LEVEE GEOTECHNICAL EVALUATION

DRILLING, TESTING, AND QUALITY CONTROL PLAN

For
USACE Section 408 Submittal

Dallas Horseshoe
Fort Worth, Texas

TxDOT Contract No. 31-118P5004

Prepared by

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Levee Geotechnical Evaluation
Drilling, Testing, and Quality Control Plan
For
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Levee Geotechnical Evaluation  
Drilling, Testing, and Quality Control Plan  
For  
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November 23, 2011

1. Purpose

This Drilling, Testing, and Quality Control Plan presents the policy and specific actions that will be implemented by Alliance Geotechnical Group (AGG) for retrieval, classification and testing of relatively undisturbed and disturbed soil samples, rock coring, and piezometer installation. This document presents the plans and procedures that AGG will implement for quality and consistency of work to be performed by the drilling crews and soils laboratories. The project will consist of soil borings for the analysis of the levee sections with the proposed secant pile wall, as well as the impact of the proposed I-30 and I-35 bridges on the existing levees.

2. Overview

As part of this project, HNTB Corporation (HNTB) is responsible for developing this Quality Control Plan, selecting samples for laboratory tests, and reviewing final logs and testing. The drilling, field testing, QA/QC, and soils laboratory testing services will be provided by AGG through a contract with HNTB. These testing and drilling programs were developed in order for HNTB to perform analysis to confirm that this project does not impair the integrity or performance of the existing East and West Dallas levees under different design conditions as part of USACE Section 33 USC 408 permit. The levee analyses will include levee stability and seepage analyses.

This plan has been developed for AGG so that the drilling, sampling, samples handling, samples storage, and laboratory testing are consistent with the USACE and/or TxDOT standards of quality.

3. References

3.1. EM1110-1-1804 Geotechnical Investigations 1 January 2001

3.2. ER1110-1-1807 Procedures for Drilling in Earth Embankments 1 March 2006
3.3 EM1110-2-1900 Instrumentation of Embankment Dams and Levees 30 June 1995


3.6 ER 1110-1-261 Quality Assurance of Laboratory Testing Procedures 15 June 1999

3.7 ER 1110-1-8100 Laboratory Investigations and Testing 31 December 1997

3.8 ER 1110-1-4000 Monitoring Well Design, Installation, and Documentation at Hazardous Toxic, and Radioactive Waste Sites

3.9 U.S. Army Engineer Waterways Experiment Station (USAEWES) Rock Testing Handbook 1993

3.10 TxDOT Geotechnical Manual August 2006

3.11 ASTM Standards for Soil and Rock Testing. Volume 04.08. Attachment 1 includes a list of potential ASTM tests and standards.

4. Plan Summary

4.1 General

The geotechnical investigation delineated in this project may be grouped into three general areas: (1) Soil Sampling, (2) Laboratory Testing, and (3) Piezometer installation.

4.2 Staging Area

No equipment or supplies will be permanently staged within the floodway. Any equipment or materials (pallets of cement, sand, or bentonite) may be stored offsite at a nearby location disclosed by AGG. Attachment 2 includes the “General Requirements for Working in the Floodway” per the USACE-SWF and the CoD.

4.3 Utility Clearance

Survey of the boring locations will be accomplished by HNTB prior to field mobilization as well as upon the completion of field operations (as-drilled locations). Prior to mobilizing to the
project site, the proposed boring locations will be cleared for utilities. Utility clearance will be coordinated by AGG.

**Utility Clearance 1-800-545-6005**

AGG will maintain valid dig tickets over the duration of the field work.

The preliminary boring location layout is shown in Figure 1.

**4.4 Inclement Weather / High Water Emergency Action Plan**

During periods of inclement weather where potential for excessive rutting of the levee slopes and crowns exists, support vehicles will be moved off of the levee.

The Trinity River stage will be monitored from the USGS Gauge No. 08057000 – Trinity River, Dallas, Texas (Commerce Street gauge) which is available through [http://waterdata.usgs.gov/nwis/uv?cb_00060=on&cb_00065=on&format=gif_default&period=7&site_no=08057000](http://waterdata.usgs.gov/nwis/uv?cb_00060=on&cb_00065=on&format=gif_default&period=7&site_no=08057000)

Flood stage is at 30 feet (river gauge) with a gauge datum of 368.024 feet NGVD29. Flood advisories and warnings will also be monitored through NOAA’s NWS web site [www.weather.gov](http://www.weather.gov).

Flood stages and predictions will be monitored; all equipment and personnel shall be removed from the floodway prior to the Trinity River reaching the flood stage of 30 feet.

**4.5 Drilling and Sampling**

The proposed borings will be used to study the subsurface and to develop the analysis parameters for the levees and bridges.

**Levee Soil Borings**

**Drilling Methods:**

1. Hollow Stem Auger (HSA) to bedrock; est. 55 to 85 feet deep.
2. Mud Rotary (per EM -1804 and ER -1807) drilling may only be used should hollow stem auger not be adequate due to relatively loose cohesionless soils below the groundwater table.

**Rock Coring:**

1. 4-inch Dia. Rock Core through HSA seated into bedrock (or a temporary surface casing). After seating the casing, drilling mud (if used) will be flushed from inside the casing. Every effort shall be made to avoid loss of circulation and embankment damage. All borings will be advanced a minimum of 25 feet into bedrock. No boring will be terminated in soil.
**Sampling:**

1. Continuous Sampling.

2. Cohesive materials: 5” Dia. Standard Piston Type Sampler with 30” alvanized Shelby Tubes (ASTM D 1587).


4. Bedrock: 4” Dia. Rock Core in 5 to 10 foot runs.

**Piezometers:**

1. 2” Dia. Temporary PVC piezometers, 5 foot screens with 20/40 filter sand, 3-ft bentonite seal, and grouted to the ground surface with 5% bentonite-cement grout.

2. Locking protective “Flush-Type” Surface completions.

3. Piezometers installed and registered with Texas Commission on Environmental Quality (TCEQ)- Office of Permitting and Registration- see Attachment 3.

**Grouting:**

1. Bentonite-Cement Grout (per EM -1804) consisting of 1sack of cement, 10 pounds of bentonite, and 15 to 20 gallons of water will be used for borings within 50 feet of the levee toe. Borings outside of this footprint will be backfilled with soil cuttings or commercial bentonite hole plug.

2. Boreholes that are awaiting backfill shall be covered to prevent unauthorized entry.

3. Boreholes at the levee crest and within 50 feet of the levee toe shall be backfilled within 24 hours of drilling completion.

4. Borings that require grouting will be grouted from bottom up at completion of boring. Grouted bore holes to be "topped-off" within 1 week.

The guidelines for obtaining, handling and preserving soil samples for geotechnical investigations is found in Engineer Manual EM 1110-1-1804 “Geotechnical Investigations, Appendix F”. The manual is intended as a guide of commonly accepted soil sampling practices and procedures used by geotechnical personnel performing actual field sampling operations for the USACE.

Personnel and field loggers involved in drilling and sampling will be senior, well qualified, and experienced in the drilling and sampling processes and procedures of soil and rock as outlined, but not limited, in this QA/QC plan. In order to check that the requirements of this Quality Control Plan are being followed, AGG’s drilling management team will meet with the drill crew daily to make sure the crew is familiar with the requirements of this plan and the specifics of the Quality Control Checklists contained in Attachment 4. On a daily basis, the driller will review the Quality Control
Checklist items for drilling, sampling, and sample handling. AGG will also have QC personnel on-site during drilling operations on a daily basis to check that the requirements of this Quality Control plan are followed. This will be documented using the appropriate checklist.

AGG will notify the USACE-Fort Worth District, City of Dallas Flood Control, and TxDOT of the drilling schedule at least 5 business days before the commencement of field operations. USACE QA personnel will be onsite during the drilling operations and will interface directly with the drill crews and loggers, HNTB project manager, and AGG Officers. QA issues observed by the USACE shall be immediately brought to the attention of the drill crews and loggers, HNTB manager, and AGG Officer so any issues may be immediately be addressed or resolved.

AGG will use the excel spreadsheet in Attachment 4 to track and report drilling QA issues. The tracking shall include the drilling rig of issue, the borehole, the issue, the date, and the resolution. If a resolution cannot be immediately identified, the drilling and sampling for the rig in question may require a work stoppage until the issue is resolved. In addition, continued poor performance and/or multiple deficiencies will constitute grounds to replace drilling rigs and/or contract personnel.

