLMER ENGINEERING INC.

GEOTECHNICAL ENGINEERING ▪ CONSTRUCTION SERVICES
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 155
ATLANTA, GA 30340-4270

FIGURE 4D
SECTION D-D'
SUBSURFACE PROFILE
ATLANTA-FULTON CO. WTP
FULTON COUNTY, GA
WILLMER PROJECT No. ATL-171-3238

APPENDIX I

BORING RECORD LEGEND

SM, CL, etc: - GROUP SYMBOL based on Unified Soil Classification System.
(Refer to ASTM D-2488 and Table 1 of D-2487)

N-VALUE: BLOWS PER FOOT- Standard Penetration Resistance (SPT) blow count, the sum of the second and third 6-inch increments of the SPT test.
(Refer to ASTM D-1586)

CONSISTENCY / RELATIVE DENSITY Correlated with SPT Blow Count, N:

SILTS AND CLAYS

N (blows per foot)	Consistency
0 - 2	Very Soft
3 - 4	Soft
5 - 8	Firm
9 - 15	Stiff
16 - 30	Very Stiff
31 - 50	Hard
> 50	Very Hard

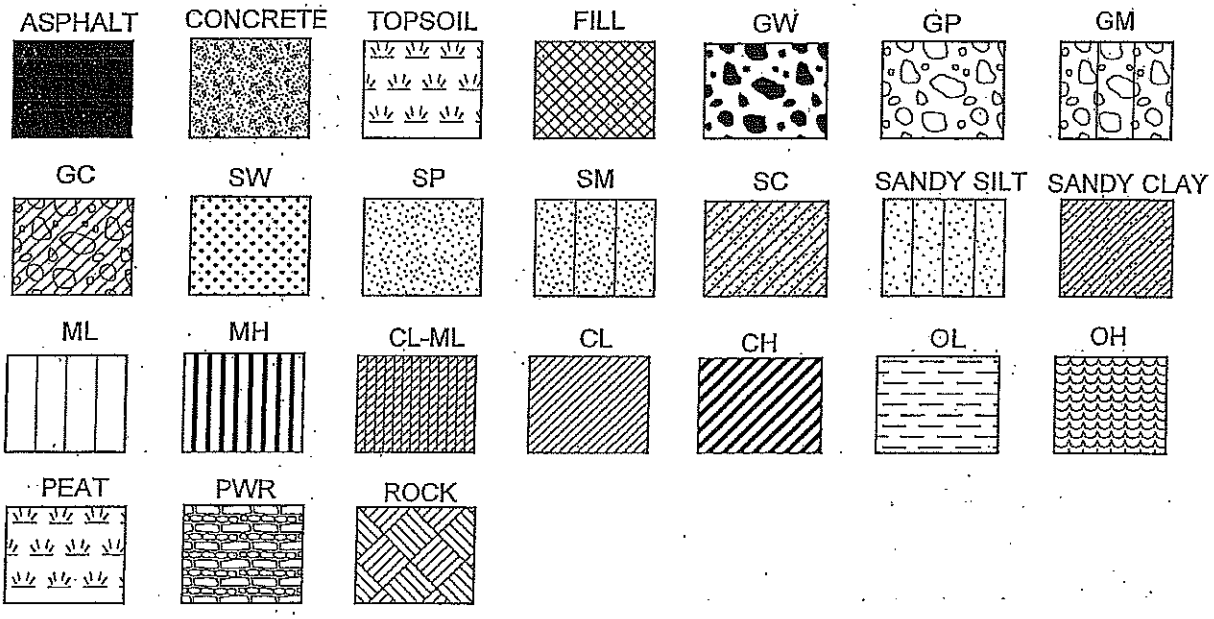
SANDS

N (blows per foot)	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
> 50	Very Dense

NOTES:

Groundwater Measurements:

- Water level at 24 hours
- Water level at time of boring
- Caved level at 24 hours



WILLMER ENGINEERING INC. WE

Willmer Engineering Inc.
3772 Pleasantdale Road, Suite 165
Atlanta, Georgia 30340

UNIFIED SOIL CLASSIFICATION SYSTEM REFERENCE SHEET

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

WILLEY ENGINEERING INC. WE

Project: **Atlanta Fulton County Water Treatment Plant**	**HOLE No. B-1**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **171-3238**	Location: **Clearwell No. 6**
Azimuth: Angle from Horizontal: **90** Surface Elevation (ft): **953.90** Station:	
Drilling Equipment: **Geoprobe 6620DT** Drilling Method: **HSA**	
Core Boxes: **NA** Samples: **10** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **50.0**	
Logged By: **RC** Date Drilled: **7/6/07**	

VERTICAL DEPTH (ft)	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
0				TOPSOIL = 6-inches (SC)	953.9	
0	SS			RESIDUUM : Medium dense red brown clayey silty medium to fine **SAND** (micaceous)		11
5	SS				950	13
10	SS			Loose dark brown and tan silty medium to fine **SAND** (micaceous) (SM)	945	10
15	SS			Loose to medium dense tan, white, and gray silty medium to fine **SAND** (micaceous) (SM)	940	5
20	SS				935	10
25	SS				930	11
30	SS			Dense gray, white, and black silty medium to fine **SAND** (micaceous) (SM)	925	42
35	SS			PARTIALLY WEATHERED ROCK : Sampled as very dense gray, white, gray-green, and black silty medium to fine **SAND** (micaceous) (PWR)	920	
40	SS				915	50/3"
45	SS				910	50/1"
50	SS				905	50/2"
50				Boring terminated at a depth of 50 feet below the existing ground surface		
				No measurable groundwater encountered at the time of drilling		

STANDARD PENETRATION TEST DATA (blows/foot): 5, 10, 20, 40, 60, 80

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-1**

SPTN 3238.GPJ 7/9/07

WILLMER ENGINEERING, INC. WE

Project: **Atlanta Fulton County Water Treatment Plant**
Location: **Fulton County, Georgia**
Project Number: **171-3238**

HOLE No. B-2
Sheet 1 of 1
Location: **Clearwell No. 6**

Azimuth: Angle from Horizontal: **90** Surface Elevation (ft): **934.50** Station:

Drilling Equipment: **CME 550** Drilling Method: **HSA**

Core Boxes: **NA** Samples: **8** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **10.0**

Logged By: **PT** Date Drilled: **6/5/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
					TOPSOIL = 2 inches / FILL	934.5	
		SS			FILL : Medium dense orange brown silty medium to fine **SAND** with gravel		28
		SS			Very loose brown orange medium to fine sandy **CLAY** with gravel / FILL	930	4
5					Loose to very loose orange brown silty medium to fine **SAND** with gravel (very rocky) / FILL		
10						925	

Auger refusal encountered @ 10 feet below the existing ground surface.

Borehole was offset halfway between B2 and B3 because of excessive rocky fill.

STANDARD PENETRATION TEST DATA (blows/foot)
5 10 20 40 60 80

SPTN 3238.GPJ 7/2/07

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. B-2

WILLMER ENGINEERING INC. WE

Project: **Atlanta Fulton County Water Treatment Plant**
Location: **Fulton County, Georgia**
Project Number: **171-3238**

HOLE No. B-2A
Sheet 1 of 1
Location: **Clearwell No. 6**

Azimuth: Angle from Horizontal: **90** Surface Elevation (ft): **931.50** Station:
Drilling Equipment: **CME 550** Drilling Method: **HSA**
Core Boxes: **NA** Samples: **8** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **35.0**
Logged By: **PT** Date Drilled: **6/5/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
		SS			TOPSOIL = 2 inches / FILL: Medium dense red brown silty medium to fine **SAND** with gravel	931.5	
5		SS				930	20
							12
						925	
10		SS			POSSIBLE ALLUVIUM : Medium dense dark gray silty medium to fine **SAND** with organic fragments. **SM**		12
						920	
15		SS			RESIDUUM : Medium dense orange brown, gray clayey medium to fine **SAND** (micaceous) **SC**		12
						915	
20		SS					18
						910	
25		SS			Medium dense gray brown silty medium to fine **SAND** (very micaceous) **SM**		30
						905	
30		SS			Very dense orange brown silty medium to fine **SAND** (micaceous) **SM**		79
						900	
35		SS			PARTIALLY WEATHERED ROCK : Sampled as very dense orange brown silty medium to fine **SAND** with rock fragment and quartz veins (micaceous) **PWR**		50/4"

Boring terminated @ 35 feet below the existing ground surface.

Groundwater was encountered @ 28 feet below the existing ground surface @ the time of boring.

Groundwater was encountered @ 20 feet below the existing ground surface 24 hours after boring.

STANDARD PENETRATION TEST DATA (blows/foot)
5 10 20 40 60 80

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-2A**

SPTN 3238.GPJ 7/2/07

WILLMER ENGINEERING INC. WE

Project: **Atlanta Fulton County Water Treatment Plant**
Location: **Fulton County, Georgia**
Project Number: **171-3238**

HOLE No. B-3
Sheet 1 of 1
Location: **Clearwell No. 5**

Azimuth: Angle from Horizontal: **90** Surface Elevation (ft): **933.47** Station:
Drilling Equipment: **CME 550** Drilling Method: **HSA**
Core Boxes: **NA** Samples: **8** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **35.0**
Logged By: **PT** Date Drilled: **6/5/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
		SS			TOPSOIL = 2 inches / FILL: Medium dense orange red silty medium to fine **SAND** with gravel	933.5	20
5		SS				930	12
						925	5
10		SS			RESIDUUM : Loose orange brown clayey medium to fine **SAND** with organic fragments (micaceous) SC	920	4
15		SS			Very loose gray brown clayey coarse to fine **SAND** (very micaceous) SC	915	12
20		SS			Medium dense tan, orange, brown silty medium to fine **SAND** (micaceous) SM	910	16
25		SS				905	41
30		SS			Dense to very dense dark brown silty medium to fine **SAND** with rock fragemnts and quartz veins (very micaceous) SM	900	81
35		SS					

Boring terminated at 35 feet below the existing ground surface.

Groundwater was encountered @ 21.5 feet below the existing ground surface @ the time of boring.

Groundwater was encountered @ 21 feet below the existing ground surface 24 hours after boring.

STANDARD PENETRATION TEST DATA (blows/foot)
5 10 20 40 60 80

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. B-3

SPTN 3238.GPJ 6/28/07

WILMER ENGINEERING, INC. WE

Project: **Atlanta Fulton County Water Treatment Plant**
Location: **Fulton County, Georgia**
Project Number: **171-3238**

HOLE No. B-4
Sheet 1 of 1
Location: **Clearwell No. 5**

Azimuth: Angle from Horizontal: **90** Surface Elevation (ft): **929.14** Station:
Drilling Equipment: **CME 550** Drilling Method: **HSA**
Core Boxes: **NA** Samples: **8** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **40.0**
Logged By: **PT** Date Drilled: **6/5/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 2 INCHES / FILL	929.1		
5		SS			FILL : Medium dense red brown silty medium to fine **SAND** with gravel and wood fragments (micaceous)	925		17
		SS						15
10		SS			RESIDUUM : Loose red brown clayey medium to fine **SAND** with rock and organic fragments (micaceous) SC	920		7
15		SS			Sample not recovered	915		6
					Medium dense orange red clayey medium to fine **SAND** SC	910		11
20		SS						
25		SS				905		11
30		SS			Medium to very dense gray silty medium to fine **SAND** with rock fragments and quartz veins (micaceous) SM	900		23
35		SS				895		78
40		SS			PARTIALLY WEATHERED ROCK : Sampled a very dense gray silty medium to fine **SAND** with rock fragments and quartz veins (micaceous) PWR	890		50/5"

Boring terminated @ 40 feet below the existing ground surface.

