Seminole Tribe of Florida
Hollywood Reservation
Deep Injection Well Completion Report
EPA Permit SEA 0001

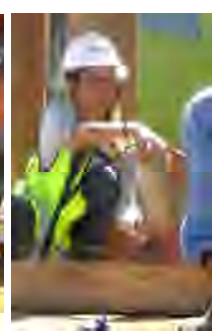
January 2019

Volume 2 – Appendices

Hazen

Hazen Project 41086-013



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Abbreviations and Terms

als – above land surface

BHC – borehole compensated [sonic log]

BHTV – borehole televiewer

bls – below land surface

CBL – cement bond log

CCL – casing collar locator

CF – cubic feet

CFR – Code of Federal Regulations

Contractor – Youngquist Brothers, Inc.

DIL – dual induction log

DIW – deep injection well

Engineer – Hazen and Sawyer and subconsultants

EPA – Environment Protection Agency [United States]

F – Fahrenheit

FPS – feet per second

FRP – fiberglass reinforced plastic

ft – feet

gal – gallons

gpd – gallons per day

gpm – gallons per minute

GRL – gamma ray log

Hazen – Hazen and Sawyer

HDPE – high density polyethylene

HW – Hollywood [Reservation]

IW – injection well

IWPS – Injection Well Pump Station

Lab – Pace Analytical Services, LLC

LAF – log after flushing

LMZ – lower monitor zone

LOP – log out of position

mCi – millicurie

Abbreviations and Terms (Continued)

MG – million gallons

mg/L – milligrams per liter

MGD –million gallons per day

MIT – mechanical integrity test

MW – monitor well

NAD – North American Datum (NAD83)

NAVD – North American Vertical Datum (NAVD88)

O&M – operation and maintenance

psi – pound per square inch

psig – pounds per square inch gauge

ROP – rate of penetration

RTS – radioactive tracer survey

SAMW – shallow aquifer monitor well

SAS – surficial aquifer system

SP – spontaneous potential [log]

STOF – Seminole Tribe of Florida

TDS – total dissolved solids

TKN – total Kjeldahl nitrogen

TSS – total suspended solids

UMZ – upper monitor zone

USDW – Underground Source of Drinking Water

µS/cm –microsiemens per centimeter

VDL – variable density log

WOB – weight on bit

WTP – water treatment plant

WWTP – wastewater treatment plant

APPENDICES

APPENDIX A

EPA INJECTION WELL PERMIT
(Abridged)

U.S. ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PROGRAM

CLASS I – INDUSTRIAL AREA PERMIT

PERMIT NUMBER SEA0001

SEMINOLE TRIBE OF FLORIDA
HOLLYWOOD RESERVATION
WASTEWATER TREATMENT PLANT
INJECTION WELL PROJECT

ISSUED TO

THE SEMINOLE TRIBE OF FLORIDA

HOLLYWOOD RESERVATION
PUBLIC WORKS ADMINISTRATION
3107 NORTH STATE ROAD 7
HOLLYWOOD, FLORIDA 33021

Issued on November 1, 2016

Abridged Version (no attachments)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

NOV 0 1 2016

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable James E. Billie
Chairman
Seminole Tribe of Florida
6300 Stirling Road, Suite 420
Hollywood, Florida 33024

Subject: Final Underground Injection Control Permit Number SEA0001
Permit Writer: Mr. Jason B. Meadows
Permit Effective: DEC 0 1 2016

Dear Chairman Billie:

Enclosed is the Underground Injection Control (UIC) permit referenced above. This action constitutes the U.S. Environmental Protection Agency's final permit decision in accordance with Title 40 of the Code of Federal Regulations at (40 C.F.R.) §124.15(a). Any person who filed comments on the draft permit may contest this decision by petitioning the Environmental Appeals Board (EAB) to review any condition of the permit decision pursuant to 40 C.F.R. §124.19.

The permit will be effective as specified in the permit, provided that no petition to the EAB for a review of this permit is filed under 40 C.F.R. §124.19. During the public notice period, 154 comments were received by the EPA. The commenter has thirty (30) days to file a petition with the EAB. In the event that such a petition is granted, this will result in a postponement of your authorization to commence construction or injection activity until the administrative review process is completed. In other words, there will not be a valid UIC permit authorizing the construction or injection and if such activity occurs, the construction or injection will constitute a violation of Section 1421 of the Safe Drinking Water Act, 42 U.S.C. §300h, resulting in civil and/or criminal liability.

If you have any questions concerning the enclosed permit, please contact us at the above address or by calling Mr. Jason B. Meadows at (404) 562-9399.

Sincerely,

James D. Giattina
Director
Water Protection Division

Enclosures

cc: Mr. Kenneth W. Dodge
Attorney, Lewis, Longman & Walker, P.A.

Mr. Derek Koger
Director, Seminole Tribe of Florida, Public Works Department

Ms. Cherise Maples
Director, Seminole Tribe Environmental Resource Management Department

Mr. Armando Ramirez
Tribal and Federal Affairs Liaison, South Florida Water Management District

Administrative Review Procedures (40 C.F.R. §124.19)

1. A petition for a review of a permit decision may be initiated by any person who filed comments on the draft permit or participated in any public hearing on the draft permit. The petition for review must be filed with the Clerk of the Environmental Appeals Board within thirty (30) days after the Regional Administrator serves notice of the issuance of a final permit decision.