4.5.1 Procedures for 5-Inch Undisturbed Borings

Continuous, 5-inch diameter relatively undisturbed samples will be obtained within clay and silt strata using a fixed-piston type sampler (Hvorslev or equivalent). This sampler consists of a piston that is connected to the piston rod (sometimes referred to as the inner rod). Within the sampler head, ball bearings prevent the piston from falling out when it is raised to the vertical position by wedging into the piston rod. The top of the piston rod is connected to a double-thread locking block that keeps the piston at the bottom of the Shelby tube during lowering of the sampler to the sample depth. The steps used in obtaining the undisturbed sample are as follows:

- A 30-inch long Shelby tube is slipped over the piston and connected to the header with four bolts.

- The piston is positioned at the bottom of the tube and locked or set in place by cone/spring lock.

- The piston rod is connected to small diameter inner rods within outer drill rods.

- Once the piston is released, the top of the inner rod is held in position (mechanically fixed to the drill rig) while the outer rod is pushed downward using the drill rig (i.e., the piston remains at the top of the sampling interval during the push).
After pushing the Shelby tube a total of 24 inches, the inner rod is removed from the outer drill rod and the sampler and Shelby tube are removed from the borehole.

Once at the ground surface, the piston sampler while still attached to the sample tube is placed horizontally on a table or saw horses.

The vacuum breaker screw is removed to release the vacuum on the sample.

The sample will then be prepared in accordance with EM-1804 for transport to the laboratory.

All sampling shall be from a "clean" hole. At the surface, the soil is field classified by a geologist or civil engineer. Shelby tubes will be sealed with expandable packers and capped prior to shipment to the soils laboratory. The prepared samples will then be transported from the drill site, typically on a daily basis, to the laboratory using special care to reduce disturbance of the undisturbed soil sample. The samples shall be secured vertically and cushioned to reduce sample disturbance. The samples are then transported to a lab facility for moisture content determination, classification, and testing.

A minimum recovery of 75% is required for each undisturbed sample. Potential very stiff to hard clays may be present in the upper overburden soils; therefore, if needed to insure adequate recovery, both 3-inch open tube push (Shelby tubes), and Split-Spoon Sampling (SPT) may be considered during the field investigation.

Pocket Penetrometer (PP) and handheld Torvane shear strength readings will be obtained upon retrieving each undisturbed sample. The prepared samples will then be transported from the drill site to the laboratory using special care to reduce disturbance of the undisturbed soil sample. The samples shall be secured vertically and cushioned to reduce sample disturbance. The samples are then transported to a lab facility for moisture content determination, classification, and testing.

4.5.2 Split-Spoon Sampling (SPT)

In those instances where cohesionless strata are encountered during the drilling process, continuous standard penetration tests (SPTs) are performed using 2.0-foot spoons until cohesive materials are again encountered.

SPT sampler shall be equipped with a "core catcher" for every test. Glass or plastic jars with screw-on lids shall be used for representative split-spoon sample(s). Samples with multiple representative portions shall be split and sampled separately, with sampling intervals/depths described on each sample jar and described on the boring log.
4.5.3 Piezometers

Piezometers will be installed at the river side toe, at the centerline, and at the land side toe. The screens will be installed within cohesionless soil deposits.

Seal any boreholes drilled deeper than the well to be constructed in the borehole to within three feet of the bottom of the well using bentonite grout. Leave temporary casing or auger flights in the hole prior to grouting to prevent caving of the borehole. Withdraw temporary casing or augers slowly as the well is backfilled with grout. Sound the top of the seal following installation to check for proper placement. Allow sufficient time for the seal to set or hydrate before constructing the well in the borehole above the seal (one to two hours for bentonite chips or pellets; 12 to 24 hours for cement or mixtures of cement and bentonite).

The piezometers will be developed and slug tested two days after installation and will be monitored thereafter. The wells will be developed using the bailer/surge method and in accordance with ER 1110-1-4000. All piezometers will be installed and registered with Texas Commission on Environmental Quality (TCEQ), see Attachment 3. Well development and slug test data will be recorded using the Well Development Log, see Attachment 3.

4.5.4 No Recovery

For sample intervals where no recovery is encountered, the sample interval shall be drilled out or cleaned to the bottom of the sampled or pushed interval. Then, a standard penetration test (SPT) will be taken, regardless of soil type. In the event that back-to-back samples with less than 25 percent recovery, the sample interval in question will be re-drilled and sampled. At a minimum, the zone should be over sampled by one sample above to one sample below. To identify any re-drilled locations, an "R" shall be incorporated in the last string of the boring identification.

4.6 Soil Laboratory Testing

4.6.1 Extraction and Handling of Soil Samples (Levee Borings)

The samples will be transported to AGG’s soil testing laboratory and will be logged by lab personnel. The samples will go through the following steps:

- The samples will be hydraulically extruded, in order of depth, into a sample tray. No samples will be extruded in the field.

- Samples are classified in accordance with USCS classification system with water content being run on each specimen (or where classifications differ within a specimen). Samples are then trimmed into 1 foot interval specimens. This data is recorded on a laboratory classification log sheet.
• The specimens are wrapped in plastic wrap and aluminum foil. They are then placed in plastic containers and waxed. The samples are then logged and placed on a shelf in the warehouse.

• Samples which will not be tested within 7 days after drilling, should be waxed for storage. In addition, all of the remaining untested/unused samples (or the 4th quadrant from triaxial tests) shall be waxed for storage.

• A laboratory log sheet that includes the water content, PP reading (undisturbed cohesive soils only), and the Torvane reading (undisturbed cohesive soils only) for each sample will be developed for each boring by the lab personnel.

• Prior to testing, samples will be stored in a climate-controlled area. Untested samples and samples after testing will be stored in a non-climate controlled facility.

• The completed laboratory log sheet will be transmitted to HNTB for testing assignments.

HNTB will then make test assignments on selected specimens. Test assignments may include Water contents, Atterberg Limits, Q test, R Tests, Unconfined Compression (UC), Consolidation (4-inch diameter for levee borings), Swell Tests, Permeability, Grain Size Analysis (Sieve and Hydrometer), Organic Content, Specific Gravity, Rock Water Content, Rock Unit Weight and Porosity, and Rock Unconfined Compression.

A record of samples that contain less than 24 inches of sample recovery as well as sample disturbance or “fall in” is kept. This is done to provide feedback to the Project Manager for Drilling Operations and to assess the need for sampling shorter intervals, using 3-inch samplers, or resampling.

4.6.2 Laboratory Testing

In accordance with ER 1110-1-8100 “Engineering and Design: Laboratory Investigations and Testing” and ER 1110-1-261 “Engineering and Design: Quality Assurance of Laboratory Testing Procedures”, only Corps validated laboratories will be used for testing.

Laboratory tests may include the following tests: Moisture Contents, Unit Weight Determination, Percent Passing #200 Sieve, Sieve Analysis, Hydrometer, Atterberg Limits, Unconfined Compression – Soil, Unconfined Compression – Rock, Swell Test, Consolidation, Permeability, UU Test, CU Test, Direct Shear, and Specific Gravity. Lab tests will be determined based on the collected samples.
4.7 Logging and Reporting of Borings and Lab Tests

The results of field borings and laboratory tests will be shown and furnished by AGG. The soil borings will be reported and furnished as a stratified plotted soil log and will contain all field/laboratory testing information. In addition, the logs will be furnished and named by number specified on the proposed boring plan. The final boring logs will be furnished on Windows compatible CD in GeoStudio or gINT file format for the levee borings. The original “field log” for each boring will be prepared by AGG and maintained by HNTB as needed for QA/QC and analysis purposes.

4.8 Boring Locations

Survey of the boring locations will be accomplished by HNTB prior to field mobilization as well as upon the completion of field operations. The intent of the borings is to determine geotechnical information in a general area; therefore if boring locations are spotted more than 5 feet from the surveyed location, the field log will include an offset distance and direction.

4.9 QC Checklists

Checklists for the Drilling, Sampling, Sample Transportation and Sample Extrusion are attached as Attachment 4 to this Quality Control Plan.

4.10 Contractor Quality Control (CQC) Plan

The Contractor Quality Control (CQC) Plan is a component of the Drilling Plan and shall identify all personnel, procedures, control, instructions, and forms to be used. All Contractors’ personnel, to include subcontractors, are responsible for ensuring that the Drilling Operations are executed in accordance with the approved Drilling Plan. In the event that it is determined that work not in accordance with the plan has been performed, and if it is determined by USACE that this deficiency has adverse effects on the quality of the samples obtained, then the work or samples in question will not be acceptable to USACE and will require re-drilling and re-testing. USACE personnel determination of the quality of the drilling and collected samples should be determined during the drilling operations and reported to the CQC Team.