Groundwater was encountered @ 17 feet below the existing ground surface @ the time of boring.

Groundwater was encountered @ 16 feet below the existing ground surface 24 hours after borin

STANDARD PENETRATION TEST DATA (blows/foot): 5, 10, 20, 40, 60, 80

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. B-4

SPTN 3238.GPJ 6/26/07

WILLMER ENGINEERING INC. WE

Project: **Atlanta Fulton County Water Treatment Plant**
Location: **Fulton County, Georgia**
Project Number: **171-3238**

HOLE No. B-5

Sheet 1 of 1
Location: **Clearwell No. 5**

Azimuth: Angle from Horizontal: **90** Surface Elevation (ft): **938.11** Station:
Drilling Equipment: **CME 550** Drilling Method: **HSA**
Core Boxes: **NA** Samples: **8** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **40.0**
Logged By: **PT** Date Drilled: **6/5/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
					TOPSOIL = 2 INCHES / FILL	938.1	
5		SS			FILL : Medium dense to loose red brown silty medium to fine **SAND** with gravel	935	18
		SS					9
						930	
10		SS			RESIDUUM : Medium dense orange brown clayey medium to fine **SAND** with rock fragments and quartz veins (micaceous) SC		18
15		SS			Medium dense orange, red, brown silty medium to fine **SAND** (micaceous) SM	925	12
						920	
20		SS			Loose gray brown silty medium to fine **SAND** (micaceous) SM		10
						915	
25		SS					10
						910	
30		SS			Sample not recovered ▽		11
						905	
35		SS			Dense orange brown silty medium to fine **SAND** SM		35
						900	
40		SS			Medium dense gray silty medium to fine **SAND** (highly micaceous) SM		30

Boring terminated @ 40 feet below the existing ground surface.

Groundwater was encountered @ 30 feet below the existing ground surface @ the time of boring.

Groundwater was not encountered below the existing ground surface 24 hours after boring.

STANDARD PENETRATION TEST DATA (blows/foot)
5 10 20 40 60 80

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. B-5

SPTN 3238.GPJ 8/28/07

WILLMER ENGINEERING INC. WE

Project: **Atlanta Fulton County Water Treatment Plant**
Location: **Fulton County, Georgia**
Project Number: **171-3238**

HOLE No. B-6
Sheet 1 of 1
Location: **Flocculation Tank No.3**

Azimuth: Angle from Horizontal: **90** Surface Elevation (ft): **955.83** Station:
Drilling Equipment: **CME 550** Drilling Method: **HSA**
Core Boxes: **NA** Samples: **9** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **40.0**
Logged By: **PT** Date Drilled: **6/6/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
5		SS			FILL : Loose to medium dense red brown clayey medium to fine **SAND** with gravel (micaceous)	FILL	955.8	8
		SS						24
10		SS			RESIDUUM : Medium dense orange brown silty medium to fine **SAND** with rock fragments and quartz veins (micaceous)	SM	950	17
15		SS			Medium dense dark gray silty medium to fine **SAND** with rock fragments and quartz veins (micaceous)	SM	945	16
20		SS					940	12
25		SS					935	18
30		SS			Medium dense dark gray brown silty medium to fine **SAND** with rock fragments and quartz veins	SM	930	30
35		SS			Medium dense red brown silty medium to fine **SAND** with rock fragments and quartz veins	SM	925	14
40		SS			Medium dense gray silty medium to fine **SAND** with rock fragments and quartz veins (very micaceous)	SM	920	19

Boring terminated @ 40 feet below the existing ground surface.

Groundwater was encountered @ 20 feet below the existing ground surface @ the time of boring.

Groundwater was encountered @ 16 feet below the existing ground surface 24 hours after boring.

STANDARD PENETRATION TEST DATA (blows/foot)
5 10 20 40 60 80

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. B-6

SPTN 3238.GPJ 6/28/07

WILLMER ENGINEERING INC. | WE

Project: **Atlanta Fulton County Water Treatment Plant**
Location: **Fulton County, Georgia**
Project Number: **171-3238**

HOLE No. B-7
Sheet 1 of 1
Location: **Flocculation Tank No.3**

Azimuth: Angle from Horizontal: **90** Surface Elevation (ft): **952.45** Station:
Drilling Equipment: **CME 550** Drilling Method: **HSA**
Core Boxes: **NA** Samples: **9** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **40.0**
Logged By: **PT** Date Drilled: **6/6/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
0		SS			FILL : Medium dense red brown clayey medium to fine SAND with gravel (micaceous)	FILL	952.5	
5		SS					950	14
								15
					Very loose red brown silty medium to fine **SAND** with gravel	FILL	945	4
10		SS						
					RESIDUUM : Medium dense orange brown silty medium to fine **SAND** (micaceous)	SM	940	11
15		SS						
20		SS					935	15
					Medium to very dense red brown silty medium to fine **SAND** with gravel	SM	930	41
25		SS						
30		SS					925	31
							920	27
35		SS						
							915	67
40		SS						

Boring terminated @ 40 feet below the existing ground surface .

Groundwater was encountered @ 26 feet below the existing ground surface @ the time of boring.

Groundwater was encountered @ 21 feet below the existing ground surface 24 hours after boring.

STANDARD PENETRATION TEST DATA (blows/foot)
5 10 20 40 60 80

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. B-7

SPTN 3238.GPJ 6/28/07

WILLMER ENGINEERING, INC. WE

Project: **Atlanta Fulton County Water Treatment Plant**
Location: **Fulton County, Georgia**
Project Number: **171-3238**

HOLE No. B-8
Sheet 1 of 1
Location: **Settling Basin No. 3**

Azimuth: Angle from Horizontal: **90** Surface Elevation (ft): **949.86** Station:
Drilling Equipment: **CME 550** Drilling Method: **HSA**
Core Boxes: **NA** Samples: **9** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **40.0**
Logged By: **PT** Date Drilled: **6/6/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
		SS			GAB = 6 inches	949.9	
		SS			FILL : Medium dense red brown silty medium to fine **SAND** with gravel (micaceous)		14
5		SS			Loose red brown clayey medium to fine **SAND**	945	9
10		SS			RESIDUUM : Loose red brown silty medium to fine **SAND** with rock fragments and quartz veins (micaceous)	940	9
15		SS				935	8
20		SS				930	5
25		SS			Medium dense gray silty medium to fine **SAND** with rock fragments and quartz veins (highly micaceous)	925	23
30		SS				920	16
35		SS			Dense silty medium to fine **SAND** with rock fragments and quartz veins (micaceous)	915	17
40		SS				910	39

Boring terminated @ 40 feet below the existing ground surface.

Groundwater was encountered @ 21 feet below the existing ground surface @ the time of boring.

Groundwater was encountered @ 19.5 feet below the existing ground surface 24 hours after boring.

STANDARD PENETRATION TEST DATA (blows/foot)
5 10 20 40 60 80

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. B-8

SPTN 3238.GPJ 9/26/07

WILLMER ENGINEERING INC. WE

Project: **Atlanta Fulton County Water Treatment Plant**
Location: **Fulton County, Georgia**
Project Number: **171-3238**

HOLE No. B-9
Sheet 1 of 1
Location: **Filter Building No. 3**

Azimuth: Angle from Horizontal: **90** Surface Elevation (ft): **947.60** Station:
Drilling Equipment: **CME 550** Drilling Method: **HSA**
Core Boxes: **NA** Samples: **8** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **40.0**
Logged By: **PT** Date Drilled: **6/6/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)
		SS			GAB = 6 inches	GAB	947.6
		SS			FILL : Medium dense red brown clayey medium to fine **SAND** with gravel	FILL	945
5		SS			Medium dense orange brown clayey medium to fine **SAND** with gravel (micaceous)	FILL	940
10		SS			RESIDUUM : Loose orange brown silty medium to fine **SAND**	SM	935
15		SS			Loose orange brown silty medium to fine **SAND** (micaceous)	SM	930
20		SS					925
25		SS			Medium dense white, gray silty medium to fine **SAND** with rock fragments and quartz veins (very micaceous)	SM	920
30		SS					915
35		SS			Medium dense gray, brown, orange silty medium to fine **SAND** (very micaceous)	SM	910
40		SS					

Boring terminated @ 40 feet below the existing ground surface.

Groundwater was encountered @ 20 feet below the existing ground surface @ the time of boring.

Groundwater was encountered @ 18.5 feet below the existing ground surface 24 hours after boring.

STANDARD PENETRATION TEST DATA (blows/foot)

N-VALUE
17
11
7
6
6
18
13
20
27

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. B-9

SPTN 3238.GPJ 6/28/07

WILLMER ENGINEERING INC. WE

Project: **Atlanta Fulton County Water Treatment Plant**
Location: **Fulton County, Georgia**
Project Number: **171-3238**

HOLE No. B-10
Sheet 1 of 1
Location: **Filter Building No. 3**

Azimuth: Angle from Horizontal: **90** Surface Elevation (ft): **947.05** Station:
Drilling Equipment: **CME 550** Drilling Method: **HSA**
Core Boxes: **NA** Samples: **8** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **35.0**
Logged By: **PT** Date Drilled: **6/6/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
					GAB = 8 inches	947.1	
5		SS			FILL : Medium dense red brown clayey medium to fine **SAND** with gravel	945	17
		SS					23
						940	
		SS					23
10					RESIDUUM : Loose orange brown silty medium to fine **SAND** (very micaceous)	935	
15		SS					6
						930	
20		SS			Loose to medium dense silver gray silty coarse to fine **SAND** (very micaceous)		7
						925	
25		SS			Medium dense silver gray, brown silty medium to fine **SAND** with rock fragments and quartz veins (very micaceous)		11
						920	
30		SS					16
						915	
35		SS					16

STANDARD PENETRATION TEST DATA (blows/foot)
5 10 20 40 60 80

Boring terminated @ 35 feet below the exsting ground surface.

Groundwater was encountered @ 21 feet below the existing ground surface @ the time of boring.

Groundwater was not encountered below the existing ground surface 24 hours after boring.

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-10**

SPTN 3238.GPJ 6/28/07

WILLMER ENGINEERING INC. | WE

Project: **Atlanta Fulton County Water Treatment Plant**
Location: **Fulton County, Georgia**
Project Number: **171-3238**

HOLE No. B-11
Sheet 1 of 1
Location: **Filter Building No. 3**

Azimuth: Angle from Horizontal: **90** Surface Elevation (ft): **942.92** Station:
Drilling Equipment: **CME 550** Drilling Method: **HSA**
Core Boxes: **NA** Samples: **8** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **35.0**
Logged By: **PT** Date Drilled: **6/5/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
					GAB = 6 inches	942.9	
5		SS			FILL : Medium dense red brown clayey medium to fine **SAND** with gravel		14
		SS				940	16
10		SS			RESIDUUM : Loose tan, gray silty medium to fine **SAND** (very micaceous)	935	7
15		ST SS			Loose tan, gray silty medium to fine **SAND** with rock fragments and quartz veins (very micaceous)	930	8
20		SS				925	5
25		SS			Loose red, orange, gray silty medium to fine **SAND** (micaceous)	920	10
30		SS			Loose tan to gray silty medium to fine **SAND** with rock fragments: quartz veins (very micaceous)	915	10
35		SS			Medium dense orange, red, gray silty medium to fine **SAND** with rock fragments and quartz veins (highly micaceous)	910	17

Boring terminated @ 35 feet below the existing ground surface.