CQC Team. The requirements for the CQC Team include a CQC Manager and a sufficient number of additional qualified personnel to ensure compliance with the approved drilling plan and applicable standards and criteria.

a. The CQC Manager must be a licensed Engineer or Geologist with a minimum of 5 years of field experience in the oversight and inspection of drilling operations. A CQC Manager not meeting these exact requirements may be utilized with approval from the USACE-SWF.
b. Other members of the CQC team shall have a Bachelor of Science degree in either Geology or Civil Engineering from an accredited institution of higher learning, and shall have a minimum of 1 year of field experience in the oversight and inspection of drilling operations. CQC Team members not meeting these exact requirements may be utilized with approval from the USACE-SWF.

**CQC Team Responsibilities and Authority**

**CQC Manager**

The CQC Manager shall be responsible for ensuring that the quality of the work meets the requirements of the drilling plan and incorporated standards. The CQC Manager shall work exclusively on the QC aspects for this project and be assigned no other tasks (within the project) for the duration of the work.

The CQC Manager shall be responsible for documenting and reporting applicable concerns identified by the CQC Team and/or USACE QA personnel. The problems identified during the CQC/QA processes will be addressed immediately with corrective actions undertaken to prevent those problems from re-occurring. This will include modification of the CQC/QA plan and work stoppage as necessary.

The CQC Manager shall have direct charge over the CQC Officer(s) and the drill crews and loggers, including the authority to stop work on any drill rig found to be in non-compliance until such time as any noted deficiencies are corrected.

**CQC Officers**

The Contractor's CQC Officer(s) shall maintain a presence at the site at all times during progress of the work and have the responsibility to take actions necessary to ensure compliance with the approved drilling plan. The CQC Officer(s) shall have direct charge over the drill crews and loggers, including the authority to stop work on any drill rig found to be in non-compliance until such time as any noted deficiencies are corrected.

**Field Loggers and Drilling Crews**

Field loggers and drill crew personnel are a critical component of the CQC program since they are directly responsible for actual performance of the work in accordance with the Drilling Plan. Field Logger Guidelines are provided in Attachment 5. Potential CQC Team resumes are included within Attachment 6.

**CQC Checklists**

The field logger will be in direct control of the drilling crew and will be responsible for ensuring that the requirements of this Quality Control Plan are being followed. The field logger will make sure the crew is familiar with the requirements of this plan and the specifics of the Quality Control Checklists contained in Attachment 4 on a daily basis. The driller will, as a part of his tool box safety meeting each morning, emphasize the
appropriate parts of the Quality Control Checklist items for drilling, sampling, and sample handling. On a daily basis the field logger will complete the applicable checklist items. The QC Officer will be responsible for checking with the field logger on a daily basis to ensure that the requirements of this drilling plan are followed.

Checklists for the Drilling, Sampling, Sample Transportation, and Sample Extrusion are attached as 4 to this Quality Control Plan.

**CQC/QA Issue Tracking, Corrective Actions, and Reporting**

CQC/QA issues and corrective actions will be tracked with an excel spreadsheet and shall be maintained on a daily basis. Tracking shall include the drilling rig of issue, the borehole, the issue, the date, and the resolution. If a resolution cannot be immediately identified, the drilling and sampling for the rig in question may require a work stoppage until the issue is resolved. In addition, continued poor performance and/or multiple deficiencies will constitute grounds to replace drilling rigs and/or contract personnel.

Reporting will be on a weekly basis by the CQC Manager, consisting of a letter report with the current QC tracking list. See Attachment 4 for a sample tracking list.

**USACE Responsibilities**

**Drilling Plan Approval**

USACE approval of the Drilling Plan is required prior to the start of field activities. Approval of the CQC Plan is conditional and will be predicated on satisfactory performance during drilling operations. USACE reserves the right to require the Contractor to make changes in the CQC Plan and operations including removal of personnel, as necessary, to obtain the required quality.

**Quality Assurance (QA)**

Contractor is responsible for CQC. USACE’s role is responsible for Quality Assurance. USACE QA personnel will be onsite during the drilling operations and will interface directly with the drill crews and loggers, the CQC Officers, and the CQC Manager. QA issues observed by the USACE shall be immediately brought to the attention of the drill crews and loggers and CQC Officer(s) so any issues may be immediately addressed or resolved. If it becomes apparent that the Contractor’s QC program is not yielding quality data in accordance with standard requirements of this CQC plan, USACE will require that all work be stopped until such time as appropriate remedies are made.

**4.11 Listing of Drilling Operations Personnel and Qualifications**

Attachment 6 is a list of AGG’s Field Operations Management, Supervisory and Drilling Personnel, with their qualification/past experience, who will be working on this contract.
The Project Manager (PM) overseeing the drilling and laboratory testing will be responsible for scheduling the project and maintaining the project checklist. The PM will ensure that no work is performed prior to acquisition of rights-of-entry. If delivery schedules cannot be met, the PM will immediately inform HNTB of all time constraints and delays encountered on the project. The PM is responsible for the scheduling of the activities and maintaining the equipment in proper working order. In addition, the PM will be responsible for the QA/QC of the drilling and testing procedures and results including checking the completeness, accuracy and format of all the data and Deliverables to be submitted to HNTB.

The Field Supervisor (FS) will work directly with the Project Manager to confirm that the work is performed in accordance with USACE and TxDOT’s guidelines, and AGG’s safety manuals/procedures. All safety violations and accidents will immediately be recorded. The FS will review and sign all daily work reports to assure that they are properly filled out and submitted, and will review weekly safety meeting reports and truck reports.

As field work progresses, the FS will ensure that all control points will be set not only to facilitate the project at hand, but also in a location where longevity and use by others are taken into account.

Final deliverables will be reviewed by AGG’s Project Manager to meet the project requirements. Complete records and documentation shall be maintained and provided to HNTB in accordance with the requirements set in this plan.

4.12 List of Laboratory Personnel

A list of Laboratory Management, Supervisory and Technician Personnel that will be involved in this project can be found in Attachment 6.

5. HNTB Point of Contact

Mr. Wael Alkasawneh has been named Technical POC for the Geotechnical portion of this project.

Mail: Mr. Wael Alkasawneh, PhD., P.E.  
HNTB Corporation  
5910 West Plano Parkway, Suite 200  
Plano, TX 75093

Phone: (972) 628-3122  
Mobile: (972) 955-8846  
Fax: (972) 661-5614
Figure 1
EXIST IH35SBML

AD-DRILLED BORING LEGEND

10" MECHANICAL BORING
20" MECHANICAL BORING
30" MECHANICAL BORING
OPT
3" MECHANICAL BORING & PIEZOMETER

PROPOSED BORING LEGEND

SCALE: 1"=100'
Attachment 1
ASTM Standards
## ASTM Standards

<table>
<thead>
<tr>
<th>ASTM Standard</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>D2216</td>
<td>Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass</td>
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<tr>
<td>D4318</td>
<td>Liquid Limit, Plastic Limit, and Plasticity Index of Soils</td>
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<tr>
<td>D2850</td>
<td>Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils</td>
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<tr>
<td>D2166</td>
<td>Unconfined Compressive Strength of Cohesive Soil</td>
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<tr>
<td>D4767</td>
<td>Consolidated Undrained Triaxial Compression Test for Cohesive Soils</td>
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<td>D3080</td>
<td>Direct Shear Test of Soils Under Consolidated Drained Conditions</td>
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<tr>
<td>D4546</td>
<td>One-Dimensional Swell or Settlement Potential of Cohesive Soils</td>
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<tr>
<td>D422</td>
<td>Particle-Size Analysis of Soils</td>
</tr>
<tr>
<td>D7012</td>
<td>Standard Test Method for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures</td>
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<tr>
<td>D5084</td>
<td>Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter</td>
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<tr>
<td>D1586</td>
<td>Penetration Test and Split-Barrel Sampling of Soils</td>
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<td>D1587</td>
<td>Thin-Walled Tube Sampling of Soils for Geotechnical Purposes</td>
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<tr>
<td>D1140</td>
<td>Amount of Material in Soils Finer than No. 200 (75-m) Sieve</td>
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<tr>
<td>D854</td>
<td>Specific Gravity of Soil Solids by Water Pycnometer</td>
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<tr>
<td>D2435</td>
<td>One-Dimensional Consolidation Properties of Soils Using Incremental Loading</td>
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<tr>
<td>D2487</td>
<td>Classification of Soils for Engineering Purposes (Unified Soil Classification System)</td>
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<tr>
<td>D2488</td>
<td>Description and Identification of Soils (Visual-Manual Procedure)</td>
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<tr>
<td>D4220</td>
<td>Preserving and Transporting Soil Samples</td>
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<tr>
<td>D2113</td>
<td>Rock Core Drilling and Sampling of Rock for Site Investigation</td>
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<tr>
<td>D2974</td>
<td>Moisture, Ash, and Organic Matter of Peat and Other Organic Soils</td>
</tr>
<tr>
<td>D5092</td>
<td>Design and Installation of Ground Water Monitorin Wells</td>
</tr>
</tbody>
</table>
Attachment 2
General Requirements for Working in the Floodway
GENERAL REQUIREMENTS FOR WORKING IN THE FLOODWAY:

a. General. The Flood Control District offices are located adjacent the East Levee near Baker Pump Station at the following address:

   2255 Irving Blvd.
   Dallas, TX  75207

b. Points of Contact for the DFCD are as follows:

   David Garcia, Division Manager
   214-671-0322
   214-460-5990 (cell)
   david.garcia@dallascityhall.com

c. All Contractors working within the Floodway shall comply with the following requirements:

1. Speed limit within Floodway will not exceed 30 mph.

2. Any environmental spills require immediate notification of the DFCD.

3. Vehicles associated with the drilling need to be identified with signs and access permits displayed on the dashboards. Access permits must be obtained at the Flood Control District office prior to initiation of field activities.