Groundwater was encountered @ 20 feet below the existing ground surface @ the time of boring.

Groundwater was encountered @ 19 feet below the existing ground surface 24 hours afer boring.

Shelby tube sample pushed from 13 to 15 feet in offset boring.

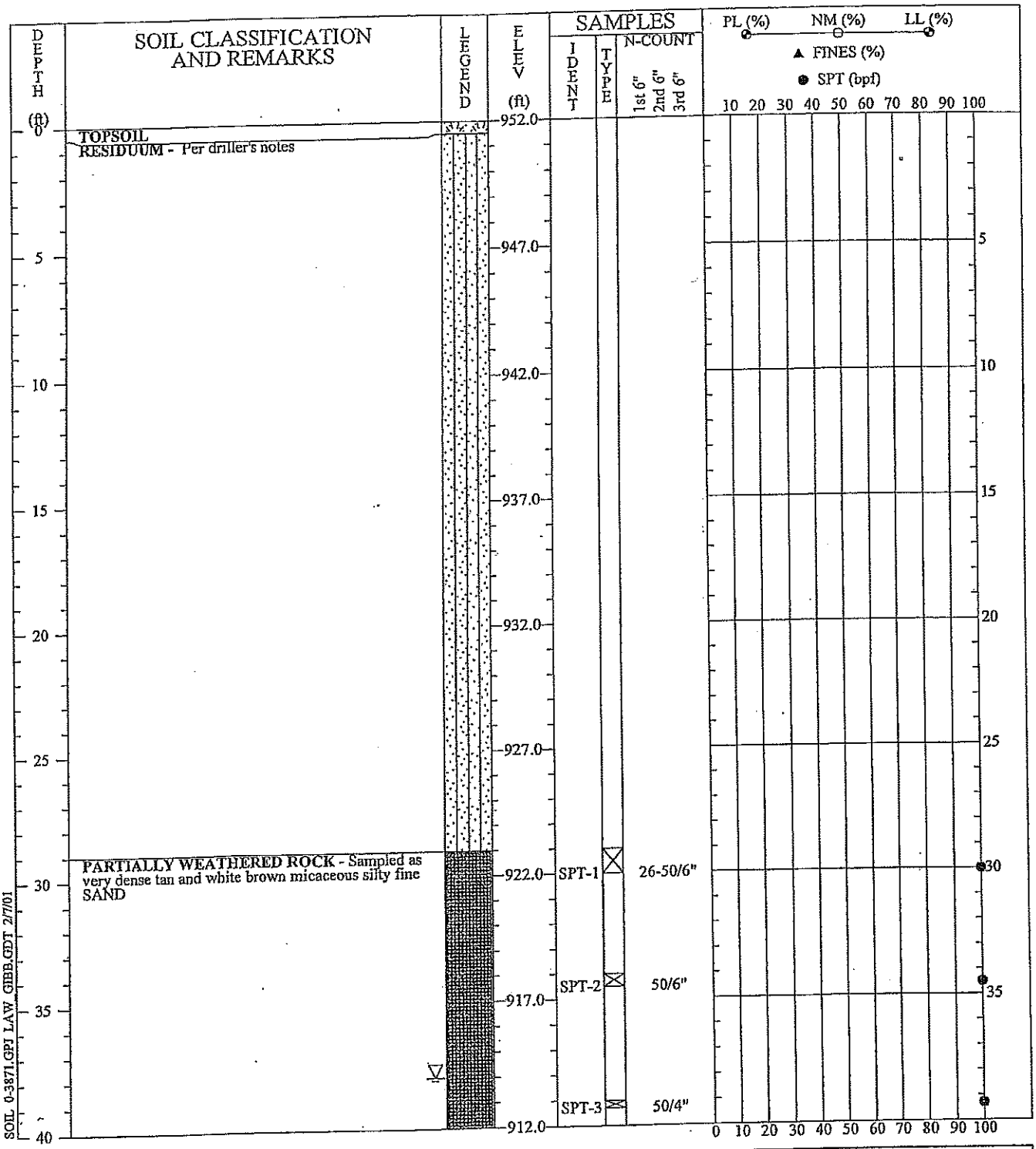
STANDARD PENETRATION TEST DATA (blows/foot)
5 10 20 40 60 80

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-11**

SPTN 3238.GPJ 6/28/07



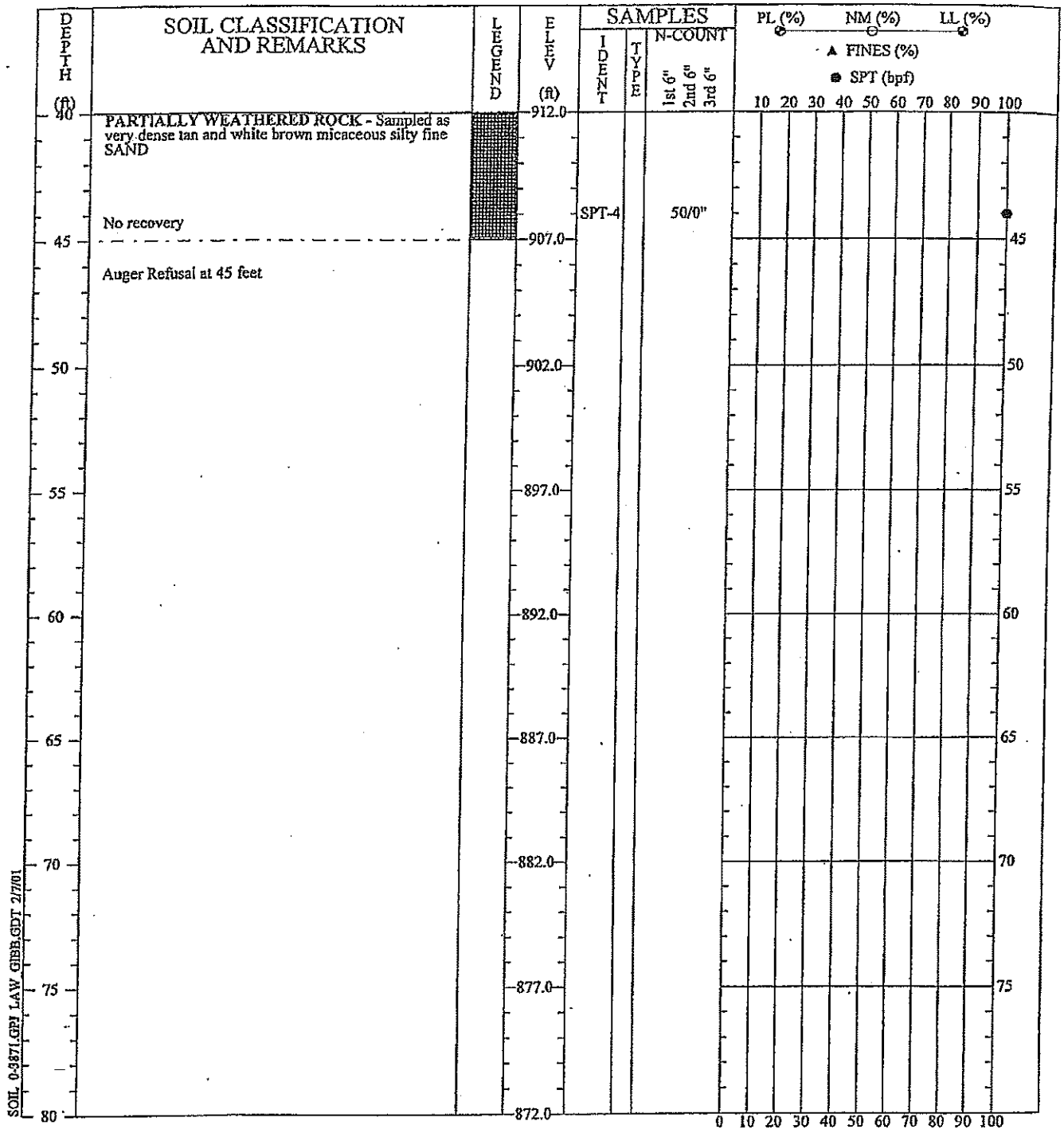
DRILLER:	LAW
EQUIPMENT:	CME - 550
METHOD:	Hollw Stem Auger- Automatic Hammer
HOLE DIA.:	6"
REMARKS:	Groundwater was encountered at a depth of 39 feet during the time of drilling.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: CW-4
PROJECT: Atlanta-Fulton County Water Treatment Plant - Reservoir 2
DRILLED: November 6, 2000
PROJECT No: 50123-0-3871

LAW
LAWGIBB Group Member



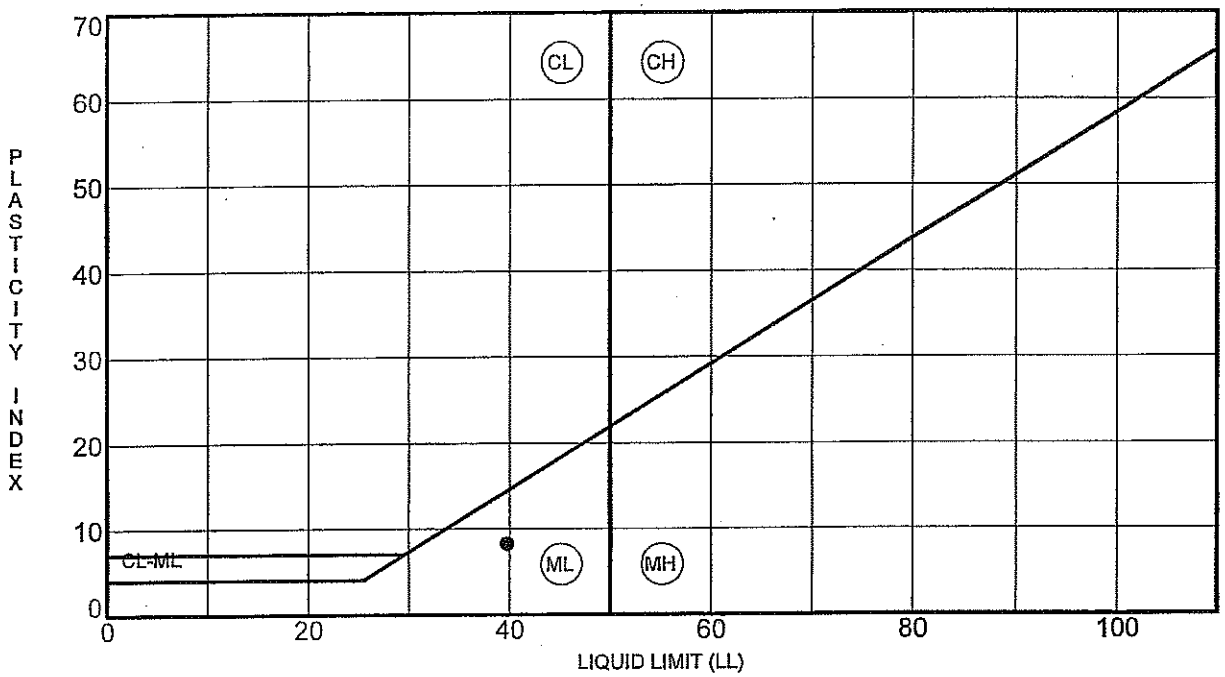
DRILLER:	LAW
EQUIPMENT:	CME - 550
METHOD:	Hollw Stem Auger- Automatic Hammer
HOLE DIA.:	6"
REMARKS:	Groundwater was encountered at a depth of 39 feet during the time of drilling.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: CW-4
PROJECT: Atlanta-Fulton County Water Treatment Plant - Reservoir 2
DRILLED: November 6, 2000
PROJECT No: 50123-0-3871 PAGE 2 OF 2