4. If any drilling for a boring requires blocking the access roads, the blockage shall be coordinated with the DFCD before drilling is commenced. Orange cones shall be set-up per DFCD requirements to identify these blockages.

5. Levee gates need to be closed and locked.

6. Access to the levees is limited to the roads at the toes and crest. Access across and parking on the levee slopes is prohibited.

7. Based on expected rainfall and predicted flooding, DFCD will determine when drilling operations need to cease. To prevent damage to the levees, drilling will not be allowed on the levees when heavy rainfall has occurred.

8. A POC and an alternate for the drilling operation shall be identified and contact information provided to the DFCD prior to the start of drilling operations.

9. Equipment and materials shall not be stored within the Floodway. Drills that are not actively boring shall be removed from the Floodway.
Attachment 3
Monitoring Well Data Sheet/Development Log
Monitor Well Data Sheet

Permittee or Site Name: _______________________________ MSW Permit No.: _____________________
County: ____________________________________________ Monitor Well I.D. No.: __________________
Date of Monitor Well Installation: _________________________ Date of Monitor Well Development: __________________
Monitor Well Latitude: ____________ Longitude: ___________ Monitor Well Driller Name: _______________________
Monitor Well Groundwater Gradient Position: Monitor Well Driller License No.: __________________
Upgradient _______ Downgradient _______

NOTES:
• Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
• Diameter of boring should be at least 4 inches larger than diameter of well casing.
• Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
• Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: ______________________________________________
Static Water Level Elevation (with respect to MSL) after Well Development: ______________________________________
Name of Geologic Formation(s) in which Well is completed: ___________________________________________________

Type of Locking Device: ______________________ Type of Casing Protection: ______________________
Concrete Surface Pad (with steel reinforcement) Dimensions: __________________

Top of Protective Collar Elevation: __________
Top of Casing Elevation: __________
Surveyor’s Pin Elevation: __________
Bentonite Seal Top Depth: __________ Elevation: __________
Filter Pack Top Depth: __________ Elevation: __________
Well Casing Type: ______________________
Size (diameter): ______________________
Schedule or Thickness: __________
Bottom Cap Depth: __________
Bore Hole Diameter: __________

TC EQ -10308
### Well Development Log

<table>
<thead>
<tr>
<th>Well ID:</th>
<th>Well Diameter (inches):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site:</td>
<td>Initial Water Level (ft BTOC):</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Well Depth (pre-development, ft BTOC):</th>
<th>Date(s) Developed:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Depth (post-development, ft BTOC):</td>
<td>Start Time:</td>
</tr>
<tr>
<td>Well Volume (gallons):</td>
<td>Well Developer Name(s):</td>
</tr>
<tr>
<td>Well Development Method: Bailer/Surge</td>
<td>Total Volume Purged (gal):</td>
</tr>
</tbody>
</table>

#### Development Data

<table>
<thead>
<tr>
<th>Time</th>
<th>Cumulative Volume Purged (~gallons)</th>
<th>Depth to Water (ft BTOC)</th>
<th>Turbidity (NTU)</th>
<th>Comments</th>
</tr>
</thead>
</table>

#### Water Quality Parameters

- **Turbidity (NTU)**
- **Comments**

**Note:** Well development is complete when water parameters have stabilized (temperature, conductivity, and pH have stabilized to +/- three percent conductivity, +/- one degree Celsius, and +/- 10% pH, over two consecutive readings, and the water is relatively free of suspended solids).

**Well Volume:** For a 2-inch diameter well, the well volume in gallons is 0.163 times the water column height in feet.
Attachment 4
QC Check List
CQC Tracking Sheet
Levee Borings QC Checklist

<table>
<thead>
<tr>
<th>Operation Inspected</th>
<th>Inspector</th>
<th>Date</th>
<th>Boring No.</th>
</tr>
</thead>
</table>

For Drilling, Sampling, Sample Transportation and Sample Extrusion

References:
1. EM 1110-1-1804 Geotechnical Investigations, Appendix F (Levee)
3. AGG QA/QC Laboratory Manual

Drilling and Sampling Operations

Yes or No

1. Is the drill crew using HSA with a center plug? _______
2. Is the driller checking for correct auger depth within +/- 4 inches? _______
3. Are drill rods marked at 2 foot intervals to accurately measure depth during sample push? _______
4. Is the inner rod locked with the piston face flush with the bottom of the sampler while lowering the sample tube down the hole, is the inner rod fixed to the drill rig while pushing the sample? _______
5. Are galvanized sample tubes clean to prior sampling? _______
6. In removing the sample tube from the sampler head, is the vacuum being released before the piston sampler is removed from the sample tube? _______
7. Is the sample extruded and prepared or is the tube plugged and capped immediately after sampling? _______
8. Is the sample being carefully handled without jarring and placed in the Transport container in the same orientation as it was sampled? _______
9. Are tubes being cleaned and inspected prior to reuse? _______
10. Are field supervisors performing QC on a daily basis of all field operations? _______
11. Are the boreholes being grouted properly and filled with 3 feet of soil? _______
12. Is site cleaned up after work is complete, no trash left and no grout spills? _______
Sample Transportation

1. Are samples being transported from the drilling site to the laboratory at vehicle speeds appropriate to the road conditions? _______
2. Are all samples properly secured to transport vehicle during transportation? _______
3. Is cushioning material used in the transport container? _______

Comments and Recommendations (On Back)
Instructions for Completing Check list

1. The Laboratory Supervisor or their appointed assistants will conduct daily inspections of the labs and will complete the checklist every fifth day for record. If any deviations from the checklist are observed, they should be corrected on the spot. The Field Supervisor or their appointed assistants will meet at least one time during the drilling rotation with the driller to go over the checklist and will complete and sign a copy of the checklist. The driller will discuss each day at the daily safety tool box meeting 4 to 5 of the checklists items. The driller will complete and sign a copy of the checklist one time during the drilling rotation. A QC person will be assigned full time to perform QC inspections using the appropriate Check List on the drill rigs on a daily basis.

2. If a “no” answer is noted on the checklist then it is considered a deficiency and requires a mandatory comment in the comment or recommendation paragraph.

3. The completed forms will be maintained by the HNTB QC and will be reviewed periodically by the project manager. The Field Supervisor and Lab Supervisor will review the reports regularly. They will be available for review by the HNTB QA Personnel.

4. If the inspection shows a problem that needs corrective action, the appropriate Field or Lab Supervisor will take immediate action to correct the problem. A corrective report documenting the action taken will be attached to the checklist.

5. If a particular operation is not observed so that the question cannot be answered, the appropriate answer will be N/O (not observed).
<table>
<thead>
<tr>
<th>Item #</th>
<th>Date of Occurrence</th>
<th>Drill Rig</th>
<th>Issue</th>
<th>CQC</th>
<th>QA</th>
<th>Corrective Action</th>
<th>Date Implemented</th>
<th>Remarks (e.g. zone to be redrilled, resampled)</th>
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CQC/QA Issue Tracking / Corrective Action
Field Logger Guidelines

INSPECTION REQUIREMENTS. The Drilling Contractor shall supply one Field Logger per drilling rig to visually classify soil and rock samples, prepare field boring logs, and label and prepare samples for transportation to the testing laboratory. Inspectors shall have a Bachelor of Science degree in either Geology or Civil Engineering from an accredited institution of higher learning and shall have at least one year of field experience classifying soil and rock materials per EM-1804. Field loggers not meeting these exact requirements may be utilized with approval from the USACE-SWF. Qualifications of Inspectors shall be provided to the technical POC at least 5 working days prior to drilling. A contact list of field personnel shall be provided to the Government POC prior to the start of drilling operations.