LAW
LAWGIBB Group Member



Specimen Identification	LL	PL	PI	Fines	Classification
● B-11 (13-15 ft)	40	31	9	47.7	Black, white, gray, brown silty medium to fine SAND (micaceous) (SM)

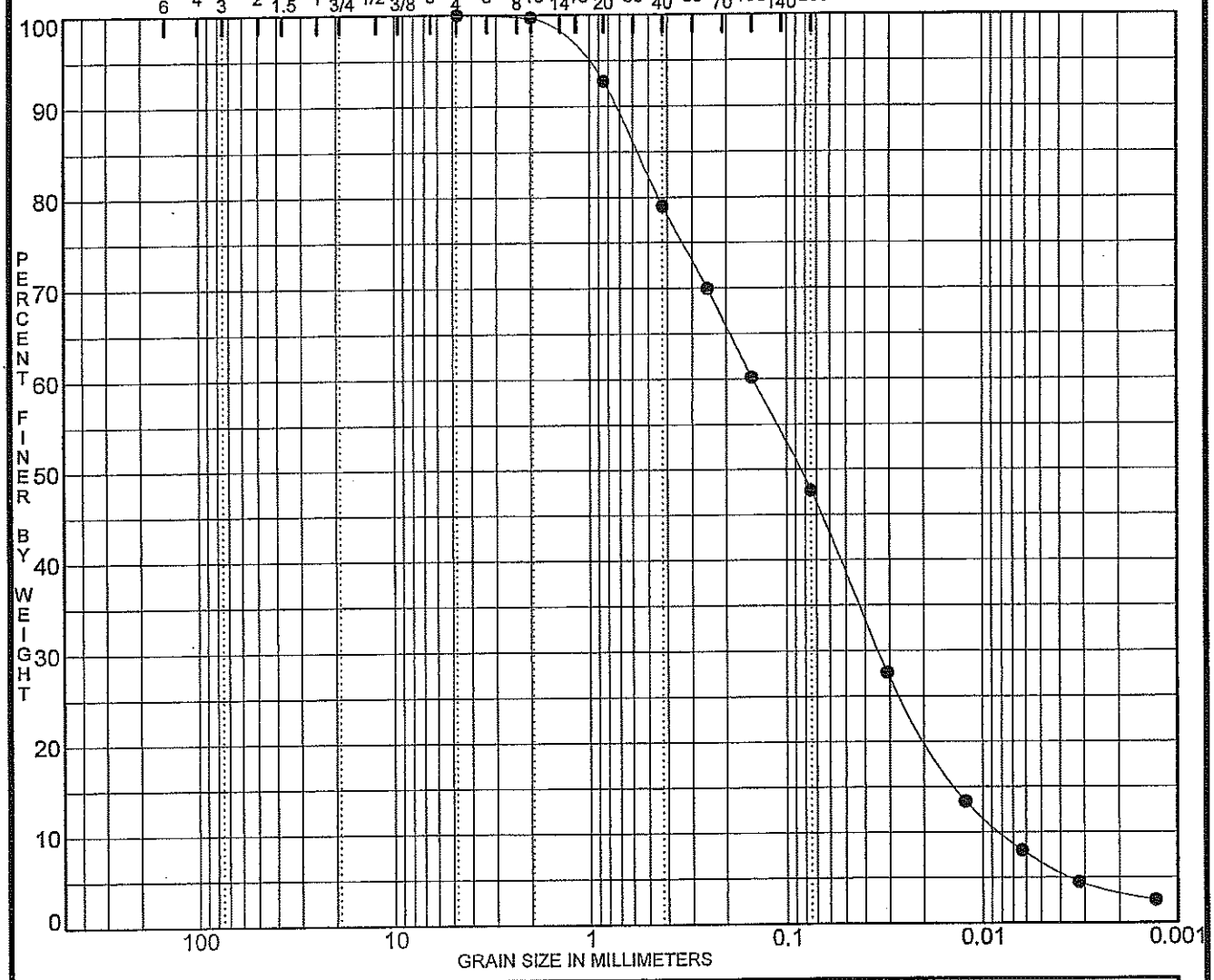
PROJECT Atlanta Fulton County WTP -- Atlanta, Georgia

JOB NO. 171-3238

DATE 6/13/07

WILLAMETTE ENGINEERING INC. WE

ATTERBERG LIMIT RESULTS



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Soil Description	MC%	LL	PL	PI	Cc	Cu
● B-11 (13-15 ft)	Black, white, gray, brown silty medium to fine SAND (micaceous) (SM)	34.8	40	31	9	0.98	18.4

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-11 (13-15 ft)	4.75	0.15	0.034	0.0081	0.0	52.3	44.2	3.5