The Field Logger shall:

a. Be present at the drill site at all times when drilling, sampling, and backfilling activities are ongoing and shall maintain accurate records of each of these activities. Verify that the auger advance rate does not exceed 1 foot/minute when drilling within the levee template or within 50 feet of the toe of the levee.

b. Identify and document the specific rig ID, rig type, driller’s name, drilling method and sequence including size of auger, core sampler, use of casing, identify unstable soil strata and fill material encountered, and identify specific sample depths.

c. Collect representative samples to insure that all encountered material types are collected for lab testing, and shall classify all soil samples in accordance with USCS field classification protocol. Each sample classification shall include:

- description of material type(s)
- description of inclusions
- color
- moisture characteristics
- plasticity characteristics
- grain-size characteristics
- odor (if present)
- relative strength/density
- unusual conditions that may be present within the sample

For rock core samples, which may include clay shales, the field logger shall describe weathering, degree of fracturing, and inclusions; all with depth.

d. Verify that all samples are labeled with the following information:

- Project Name or Number
- Boring Number
• Sampling Interval Depth
• Sample Number
• (U5 or U3: Shelby Tube (5 or 3 inch); D: SPT or disturbed Shelby Tube; RC: Core Sample)

e. Prepare field boring logs on USACE supplied form ENG Form 1836. All logs shall be neat, legible, and accurately indicative of the drilling activities and subsurface findings. The Field Logger shall take care to document on the field logs all pertinent conditions encountered or observed during drilling and sampling activities, including:

• Depth of material changes
• Depth for sampling intervals
• Blow counts per 6-inch interval (for intervals of less than 6-inches, the Inspector shall record the actual depth of the penetration interval in inches).
• Measured depth to water surface (if none, so indicate) during and upon completion of drilling
• Depth of top of rock
• Starting and ending dates for drilling
• Unusual conditions encountered, etc.

Copies of the field boring logs shall be provided to the Government POC on a weekly basis after completion of the borehole.

f. After field classification of SPT sampled soils, the Field Logger shall place a representative sample(s) into a properly labeled jar(s). The properly sealed jar will then be stored in an appropriately labeled box. The SPT test may be terminated when:

• 50 blows are obtained within any of the three (3) 6-inch drive intervals; or
• A total of 100 blows are obtained within the three (3) 6-inch drive intervals; or
• when no movement is observed from 10 consecutive blows.

g. Undisturbed tube samples shall not be extruded in the field. The Field Logger shall measure the length of sample obtained, remove material from the ends of the sample for visual classification, and then seal each end of the sample with expandable packers before capping them with plastic end caps. Capped tube samples shall be placed in a vertical orientation in a padded rack for storage and transportation purposes.

h. The Field Logger shall carefully clean and log each rock core, then wrap it in plastic before placing it into a suitably labeled core box. Depths of drilling in rock must be checked by taping the depth after each run.
i. Be responsible for verifying that all jar, tube, and core samples are carefully stored and maintained until such time as they are delivered to the testing lab. Samples obtained each day shall be stored in the shade or air conditioned vehicle until such time as they are transported to the testing lab. Samples shall be transported on a daily basis (typically).

j. Document specific changes made to borehole location or alignment and any other pertinent information about the drilling process.

k. Observe and document at the end of the field log the methods, depths, and materials (including quantities) used during the backfilling of each borehole. This documentation shall be provided to the technical POC weekly.
Attachment 6
Potential Project Personnel
AGG Project Personnel:

Project Manager: Mike Roland, P.E.
Drilling Manager: Lee Stoudenmire
Lab Manager: Hossein Shirazi
QA/QC Manager Lab: Jim Yesenik
Mr. Roland has over 22 years experience in geotechnical consulting and construction materials engineering in the North Texas area. The majority of the projects that Mr. Roland has worked on have consisted of roadway projects including pavement design, PVR calculations, bridge foundation recommendations, retaining walls recommendations, etc. Mr. Roland has worked with Alliance Geotechnical Group since the founding of Alliance Geotechnical Group 13 years ago.

Mr. Roland has been selected to present several professional engineering papers over the last several years at ASCE State Conventions. In addition, Mr. Roland routinely provides brown bag seminars to engineers and architects as part of the continuing education credits.

**RELATED PROJECT EXPERIENCE**

**Roadways**

**TxDOT – Statewide Geotechnical Testing and Soil Exploration Evergreen**

Project Manager, responsible for all aspects of soil exploration and drilling for miscellaneous sites. Tasks included soil exploration for bridges, roadways and retaining walls for sites throughout TX. Among tasks were included tough access sites where buggy ATV rigs were required and over water drilling requiring barge drilling equipment.

**Dallas TxDOT**

Project Manager - AGG is currently under contract with TxDOT Dallas District to perform geotechnical drilling, testing and engineering services for the construction and design of bridge, retaining wall, pavement and other related structures. The work includes obtaining samples of subsurface soil formations and evaluation of general soil and groundwater conditions, performing laboratory soil tests and providing geotechnical recommendations for preliminary and/or final design in the work orders executed under the contract. The work includes global stability analyses, bearing capacity analysis, potential vertical rise calculation, pavement design and lateral load analysis on piles. All drilling is performed in accordance with Test Method 132-E which includes Texas Cone Penetrometer (TCP) tests on 5 foot intervals.

**IH 35 W Section 3B**

Project Manager - AGG is performing subsurface exploration services for this project which consists of the reconstruction of IH35W from IH820 to US 81/287 split (Segment 3B of the North Tarrant County including adding lanes in each direction.

**SH 121, Segment 1 & 2**

AGG/MTE team provided geotechnical engineering for the project consisting of various structures along SH 121 from Business 121 in Coppell, Texas to Coit Road in Frisco, Texas. The structures included gantries, signage structures, towers and noise barrier walls. The purposes of the study were to: explore the subsurface conditions at the site; characterize the subsurface conditions by testing the physical and engineering properties of the underlying soil and shale strata and by observing groundwater conditions; provide recommendations for the most suitable foundation system for the proposed structures and provide recommendations for lateral bearing per the 1992 UBC. Samples were examined at our laboratory by the project geotechnical engineer. Selected samples were subjected to laboratory tests under the supervision of this engineer.
Tollway Widening – NTTA – Dallas, Texas - AGG was the prime geotechnical consultant responsible for subsurface exploration, geotechnical testing and engineering required for the widening of the Tollway from Cedar Springs to Wycliff. This project included the widening of Wycliff Bridge, widening and lengthening of Cedar Springs Bridge, as well as the removal and replacement of ramps. This project also included toll booth construction and pavement and several retaining walls.

George W. Bush Turnpike, HWY 190 Segment III – NTTA – The President George Bush Turnpike is an east-west highway facility designed to relieve traffic congestion in the northern portions of the Dallas Metroplex. For a section of the turnpike west of Midway Road and east of IH-35E, there will be significant cuts to achieve finish grade. For the planned cuts in the Eagle Ford Shale (EFS) formation, a tieback retaining wall system was used. The purpose of this testing program was to test and evaluate the capacity and performance of tiebacks in the fresh Eagle Ford Shale (EFS) formation. The scope of the testing program included the installation of and loading until failure of 8 tiebacks in two different locations, and analysis of the test results. Location/Test Pad: Two different locations for the testing were selected. The first site (A) was located west of Denton Road. Originally the location was to be east of the Denton Road, but because of access restrictions, it had to be moved. The second site (B) was located west of Kelly Road.

FM 720 – Lewisville Lake Corridor – Segments 4, 5 & 6, Little Elm, Texas – AGG/MTE team provided geotechnical services for Sections 4, 5 & 6 of the Lewisville Lake Corridor project in the east portion of FM 720 located in the Town of Little Elm. These sections, henceforth referred to as the Project, are approximately 4.9 miles long and carry two lanes of traffic in each direction plus a 40-foot median and connect to Lewisville Lake Corridor Section 3 on the west and Eldorado Parkway on the east. There are two bridges on this project, an approximate 2,400 foot bridge, which crosses Lewisville Lake and replaces a 2 lane bridge, and a 220 foot bridge which replaces a flat slab bridge at Harts Branch. Both bridges match the roadway typical section, but the longer bridge is designed so that the substructure can accommodate future inside widening of the bridge without impacting Lewisville Lake. The project consisted of bridge, retaining walls, embankments and pavement design.

Mustang Drive and Mustang Drive Bridges—Grapevine, Texas. Geotechnical studies, pavement design, recommendations for new bridge foundations, trench safety design recommendations, and construction phase services.

Hall Johnson Road—Grapevine, Texas. Geotechnical studies, pavement design, recommendations for new bridge foundations, trench safety design recommendations, and construction phase services.

Arapaho Road—Richardson, Texas. Geotechnical studies, pavement design, recommendations for new bridge foundations, trench safety design recommendations, and construction phase services.

DFW Airport Bridges—DFW Airport, Texas. DFW Airport Bridges, DFW Airport, Texas - Geotechnical studies, evaluation of excessive differential settlements of bridge approach slabs within various terminals.
EDUCATION
BS / Civil Engineering / University of Texas at Arlington/1989

TxDOT PRECERTIFICATIONS
TxDOT 12.1.2, 14.1.1, 14.2.1, 14.3.1, 14.4.1

REGISTRATION
Registered Professional Engineer, Texas, #96043 - 2005
Mr. Stoudenmire’s 20 years of technical experience and project responsibilities include quality control, computer technology, construction, and construction inspection. Mr. Stoudenmire’s construction inspection responsibilities have included testing of lime and water injection stabilization, nuclear density compaction testing, observation inspection of foundation piers, structural masonry inspections, reinforcing steel inspection, mortar and grout inspection and testing for CMU walls, and observations and testing of soil placement. Other responsibilities include quality control and project coordination and management. Mr. Lee Stoudenmire’s varied experience has provided him with the ability to quickly respond to problems that arise from today’s construction projects. He has worked as the field consultant responsible for testing and inspection of impacted soil, and inspection of concrete placement of parking lots. This inspection and testing has been on various federal buildings, commercial buildings, schools, and churches.

Mr. Stoudenmire has served as Alliance Geotechnical Group’s drilling coordinator for the past 5 years. Mr. Stoudenmire has served as drilling coordinator for several large projects over the last few years.

**RELATED PROJECT EXPERIENCE**

**Roadways**
Mr. Stoudenmire served as Drilling Coordinator for the following Roadway Projects.

**Dallas TxDOT**
Drilling Coordinator - AGG is currently under contract with TxDOT Dallas District to perform geotechnical drilling, testing and engineering services for the construction and design of bridge, retaining wall, pavement and other related structures. The work includes obtaining samples of subsurface soil formations and evaluation of general soil and groundwater conditions, performing laboratory soil tests and providing geotechnical recommendations for preliminary and/or final design in the work orders executed under the contract. The work includes global stability analyses, bearing capacity analysis, potential vertical rise calculation, pavement design and lateral load analysis on piles. All drilling is performed in accordance with Test Method 132-E which includes Texas Cone Penetrometer (TCP) tests on 5 foot intervals.

**IH 35 W Section 3B**
Drilling Coordinator - AGG is performing subsurface exploration services for this project which consists of the reconstruction of IH35W from IH820 to US 81/287 split (Segment 3B of the North Tarrant County including adding lanes in each direction).

**TxDOT – Statewide Geotechnical Testing and Soil Exploration Evergreen**
Drilling Coordinator - Tasks included soil exploration for bridges, roadways and retaining walls for sites throughout TX. Among tasks were included 18 bridge sites for drilling foundation exploration core holes in the Amarillo, Childress and Wichita Falls Districts.

**Tollway Widening – NTTA – Dallas, Texas** - Drilling Coordinator - AGG was the prime geotechnical consultant responsible for subsurface exploration, geotechnical testing and engineering required for the widening of the Tollway from Cedar Springs to Wycliff. This project included the widening of Wycliff Bridge, widening and lengthening of Cedar Springs Bridge, as well as the removal and replacement of ramps. This project also included toll booth construction and pavement and several retaining walls.
George W. Bush Turnpike, HWY 190 Segment III – NTTA – Drilling Coordinator - The President George Bush Turnpike is an east-west highway facility designed to relieve traffic congestion in the northern portions of the Dallas Metroplex. For a section of the turnpike west of Midway Road and east of IH-35E, there will be significant cuts to achieve finish grade. For the planned cuts in the Eagle Ford Shale (EFS) formation, a tieback retaining wall system was used. The purpose of this testing program was to test and evaluate the capacity and performance of tiebacks in the fresh Eagle Ford Shale (EFS) formation. The scope of the testing program included the installation of and loading until failure of 8 tiebacks in two different locations, and analysis of the test results. Location/Test Pad: Two different locations for the testing were selected. The first site (A) was located west of Denton Road. Originally the location was to be east of the Denton Road, but because of access restrictions, it had to be moved. The second site (B) was located west of Kelly Road.

FM 720 – Lewisville Lake Corridor – Segments 4, 5 & 6, Little Elm, Texas – Drilling Coordinator - AGG/MTE team provided geotechnical services for Sections 4, 5 & 6 of the Lewisville Lake Corridor project in the east portion of FM 720 located in the Town of Little Elm. These sections, henceforth referred to as the Project, are approximately 4.9 miles long and carry two lanes of traffic in each direction plus a 40-foot median and connect to Lewisville Lake Corridor Section 3 on the west and Eldorado Parkway on the east. There are two bridges on this project, an approximate 2,400 foot bridge, which crosses Lewisville Lake and replaces a 2 lane bridge, and a 220 foot bridge which replaces a flat slab bridge at Harts Branch. Both bridges match the roadway typical section, but the longer bridge is designed so that the substructure can accommodate future inside widening of the bridge without impacting Lewisville Lake. The project consisted of bridge, retaining walls, embankments and pavement design.

Pump Stations

Mr. Stoudenmire served as Drilling Coordinator for the following Pump Station Projects. The work was performed per Corp of Engineers requirements.

Able Pump Station

Hampton Pump Station

Charlie Pump Station

Trinity / Portland Pump Station

Baker Pump Station

Other Project Experience

- Texas PreStress Facility – TxDOT Waco – Worked with Materials Division of TxDOT on Pre-Test Inspections on-site daily from January 2006 to April 2006, duties included:
  - Witness compression and cylinder testing
  - Inspection of reinforcing steel of bridge beams to specification
  - Inspection of number sequence of strands prior to stressing
  - Witness stressing of bridge beams
  - Monitor concrete process of bridge beams
  - Final inspection of product prior to shipment for detections

  - Form inspections prior to placement of reinforcing steel for defects
  - Inspection of reinforcing steel prior to concreting per drainage
• Verify correct mix design
• Monitor concreting of concrete barriers
• Testing of aggregate and sand for mix design use
• Conducted concrete testing per ACI for barrier
• Assisted in mix design testing for batching of concrete
• Witness compression test on cylinders
• Conducted final inspection of finished products (barriers) prior to shipment
• Record and tracking of barriers casted for each county on TxDOT computer system

• Reinforce Earth Concrete Plant – Reco, TX - In house inspections of panels duties included:
  • Reinforcing steel inspection per drainage for panels
  • Monitor concreting of panels per specification
  • Verify mix designs for the different panels
  • Witness concrete testing and compression tests
  • Inspect final product prior to shipment

• Glen Rose Nuclear Power Plant – Glen Rose, TX – System planning and walk downs on mechanical systems
• Whirlpool Facility - Centerport - Fort Worth, TX – Engineering technician for concrete and soil testing on the warehouse facility.
• Centerport Buildings F & G – DFW Airport, TX – Engineering technician for concrete and soil testing on the office building.
• Exodus Center – Fort Worth, TX - -- Engineering technician for concrete and soil testing for the proposed site.
• Centerport Technical Building – DFW Airport, TX - -- Engineering technician for concrete and soil testing on the office building.
• Koll Center – Coppell, TX – Engineering technician for concrete and soil testing on the office building.
• Gateway Station Phases I & II – Burleson, TX – Engineering technician for concrete and soil testing on the multi-story office building.
• International Plaza Phases II & III – Farmers Branch, TX – Engineering technician for concrete and soil testing on the multi-story office building.
• Highland Park DPS – Town of Highland Park, TX – Engineering technician for concrete, soil and density testing for proposed government facility.
• Josey Ranch Library & Senior Citizens Center – Engineering technician for concrete, soil and density testing for proposed facility.
• American Airlines Priority Parcel Facility – DFW International Airport, TX
• Richardson Performing Arts Facility – Richardson, TX – Engineering technician for concrete, soil and density testing for the performing arts facility.
• Richardson Service Center – Richardson, TX
• Corning Cable Systems – Keller, TX
• DFW Car Rental Facility – DFW Airport, TX
• Del Webb – Frisco, Texas – Engineering technician for the proposed subdivision
• Lebanon Road Improvement
• Wilcox 190 Building – Plano, TX – Engineering technician for concrete soil and density testing

CERTIFICATIONS
Radiation Nuclear Safety Course
American Concrete Institute (ACI) Grade I
Precast / Prestressed Concrete Institute (PCI) Level I & II
TxDOT Certification – Soils
TxDOT Certification – Concrete
Texas Excavation Safety System Certification for Pipeline & Gas Distribution Safety Emergency Response

**TxDOT Precertifications**
2.2.1 – Plant Inspection and Testing
Sequence No. 12558

**Education**
Associates of Arts, General Studies, Tarrant County Community College
Mr. Shirazi has been involved in all areas of laboratory testing of soils and rocks. His primary responsibilities are performance of day-to-day testing, coordination of laboratory work and reviewing all lab test results. Mr. Shirazi has worked with Alliance Geotechnical Group for the last 7 years. The last three years Mr. Shirazi has served as Laboratory Manager.