PROJECT Atlanta Fulton County WTP -- Atlanta, Georgia

JOB NO. 171-3238

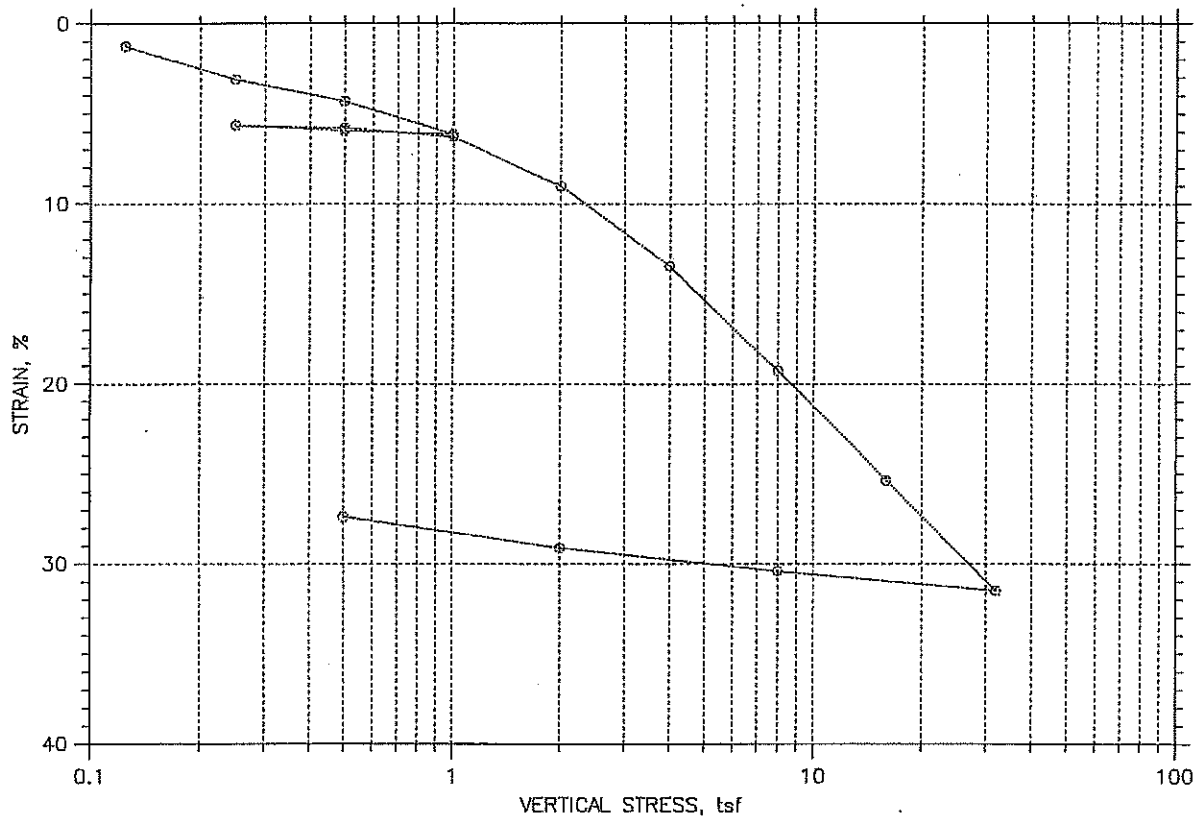
DATE 6/13/07

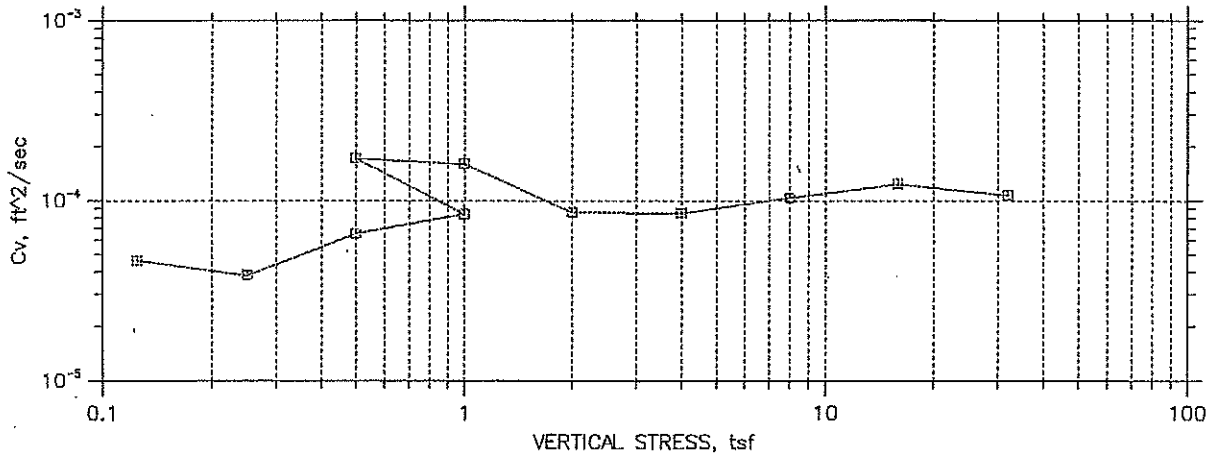
WILLE-WEBER ENGINEERING, INC. WE

GRADATION CURVE

CONSOLIDATION TEST DATA

SUMMARY REPORT



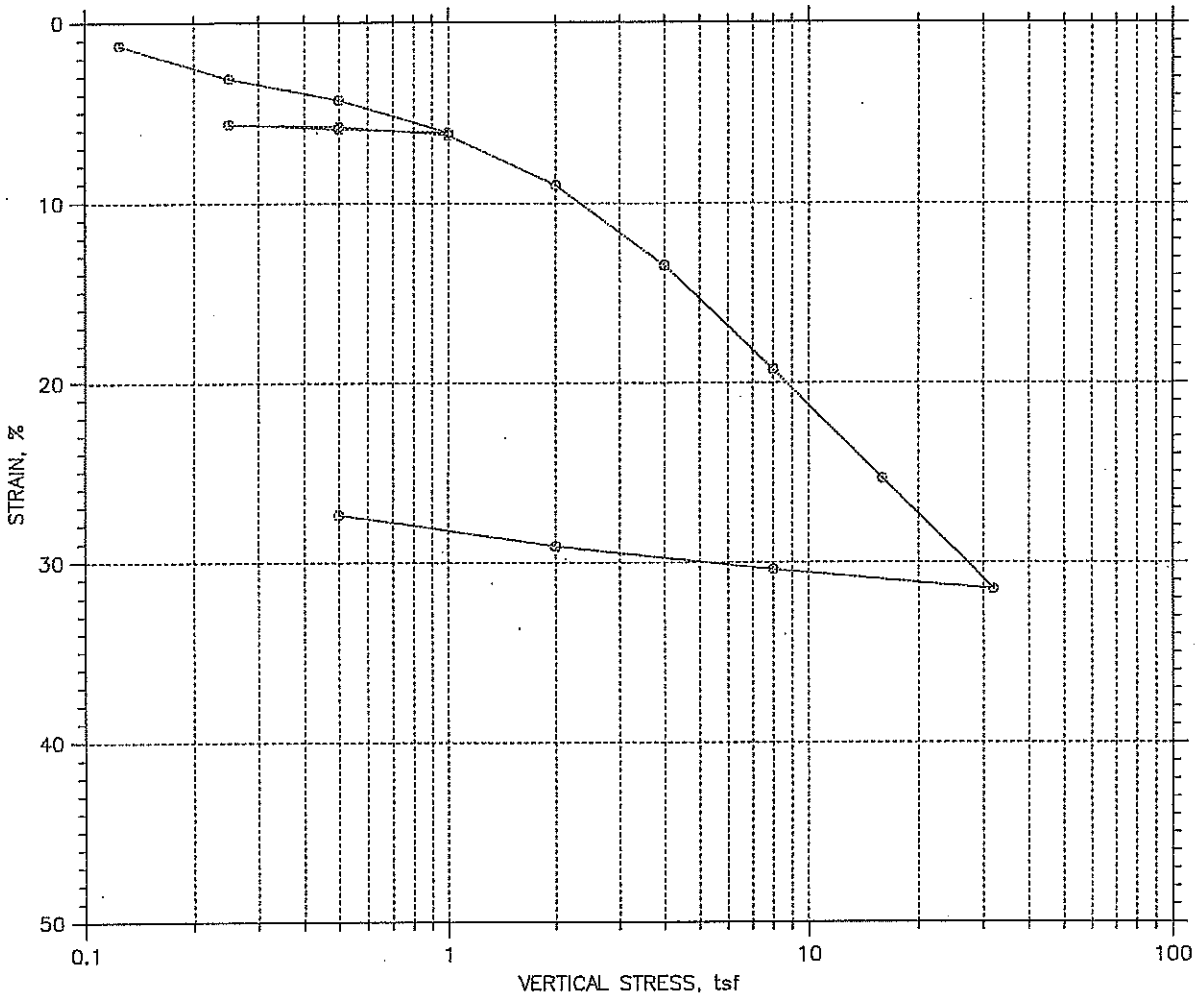


	Project: Atlanta Fulton Co. WWTP	Location: Atlanta,Georgia	Project No.: 171-3238
	Boring No.: B-11	Tested By: Kulin	Checked By: E.Leo
	Sample No.: B-11	Test Date: 06/07/2007	Depth: 13-15 feet
VE	Test No.: CON1	Sample Type: Tube	Elevation: ---
	Description: White, black, gray, brown silty medium to fine SAND (micaceous) (SM)		
	Remarks: ASTM D2435		

Wed, 13-JUN-2007 10:36:18

CONSOLIDATION TEST DATA

SUMMARY REPORT



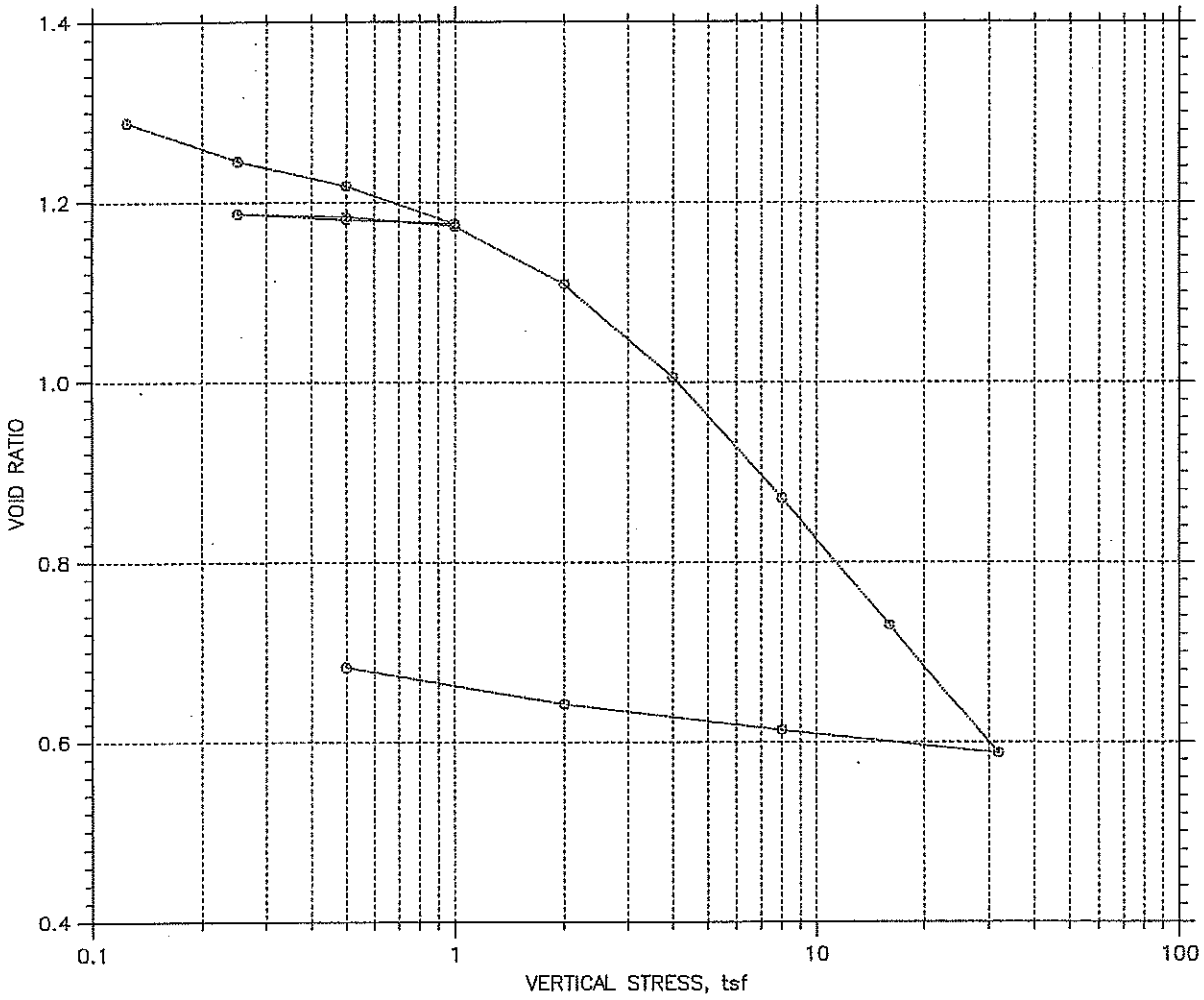
					Before Test	After Test
Overburden Pressure: 0 tsf				Water Content, %	46.95	26.72
Preconsolidation Pressure: 0 tsf				Dry Unit Weight, pcf	72.46	99.79
Compression Index: 3.81959e-313				Saturation, %	95.85	105.25
Diameter: 2.5 in		Height: 1 in		Void Ratio	1.32	0.68
LL: 40	PL: 31	PI: 8	GS: 2.69			

	Project: Atlanta Fulton Co. WWTP	Location: Atlanta,Georgia	Project No.: 171-3238
	Boring No.: B-11	Tested By: Kulin	Checked By: E.Leo
	Sample No.: B-11	Test Date: 06/07/2007	Depth: 13-15 feet
VVE	Test No.: CON1	Sample Type: Tube	Elevation: ---
	Description: White, black, gray, brown silty medium to fine SAND (micaceous) (SM)		
	Remarks: ASTM D2435		

Wed, 13-JUN-2007 10:36:18

CONSOLIDATION TEST DATA

SUMMARY REPORT



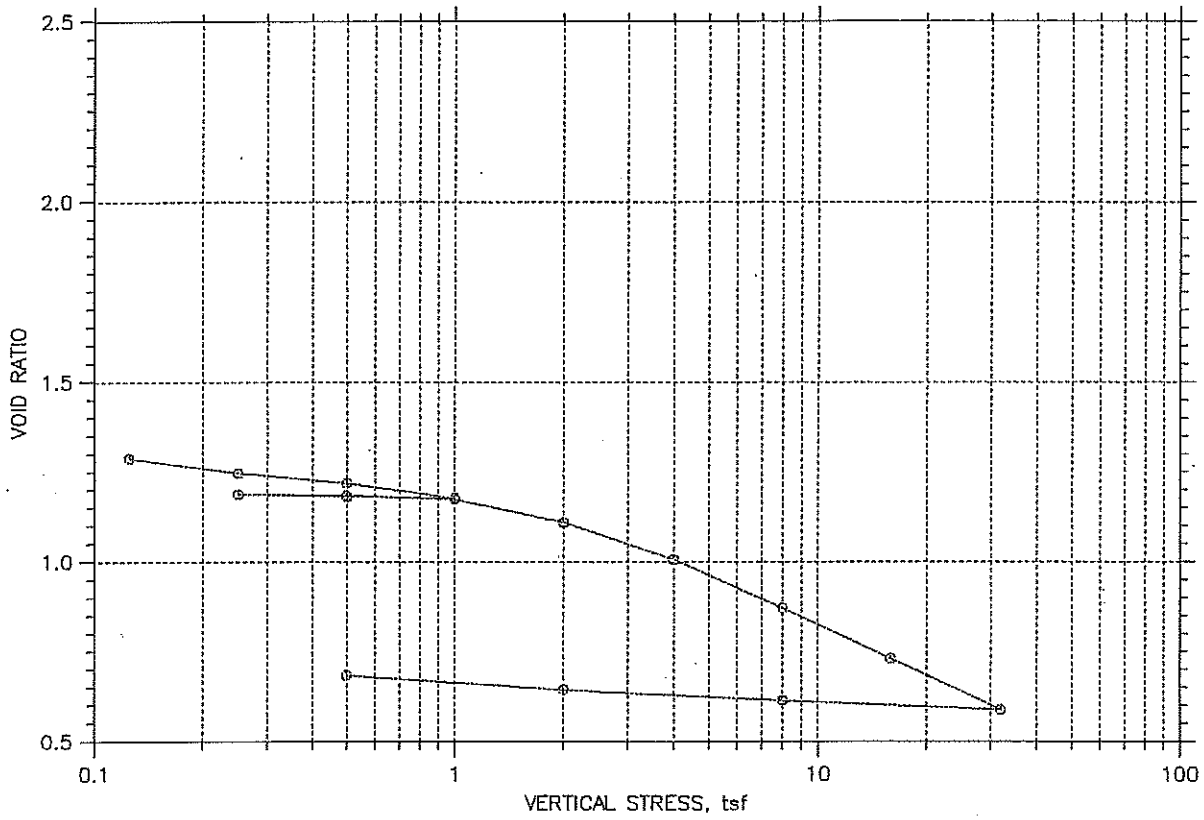
					Before Test	After Test
Overburden Pressure: 0 tsf				Water Content, %	46.95	26.72
Preconsolidation Pressure: 0 tsf				Dry Unit Weight, pcf	72.46	99.79
Compression Index: 3.81959e-313				Saturation, %	95.85	105.25
Diameter: 2.5 in		Height: 1 in		Void Ratio	1.32	0.68
LL: 40	PL: 31	PI: 8	GS: 2.69			