Mr. Shirazi is TxDOT and ACI certified in laboratory testing. Mr Shirazi is very familiar with TxDOT testing on numerous roadway projects over the past 7 years.

RELATED PROJECT EXPERIENCE:

Dallas TxDOT
Project Manager - AGG is currently under contract with TxDOT Dallas District to perform geotechnical drilling, testing and engineering services for the construction and design of bridge, retaining wall, pavement and other related structures. The work includes obtaining samples of subsurface soil formations and evaluation of general soil and groundwater conditions, performing laboratory soil tests and providing geotechnical recommendations for preliminary and/or final design in the work orders executed under the contract. The work includes global stability analyses, bearing capacity analysis, potential vertical rise calculation, pavement design and lateral load analysis on piles. All drilling is performed in accordance with Test Method 132-E which includes Texas Cone Penetrometer (TCP) tests on 5 foot intervals.

DALLAS LEVEE REHABILITATION PROJECT
The AGG/Mas-Tek team has recently completed the Dallas Levee Rehabilitation project. This project required having 8 drill rigs and 8 loggers working simultaneously. All loggers assigned to this project were either geologists or EIT’s.

IH 35 W Section 3B
Project Manager - AGG is performing subsurface exploration services for this project which consists of the reconstruction of IH35W from IH820 to US 81/287 split (Segment 3B of the North Tarrant County including adding lanes in each direction.

TxDOT – Statewide Geotechnical Testing and Soil Exploration Evergreen
Project Manager, responsible for all aspects of soil exploration and drilling for miscellaneous sites. Tasks included soil exploration for bridges, roadways and retaining walls for sites throughout TX. Among tasks were included tough access sites where buggy ATV rigs were required and over water drilling requiring barge drilling equipment.

Education
Bachelor of Science – Civil Engineering – University of Estahban/Fars
James R. Yesenik has over 34 years experience in construction materials testing, with over 25 years managing construction materials engineering/testing firms. Mr. Yesenik has over 20 years experience as Quality Control Manager. In addition, Mr. Yesenik has extensive experience with roadway projects.

**RELATED PROJECT EXPERIENCE**

**Transportation**
- SH-161, Segment #3, Irving and Grand Prairie, Texas.
- Addison Toll Tunnel under Addison Airport – Addison, TX – Concrete and soil testing, pier observation, tie-back testing on tie-back system, early construction materials testing on liner. Tunnel connect both ends of Cedar Springs Drive under Addison Airport.
- TxDOT Austin District: Hot Mix Asphaltic Concrete Plant Testing
- I-30, Hunt County, Texas (Granite Construction)
- I-30, Dallas County, Texas (Granite Construction)
- I-30, Dallas County, Texas (Brown & Root, U.S.A.)
- I-35E, Dallas County, Texas (APAC)
- University Park Subdivision, College Station, Texas (Precast Testing)
- TxDOT Austin District: Asphaltic Concrete Plant Testing
  - Review Design of Asphaltic Mixtures
  - Complete Aggregate and Asphaltic Cement Testing
  - Quality Control, Plant and Field Inspection
  - Field Stability Testing
  - Verification of Mixes
  - Density Control/Lab Testing
  - Compaction/Thickness Inspection
  - Asphalt Burn off/Extraction/Gradation
- I-30, Hunt County, Texas (Granite Construction)
- City of Dallas, Texas, annual contracts, Hot Mix Asphaltic Concrete Overlay Projects
- Texas Department of Criminal Justice facilities, Gatesville and Marlin, Texas (Precast Testing)
- TxDOT Palmer Precast Plant – Robert Roe/Reed Field Office – 254.836.4189
  Manufacturing for use in highway construction. Responsibilities included in-house inspections; testing on aggregate and sand; witness compression test on cylinders. Was on-site from 1997 to 1998 as part of a 3 year contract. Specific tasks included:
  - Conducted concrete testing on concrete used on precast concrete barrier walls
  - Conducted aggregate & sand sampling from batch plant stockpiles
  - Conducted testing (gradations, decant, sand equivalence tests, etc.) on aggregate & sand samples
  - Conducted reinforcing steel inspection on precast barriers prior to concrete pour
  - Conducted inspection of precast barrier molds
  - Witness breaking of cylinders (7 day) for barrier acceptance prior to shipment
  - Inspected barriers prior to shipment for acceptance of rejection
  - Assisted TxDOT personnel on mix design testing
  - Recorded daily activities, testing data and quantities of barrier wall cast per county.
  - Precasted both temporary and permanent barriers for various counties.
- Highway 121 at Preston Road
- Highway 121 from Ohio to Hillcrest – Frisco, Texas – Site Paving
- Melissa Road - Melissa, Texas
- Avenue J and 12th Street Coring – Plano, Texas
- I-20 & Lynn Scott – Grand Prairie, Texas
Western Center South – Fort Worth, Texas
Western Center North – Fort Worth, Texas
Whitecliff & Custer Road Alley – Richardson, Texas
Hardin Road and Wilmeth Road
Gaylord/Preston Crossing – Frisco, Texas
FM66 – Waxahachie
FM157 – Ellis County – Three bridges
FM1902 – Johnson County
County Road 548 and State Hwy 80
US183 & Hwy 114 – Irving, Texas
FM813 Bridges One & Two – Palmer, Texas
I35 Barrier Wall at Highway 121
Los Rio Blvd. Coring – Plano, Texas
I20 Eastbound at Carrier Parkway – Grand Prairie, Texas
Dallas North Tollway
McKinney Airport Road – McKinney, Texas
State Highway 34 – Royse City, Texas
Ridgecrest Road Bank Section – Forney, Texas
Ridgecrest Road Right of Way – Forney, Texas
FM1382 – Grand Prairie, Texas
Independence Parkway – Frisco, Texas
DART – Light Rail Line # NC-2 – QA Testing
DART – Light Rail Line #NC-3 – QA Testing
DART – Light Rail Line #NC-4 – QA Testing
DART – Light Rail Line # G-2 – QA Testing
DART – Light Rail Line #G-3 – QA Testing
DART – City Park Station – QA Testing
DART – Mockingbird Station – QA Testing
DART – White Rock Station – QA Testing
DART – LBJ/Skillman Station – QA Testing

Airports
American Airlines Maintenance Base, Alliance Airport, Fort Worth, Texas (1990-1992). Mr. Yesenik was Senior Supervising Technician for 21 buildings and aircraft parking and ramps on this project.
Love Field Runway and Taxiway Rehabilitation, City of Dallas (2003).
Love Field Rehabilitation of Taxiway “C” (1998-1999). Mr. Yesenik was Senior Supervising Technician for concrete pavement rehabilitation.
Arlington Municipal Airport (1995). Mr. Yesenik was Senior Supervising Technician for concrete pavement replacement.
Love Field Airport, Garage A Rehab (2003-2004) – Dallas, Texas
Love Field Terminal Apron Repairs, Phase I (2005) – City of Dallas
Love Field Terminal Apron Repairs, Phase II (2006) – City of Dallas
Love Field Investigation for Paving – City of Dallas
Love Field Blast Fence Reconstruction (2005) – City of Dallas
Love Field Runway Safety Area Enhancements, Dallas, Texas (2008)
Mesquite Airport, New Hanger – Mesquite, Texas
Addison Airport Runway Rehabilitation (1997). Mr. Yesenik was Senior Supervising Technician for Hot Mix Asphaltic Concrete overlay.
Grand Prairie Airport 2004 Improvements
Sherman Airport – Sherman, Texas
• Hensley Airfield Improvements – Dallas, Texas
• Meacham Airport – Taxiway “C” Rehabilitation – Fort Worth, Texas
• CCRA – 12” Concrete Overlay, McKinney, Texas (2007).