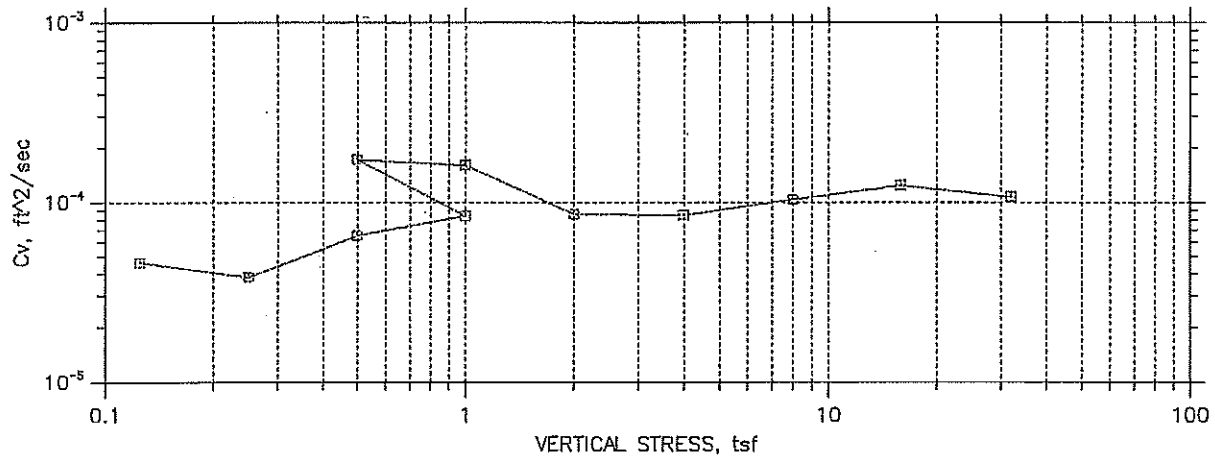
	Project: Atlanta Fulton Co. WWTP	Location: Atlanta,Georgia	Project No.: 171-3238
	Boring No.: B-11	Tested By: Kulin	Checked By: E.Leo
	Sample No.: B-11	Test Date: 06/07/2007	Depth: 13-15 feet
WE	Test No.: CON1	Sample Type: Tube	Elevation: ---
	Description: White, black, gray, brown silty medium to fine SAND (micaceous) (SM)		
	Remarks: ASTM D2435		

Wed, 13-JUN-2007 10:36:40

CONSOLIDATION TEST DATA

SUMMARY REPORT





	Project: Atlanta Fulton Co. WWTP	Location: Atlanta,Georgia	Project No.: 171-3238
	Boring No.: B-11	Tested By: Kulin	Checked By: E.Leo
	Sample No.: B-11	Test Date: 06/07/2007	Depth: 13-15 feet
VE	Test No.: CON1	Sample Type: Tube	Elevation: ---
	Description: White, black, gray, brown silty medium to fine SAND (micaceous) (SM)		
	Remarks: ASTM D2435		

Wed, 13-JUN-2007 10:36:40

APPENDIX II

June 12, 2007

Mr. Ed Leo, P.E.
Willmer Engineering, Inc.
3772 Pleasantdale Road, Suite 165
Atlanta, Georgia 30340

Subject: Results of Seismic Shear-Wave Investigation
Atlanta Fulton County – WTP (171-3238)

Dear Mr. Leo:

As requested, GeoWave Solutions, Inc. has completed a shear-wave investigation using a combination of active multi-channel analysis of surface wave (MASW) and passive (micro-tremor) methods at the proposed expansion of the Atlanta Fulton County – WTP in Alpharetta, Georgia. This study was conducted to aid Willmer Engineering in establishing IBC seismic soil classifications for proposed additions to the facility. This report describes the scope and methods utilized for this study and presents shear-wave velocity data produced on test arrays conducted on the site.

The scope of service for this project was to conduct two shear-wave arrays in the area proposed for construction of Flocculation Structure No. 3 and Filter Building No. 3, and one array in the planned area of Clear Wells No. 5 and 6. Vertices for all three arrays corresponded with surveyed/staked boring locations in the field. Additional orange and white flagging were added to the staked locations. GPS coordinate data were collected at the vertex of each test array and are posted at the top of each shear-wave column. We have also included a site plan depicting the approximate location of the test arrays.

Seismic data for the arrays were collected using a 24-channel Geometrics Geode seismograph with 4.5-Hz geophones. Passive, micro-tremor records were collected using 20-foot geophone spacings on 'L'-shaped, two-dimensional arrays. Because the passive technique uses ambient vibration for a seismic source, the two-dimensional arrays provide better evaluation of seismic waves emanating from all directions than one-dimensional, linear arrays. A second set of data were collected using an active, MASW technique along linear extensions of the passive 'L' arrays. Array configuration for this portion of our study included 10-foot geophone spacings with hammer blows at various offset points to provide the seismic sources for each line.

Data from both modes of testing were processed and analyzed using Geometrics *Seisimager/SW* analysis program. The program enables the user to compute a velocity

spectrum which includes a Rayleigh wave dispersion trend. After this process is completed for both passive and active data, the resulting dispersion data are appended to produce a final shear-wave velocity depth profile. We have attached shear-wave velocity plots for the three arrays completed at this site.

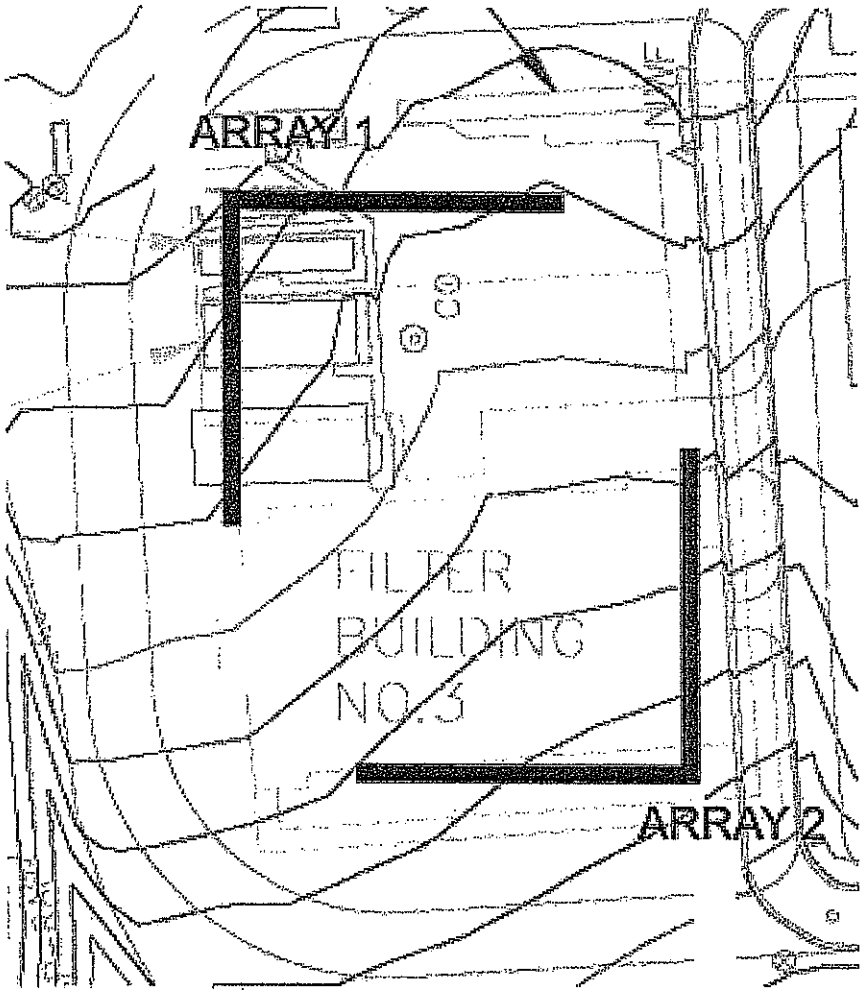
This report contains subsurface shear-wave columns that were averaged across the various arrays conducted during this study. The attached columns should be interpreted beneath the vertex of the 'L'-shaped arrays depicted on the site plan. Because abrupt changes in the subsurface are common in this geologic province, the attached velocity columns may not be representative of subsurface conditions across the entire site. Additional testing may be desired at areas not covered by this report.

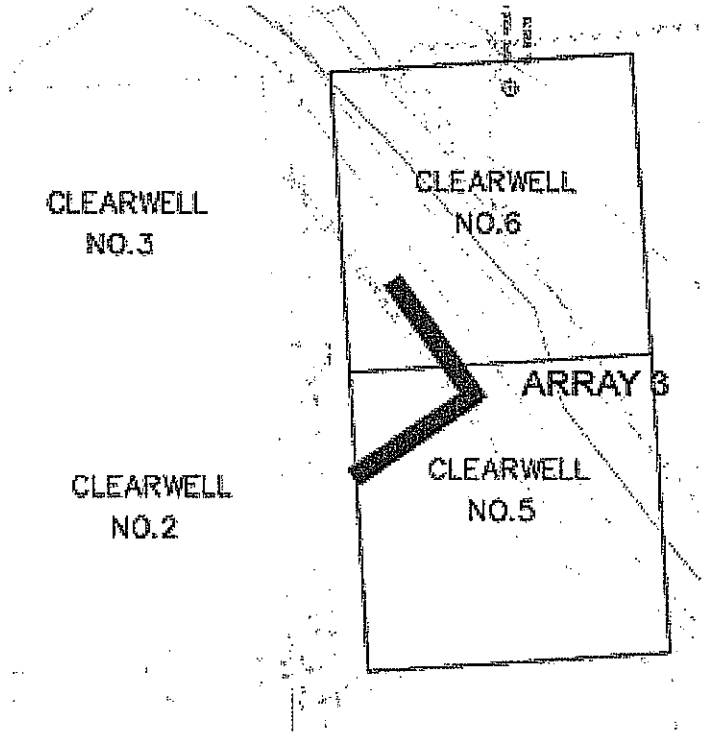
If you have any questions regarding the findings of this study or the data contained in this report, or if you require any further services, please feel free to call us. We appreciate the opportunity to provide these consulting services and look forward to working with you again future projects.