Commercial Buildings
• Woodbine Financial Center, College Station, Texas (Precast Testing)
• 13-Story College Station Hilton Hotel and 200,00 s.f. Convention Center
• Raytheon Warehouse Expansion – Dallas, Texas
• Hilton Hotel, College Station, Texas

Utilities
• June Street Sewer Improvements – Terrell, Texas
• City of Dallas Water Utilities (numerous projects). Mr. Yesenik was Senior Supervising Technician for these projects which involved soil testing at various locations throughout Dallas.
• Southside Wastewater Treatment Plant, City of Dallas. Mr. Yesenik performed various concrete and soil testing services.
• Eastside Water Treatment Plant – Dallas Water Utilities
• Clemmons Creek Sewer Line – Melissa, Texas
• 2004 Street/Utility Repair – City of Richardson, Texas
• 2005 Street/Utility Improvements – Terrell, Texas
• 2005 Utility Pavement Repair – Richardson, Texas
• 72” Pipeline, Allen, Plano, Frisco & McKinney, Texas
• Southwest Pipeline, Phase II, Section I – Flower Mound, Texas
• Gables Phase 3 Utilities – Murphy, Texas
• Renner Road 2005 Utility Pavement Repair – City of Richardson, Texas
• 24” & 30” Water Main, State Highway 360 – Grand Prairie, Texas
• Gas Line – 121 & Paige Road – The Colony, Texas
• Bridge Improvements – North Shore Drive – Rockwall, Texas
• Northcreek Off-Site Water – Melissa, Texas
• Tom Harpool Regional Water Treatment Plant – Dallas, Texas
• Liberty Off-Site Sanitary Sewer – Melissa, Texas
• 16” Waterline Renner Road – City of Richardson, Texas

Municipal Buildings
• City of McKinney Public Library – McKinney, TX
• DPS Expansion – Highland Park, TX
• TDCJ Facilities, Gatesville and Marlin, Texas.
• Olin E. Teague Veterans Center, Temple, Texas.
• Texas Department of Criminal Justice facilities, Gatesville and Marlin, Texas
• TDCJ Prison Sites at New Boston and Wichita Falls, Texas

Other Municipal
• City of Dallas (numerous projects). Mr. Yesenik was Senior Supervising Technician for these hot mix overlay projects on various streets throughout the City of Dallas.
• Campbell Storm Sewer Improvements
• 1.5 Million Gallon UST – Fairview, Texas
• Parking Lot – City of Fairview, Texas
• 2004 Alley Reconstruction – City of Richardson
JAMES R. YESENIK, S.E.T. (continued)

Schools
- New Elementary School – Forney ISD
- New High School Football Stadium and Track – Forney ISD
- High School No. 3 – Mansfield ISD
- New Elementary School – Mansfield TX
- Arthur Kramer Elementary School – Dallas ISD
- Jimmie J. Brashear Elementary – Dallas ISD
- Classroom Addition and New Parking Lot – Dallas County Community College District
- Gerald J. Ford Football Stadium – Southern Methodist University – Dallas, TX
- Polk Middle School – Carrollton ISD
- McKinney Sportsplex – McKinney, Texas
- Montessori School – Plano, Texas
- North Lake College Petrographic Analysis – DCCCD – Irving
- Kirk Patrick Elementary – Fort Worth ISD – CMU Wall Investigation

Other Experience - Construction Materials Engineering & Testing:
- Galleria Tower I & II
- Embassy Suites – Grapevine, Texas
- Bass Pro Shops – Grapevine, Texas
- Baylor Carrier Center
- Southwest – Carrier Center
- Wilcox One International Place
- S.W. Bell - Irving, Texas
- Hampton Inn - Mesquite, Texas
- Carraba’s NE Mall Pad Site – Hurst Texas
- Atom’s – Ennis #7774 – Ennis, Texas
- Homestead Retail – Roanoke, Texas
- Verizon at William D. Tate – Grapevine, Texas
- Frisco Main Retail – Frisco, Texas
- Centreport Tech Building – Fort Worth, Texas
- Parkview Villas – Carrollton, Texas
- Deerfield Heights, Phase II – Forney, Texas
- Collins Estate Franchise – Wylie, Texas
- Silveron Center One – Flower Mound, Texas
- Dallas Cowboy Stadium – Arlington, Texas
- H.C. Weaver Power Plant, University of Texas at Austin, Austin, Texas
- Nuclear Engineering Lab., Austin, Texas.
- Centreport Area 1 – Fort Worth, Texas
- Horse Hollow Wind Turbines – Abilene, Texas
- Bo Miller Tract – Celina, Texas
- Pearson Farms, Phase 1A – Frisco, Texas
- Pearson Farms, Phase 1B Amenities Center – Frisco, Texas
- Pearson Farms, Phase 1C – Frisco, Texas
- Pearson Farms, Phase II – Franchise, Mass Grading Paving – Frisco, Texas
- Craig Ranch Estates West – McKinney, Texas
- Craig Ranch, Hemingway Town Homes – McKinney, Texas
- Collins Estate
- Sachse Farms, Phase 1 Pad Extension
- The Cedars – The Colony, Texas
- The Gables, Phase 3 – Murphy, Texas
JAMES R. YESENIK, S.E.T. (continued)

- Lake Forest Crossing – McKinney, Texas
- Lakes Parks West, Phase III – Grand Prairie
- Magnolia Springs, Phase 5A & 5B, Utilities, Paving & Mass Grading – Rowlett, Texas
- Elevated Storage Tank – Grand Prairie
- Park Vista Addition – Fort Worth
- Walsch Ranch Water Facility, Phase I – Fort Worth, Texas
- Valwood Service Center I – Farmers Branch, Texas
- Villages of Willow Bay Mass Grading, Utilities, Paving, Franchise, Grading – Frisco, Texas
- Country Club Ridge, Water Injection – Frisco, Texas
- 12 Pecan Grove – Lucas, Texas
- Alcon Laboratories – Fort Worth, Texas
- Princeton Meadows – Princeton, Texas
- Deerfield Heights, Phase II – Forney, Texas
- Thompson Springs, Phase II – 6 Lots – Fairview, Texas
- Federal Express Parking Lot – Sherman, Texas
- Frisco Business Park – Frisco, Texas
- Twin Creeks, Phase 6B, 7B, & 8B – Allen, Texas
- The Swim Club at Gables North Hills – Murphy, Texas
- Beach & Tennis Club Expansion Parking Lot – McKinney, Texas
- Wal-Mart #426 – 121 & Main Street – The Colony, Texas
- Hunters Ridge, Phase 3 – Melissa, Texas
- Oak creek Court Tennis Center – Carrollton, Texas
- Altamesa Center – Fort Worth, Texas
- Lakeview Retail – Rowlett, Texas
- Glen Park Estates – Flower Mound, Texas
- McKinney Place Towers – Dallas, Texas
- Honda Environmental Learning Center – Irving, Texas
- Starwood Village #16 – Frisco
- Starwood Drive Entry – Frisco
- Home Depot Out Parcels - Rowlett
- Northcreek Estates Phase I – Paving – Melissa, Texas
- Avondale – Allen, Texas
- Panther Creek Estates, Phase 4 – Frisco, Texas
- Kubota Tractor Corporate Office
- Tahama Ridge, Phase I – Fort Worth, Texas

CERTIFICATIONS

- TxDOT Level IA Plant Operations Specialist - #1762
- TxDOT Level 1B – Roadway Specialist - #3826
- ACI Concrete Field Testing Technician Grade 1
- NICET Level IV: Asphalt, Concrete, Soils
- NICET Geotechnical Level II: Exploration, Laboratory, Construction
- TxDOT QAP Construction Tex-447-A-Pt 2
- TxDOT Level 2 Mix Design Specialist #751
- PTI Level 1 - #C866
- PTI Level 2 Inspector - #C866
- Precast/PreStressed Level I & II
- T.T.I Roadway Surface Profiler
- TxDOT QAP Construction Tex-415-A
  TxDOT QAP Construction Tex-416-A
JAMES R. YESENIK, S.E.T. (continued)

TxDOT QAP Construction Tex-418-A
TxDOT QAP Construction Tex-448-A

TxDOT PRECERTIFICATIONS
Sequence #000001993
12.1.1 – Asphaltic Concrete
12.1.2 – Portland Cement Concrete Testing
12.2.1 – Plant Inspection and Testing

PREVIOUS EXPERIENCE
1976 -1988 Meyer Lytton Allen Inc., Austin, Houston and Bryan, Texas
1988-1990 Raba-Kistner Consultants, Inc., Austin, Texas
1990-1996 Trinity Engineering Testing Corp, Dallas, Texas
1996-2000 Terra-Mar, Inc., Dallas, Texas
2000-2003 Trinity Engineering Testing/Kleinfelder, Dallas, Texas
2003-present Alliance Geotechnical Group, Inc., Dallas, Texas