Sincerely,

Michael C. Stone

Michael C. Stone, P.G.
GeoWave Solutions, Inc.





GeoWave Solutions, Inc.
4575 Ansley Lane
Cumming, Georgia 30040
Tel: 770-888-3776
Fax: 770-888-7212

Atlanta Fulton County - WTP

Seismic Shear-Wave Investigation

Wiltmer Engineering, Inc.

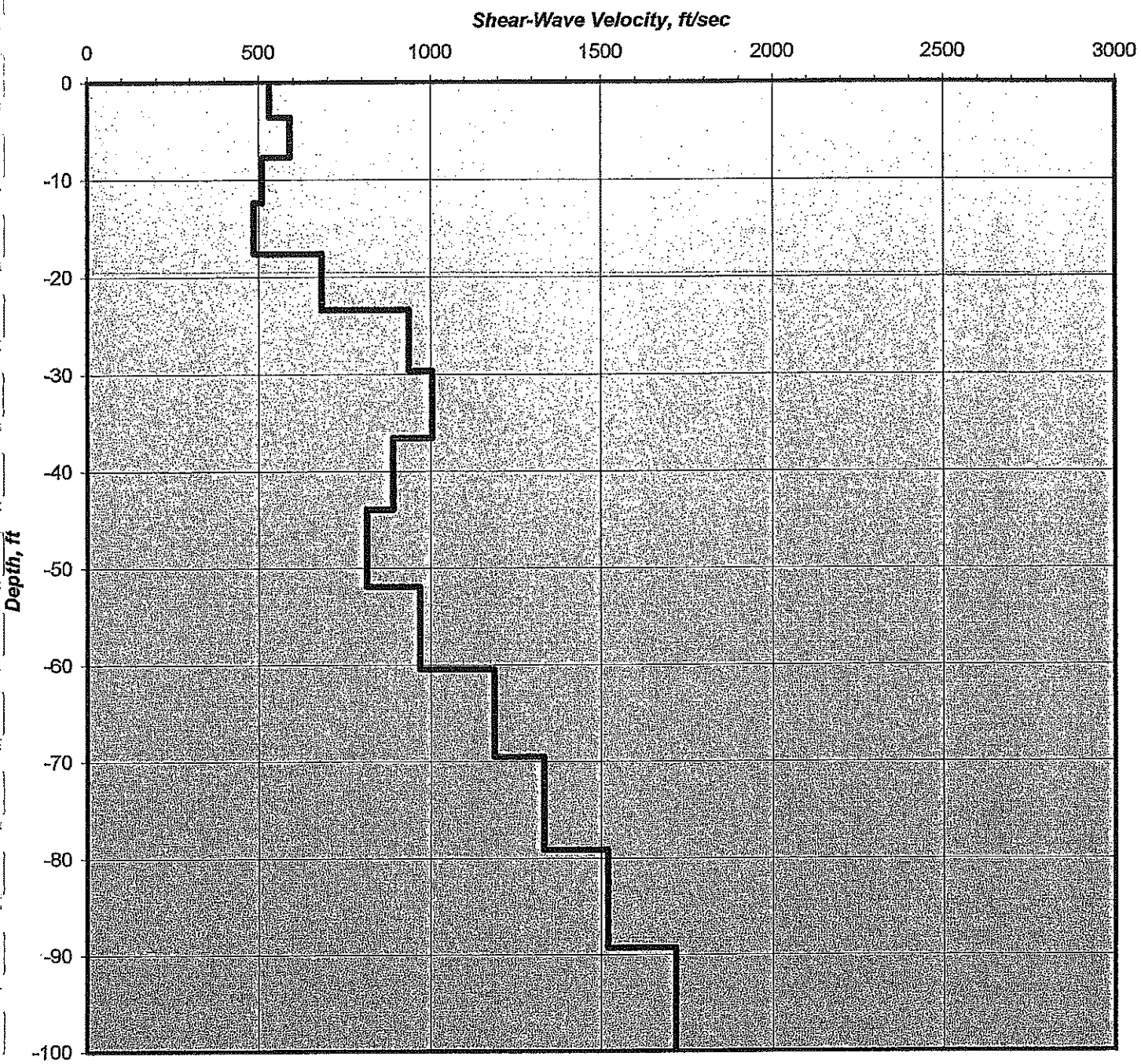
Project Manager: M. Stone

Date: June 12, 2007

NOT TO SCALE

Array 1

Vertex Location: 84 13' 35.00"W 34 01' 06.88"N



Average Vs (100 feet) = 906.7 ft/sec

GeoWave Solutions, Inc.
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Atlanta - Fulton County WTP

Willmer Engineering, Inc.

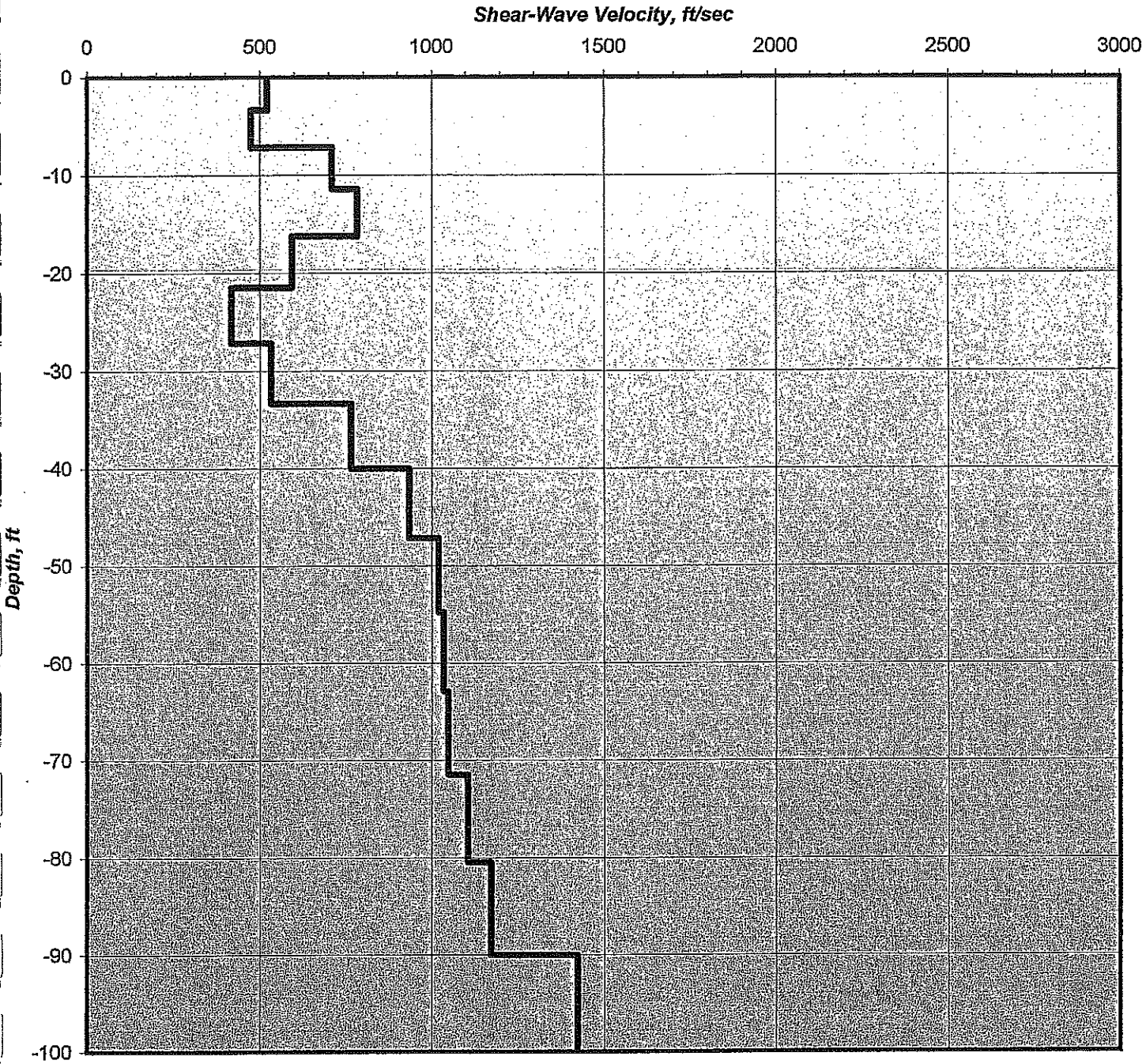
Seismic Shear-Wave Investigation

Project Manager: M. Stone

June 6, 2007

Array 2

Vertex Location: 84 13' 37.42"W 34 01' 05.19"N



Average Vs (100 feet) = 806.9 ft/sec

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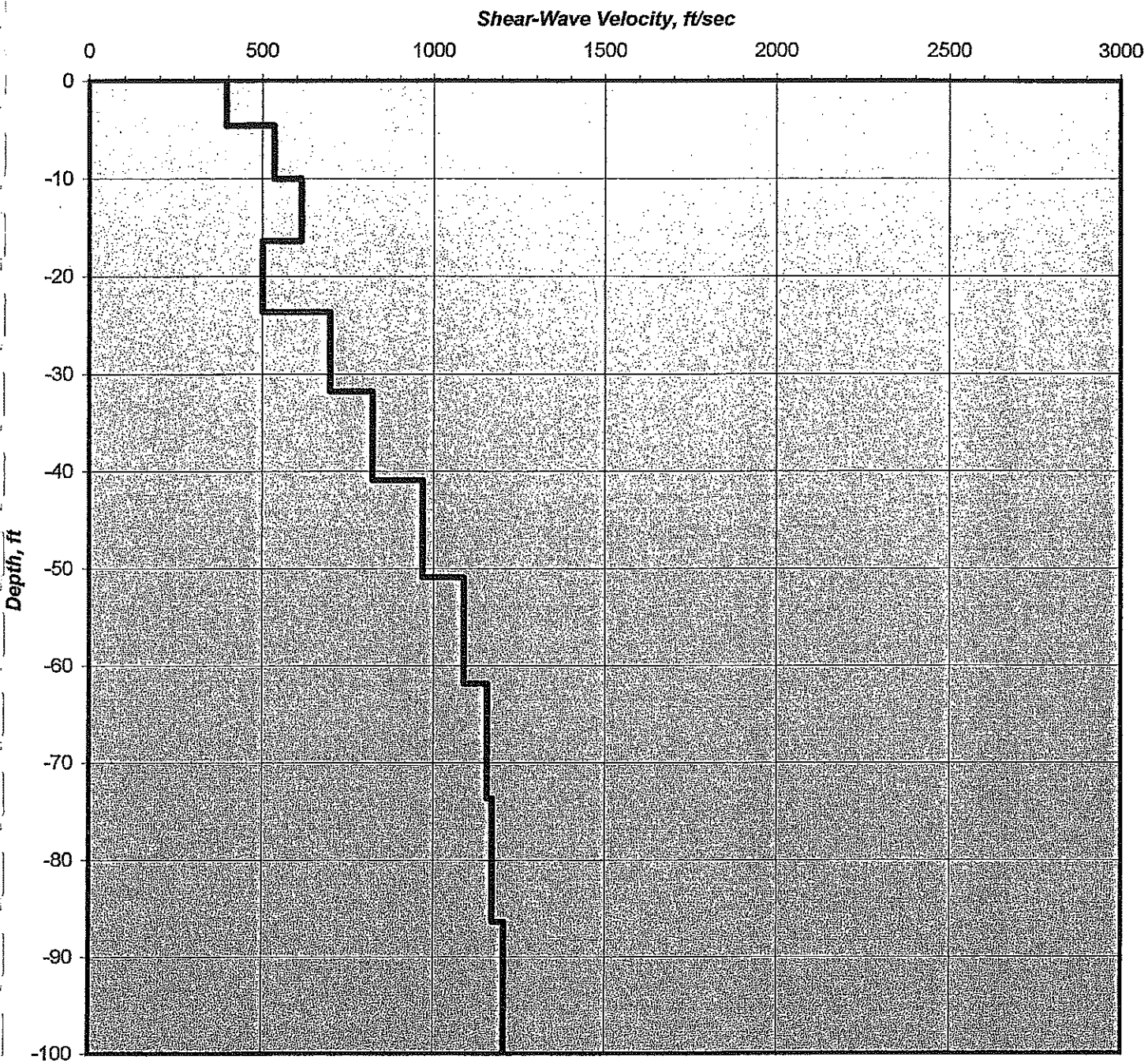
Seismic Shear-Wave Investigation

Project Manager: M. Stone

June 6, 2007

Array 3

Vertex Location: 84 13' 33.83"W 34 00' 53.68 "N



Average Vs (100 feet) = 818.8 ft/sec

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Atlanta - Fulton County WTP

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Seismic Shear-Wave Investigation

Project Manager: M. Stone

June 6, 2007

APPENDIX B

INSURANCE & BONDING REQUIREMENTS

APPENDIX B
INSURANCE & BONDING REQUIREMENTS
FC-6487 Atlanta-Fulton County Water Treatment Plant
Phase 1.0 Plate Settler Replacement and Stream Relocation

A. Preamble

The following requirements apply to all work under the agreement. Compliance is required by all Contractors/Consultants. **To the extent permitted by applicable law, the Atlanta Fulton County Water Resources Commission, a joint venture between the City of Atlanta and Fulton County ("Commission") reserves the right to adjust or waive any insurance or bonding requirements contained in this Appendix B and applicable to the agreement.**

1. Evidence of Insurance Required Before Work Begins

No work under the agreement may be commenced until all insurance and bonding requirements contained in this Appendix B, or required by applicable law, have been complied with and evidence of such compliance satisfactory to Commission as to form and content has been filed with Commission. Contractor/Consultant must provide Commission with a Certificate of Insurance that clearly and unconditionally indicates that Contractor/Consultant has complied with all insurance and bonding requirements set forth in this Appendix B and applicable to the agreement. If the Contractor/Consultant is a joint venture, the insurance certificate should name the joint venture, rather than the joint venture partners individually, as the primary insured. In accordance with the solicitation documents applicable to the agreement at the time Contractor/Consultant submits to Commission its executed agreement, Contractor/Consultant must satisfy all insurance and bonding requirements required by this Appendix B and applicable by law, and provide the required written documentation to Commission evidencing such compliance. In the event that Contractor/Consultant does not comply with such submittal requirements within the time period established by the solicitation documents applicable to the agreement, Commission may, in addition to any other rights Commission may have under the solicitation documents applicable to the agreement or under applicable law, make a claim against any bid security provided by Contractor/Consultant.

2. Minimum Financial Security Requirements

All companies providing insurance required by this Appendix B must meet certain minimum financial security requirements. These requirements must conform to the ratings published by A.M. Best & Co. in the current Best's Key Rating Guide - Property-Casualty. The ratings for each company must be indicated on the documentation provided by Contractor/Consultant to Commission certifying that all insurance and bonding requirements set forth in this Appendix B and applicable to the agreement have been unconditionally satisfied.

For all agreements, regardless of size, companies providing insurance or bonds under the agreement must meet the following requirements:

i) Best's Rating not less than A-,
ii) Best's Financial Size Category not less than Class IX, and
iii) Companies must be authorized to conduct and transact insurance contracts by the Insurance Commissioner, State of Georgia.
iv) All bid, performance and payment bonds must be underwritten by a U.S. Treasury Circular 570 listed company.

If the issuing company does not meet these minimum requirements, or for any other reason is or becomes unsatisfactory to Commission, Commission will notify Contractor/Consultant in writing. Contractor/Consultant must promptly obtain a new policy or bond issued by an insurer acceptable to Commission and submit to Commission evidence of its compliance with these conditions.

Contractor/Consultant's failure to comply with all insurance and bonding requirements set forth in this Appendix B and applicable to the agreement will not relieve Contractor/Consultant from any liability under the agreement. Contractor/Consultant's obligations to comply with all insurance and bonding requirements set forth in Appendix B and applicable to the agreement will not be construed to conflict with or limit Contractor/Consultant's/Consultant's indemnification obligations under the agreement.

3. Insurance Required for Duration of Contract

All insurance and bonds required by this Appendix B must be maintained during the entire term of the agreement, including any renewal or extension terms, and until all work has been completed to the satisfaction of Commission.

4. Notices of Cancellation & Renewal

Contractor/Consultant must, notify the Commission in writing at the address listed below by mail, hand-delivery or facsimile transmission, within 2 days of any notices received from any insurance carriers providing insurance coverage under this Agreement and Appendix B that concern the proposed cancellation, or termination of coverage.

Enterprise Risk Management
68 Mitchell St. Suite 9100
Atlanta, GA 30303
Facsimile No. (404) 658-7450

Confirmation of any mailed notices must be evidenced by return receipts of registered or certified mail.

Contractor/Consultant shall provide the Commission with evidence of required insurance prior to the commencement of this agreement, and, thereafter, with a certificate evidencing renewals or changes to required policies

of insurance at least fifteen (15) days prior to the expiration of previously provided certificates.

5. Agent Acting as Authorized Representative

Each and every agent acting as Authorized Representative on behalf of a company affording coverage under this contract shall warrant when signing the Acord Certificate of Insurance that specific authorization has been granted by the Companies for the Agent to bind coverage as required and to execute the Acord Certificates of Insurance as evidence of such coverage. The Commission coverage requirements may be broader than the original policies; these requirements have been conveyed to the Companies for these terms and conditions.

In addition, each and every agent shall warrant when signing the Acord Certificate of Insurance that the Agent is licensed to do business in the State of Georgia and that the Company or Companies are currently in good standing in the State of Georgia.

6. Certificate Holder

The **Commission** must be named as certificate holder. All notices must be mailed to the attention of **Enterprise Risk Management** at **68 Mitchell Street, Suite, 9100, Atlanta, Georgia 30303.**

7. Project Number & Name

The project number and name must be referenced in the description section of the insurance certificate.

8. Additional Insured Endorsements Form CG 20 26 07 04 or equivalent

The Commission must be covered as Additional Insured under all insurance (except worker's compensation and professional liability) required by this Appendix B and such insurance must be primary with respect to the Additional Insured. **Contractor/Consultant must submit to Commission an Additional Insured Endorsement evidencing Commission's rights as an Additional Insured for each policy of insurance under which it is required to be an additional insured pursuant to this Appendix B. Endorsement must not exclude the Additional Insured from Products - Completed Operations coverage. The Commission shall not have liability for any premiums charged for such coverage.**

9. Mandatory Sub-Contractor/Consultant Compliance

Contractor/Consultant must require and ensure that all subContractor/Consultants/subconsultants at all tiers to be sufficiently insured/bonded based on the scope of work performed under this agreement.

10. Self Insured Retentions, Deductibles or Similar Obligations

Any self insured retention, deductible or similar obligation will be the sole responsibility of the contractor.

11. Task Order

Evidence of compliance with insurance requirements must be provided on a Task Order basis prior to the issuance of any Notice to Proceed.

B. Workers' Compensation and Employer's Liability Insurance

Contractor/Consultant must procure and maintain Workers' Compensation and Employer's Liability Insurance in the following limits to cover each employee who is or may be engaged in work under the agreement:

Workers' Compensation.	**Statutory**
Employer's Liability:	
Bodily Injury by Accident/Disease	**$1,000,000 each accident**
Bodily Injury by Accident/Disease	**$1,000,000 each employee**
Bodily Injury by Accident/Disease	**$1,000,000 policy limit**

C. Commercial General Liability Insurance

Contractor/Consultant must procure and maintain Commercial General Liability Insurance on form (CG 00 00 01 or equivalent) in an amount not less than **$1,000,000 per occurrence subject to a $2,000,000 aggregate**. The following indicated extensions of coverage must be provided:

- ☒ Contractual Liability
- ☒ Broad Form Property Damage
- ☒ Premises Operations
- ☒ Fire Legal Liability
- ☒ Medical Expense
- ☒ Independent Contractor/Consultants/SubContractor/Consultants
- ☒ Products – Completed Operations
- ☒ Explosion, Collapse and Underground (XCU) Liability
- ☒ Additional Insured Endorsement* (primary& non-contributing in favor of the Commission)
- ☒ Waiver of Subrogation in favor of the Commission

D. Commercial Automobile Liability Insurance

Contractor/Consultant must procure and maintain Automobile Liability Insurance in an amount not less than **$1,000,000** Bodily Injury and Property Damage combined single limit. The following indicated extensions of coverage must be provided:

- ☒ Owned, Non-owned & Hired Vehicles
- ☒ Waiver of Subrogation in favor of the Commission

If Contractor/Consultant does not own any automobiles in the corporate name, non-owned vehicle coverage will apply and must be endorsed on either Contractor/Consultant's personal automobile policy or the Commercial General Liability coverage required under this Appendix B.

E. Installation Floater

Contractor/Consultant shall procure and maintain policy for Installation Floater with all risk coverage to cover damage or destruction to renovations, repairs or equipment being installed or otherwise being handled or stored by the Contractor, including off-site storage, transit and installation. The coverage must be in an amount equal to **100 percent of the value of the contract**. The following indicated extensions of coverage must be provided:

☒ All Risk Coverage
☒ Operational Testing Coverage included
☒ Loss Payee Endorsement

F. Property Coverage/Inland Marine

Contractor/Consultant shall procure and maintain all risk property coverage in an amount equal to replacement value for all equipment, furniture, fixtures, machinery and/ or personal property.

G. Pollution Liability

Contractor/Consultant must procure and maintain Pollution Liability Insurance in an amount not less than **$1,000,000** each occurrence/aggregate. Completed operations coverage shall remain in effect for no less than three (3) years after final completion. This coverage can also be satisfied with an endorsement to the General Liability policy.

H. Performance Bond and Payment Bond

Contractor/Consultant shall furnish a Payment Bond and a Performance Bond to the Commission in an amount equal to **100 percent of the total contract value** and for the duration of the entire term.

The person executing the Bonds on behalf of the surety shall file with the Bonds a general power of attorney unlimited as to amount and type of bonds covered by such power of attorney, and certified by an official of said surety.