2. Any person who failed to file comments or participate in any public hearing on the draft permit may petition for administrative review but only to the extent that the final permit conditions reflect changes from the proposed draft permit conditions.

3. The petition for review must identify the contested permit condition or other challenge to permit decision. The petition must show that each challenge to the permit decision is based on:

    a. A finding of fact or conclusion of law which is clearly erroneous; or

    b. An exercise of discretion or an important policy consideration which the Environmental Appeals Board should, in its discretion, review.

4. Petitioners must also show, by providing specific citation to the administrative record, that each challenge to the permit decision being raised in the petition was raised during the public comment period (including any public hearing). If the issue was not raised during the public comment period the petition must explain why the issues were not required to be raised during the public comment period.

5. The petition for review shall be mailed to: U.S. Environmental Protection Agency, Clerk of the Board, Environmental Appeals Board (MC 1103B), 1200 Pennsylvania Avenue, N.W., Washington, D.C. 20460-0001.

6. A petition to the Environment Appeals Board under 40 C.F.R. §124.19 is a prerequisite to the seeking of judicial review of the final permit decision.

U.S. ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PROGRAM

CLASS I – INDUSTRIAL AREA PERMIT

PERMIT NUMBER SEA0001

SEMINOLE TRIBE OF FLORIDA
HOLLYWOOD RESERVATION
WASTEWATER TREATMENT PLANT
INJECTION WELL PROJECT

ISSUED TO

THE SEMINOLE TRIBE OF FLORIDA

HOLLYWOOD RESERVATION
PUBLIC WORKS ADMINISTRATION
3107 NORTH STATE ROAD 7
HOLLYWOOD, FLORIDA 33021

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PART I. AUTHORIZATION TO CONSTRUCT AND OPERATE TWO CLASS I – NON-HAZARDOUS INDUSTRIAL INJECTION WELLS

Under the authority of the Safe Drinking Water Act and Underground Injection Control (UIC) Program regulations of the U.S. Environmental Protection Agency codified at Title 40 of the Code of Federal Regulations (40 C.F.R.) Parts 124, 144, 146 and 147:

The Seminole Tribe of Florida - Hollywood Reservation
Public Works Administration
3107 North State Road 7
Hollywood, Florida 33021

hereby referred to as the "Permittee" is hereby authorized to construct, operate, and plug and abandon the following Class I – Non-Hazardous Industrial injection wells located on the Seminole Tribe of Florida's Hollywood Reservation Water and Wastewater Treatment Plant in Hollywood, Florida:

EPA ID #	Well Name	Latitude	Longitude
SES0110001	Hollywood IW-1	26° 2' 5.5" N	80° 13' 13.3" W
SES0110002	Hollywood IW-2	26° 2' 8.5" N	80° 13' 13.3" W

With the approximate center of this project being located at
SE ¼ of Section 2, Township 51S, Range 41E
26° 2' 7.0" N, 80° 13' 13.3" W

This authorization is in accordance with the limitations, monitoring requirements and other conditions set forth herein. All references to 40 C.F.R. are to regulations that are in effect on the date that this permit becomes effective.

This permit and the authorization to inject (if granted) shall remain in full force and effect for five (5) years after the effective date, unless this permit is otherwise modified, revoked and reissued, terminated, or a minor modification is made as provided at 40 C.F.R. §§124.5, 144.12, 39, 144.40 and 144.41.

This permit shall become effective on DEC 0 1 2016. This permit shall expire on DEC 0 1 2021.

NOV 0 1 2016
Issuance Date

James D. Giattina, Director
Water Protection Division
U.S. Environmental Protection Agency
Region 4

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PART II. PERMIT SPECIFIC CONDITIONS

SECTION A. IMPLICATIONS FOR "THE WATER RIGHTS COMPACT AMONG THE SEMINOLE TRIBE OF FLORIDA, THE STATE OF FLORIDA, AND THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT" (the Compact)

In addition to the requirements established by the Safe Drinking Water Act (SDWA) [Title 42 of the United States Code (U.S.C.) 300f et. seq. and the rules adopted thereunder as found in 40 C.F.R. §§124, 144, 146 and 147, this permit includes applicable requirements established in the Compact as described under 25 U.S.C. §1772e. In an effort to reduce duplication of effort on the Permittee, the EPA has attempted to align this permit with the applicable requirements of the Compact and the corresponding Evaluation Criteria Manual (Manual). The language of this permit does not change or supersede any obligations established under the Compact.

The Permittee is responsible for notifying the EPA of any changes to the Compact or the Manual that could affect the wells covered by this permit. This includes any related agreements between the Permittee, the State of Florida and the South Florida Water Management District regarding oversight, technical assistance and/or data reporting. The Permittee is required to submit copies of any reports regarding the construction, operation, and plugging and abandonment of the wells covered under this permit that are not required by this permit but are required under the Compact.

The Permittee may request modification of the permit under Part III, Section B to remove conflicting requirements between this permit and the Compact or where the Permittee feels that duplication of effort may be removed or to reduce undue regulatory burden on the Permittee. The EPA will evaluate such requests in consultation with The Permittee, The Seminole Tribe of Florida, The State of Florida and the South Florida Water Management District.

SECTION B. AREA AND WELLS AUTHORIZED

1. Area within Which Underground Injections are Authorized
   The Permittee is authorized to construct, operate, and plug and abandon two Class I – non-hazardous industrial injection wells at the Wastewater Treatment Plant (WWTP) on the Seminole Tribe of Florida's Hollywood Reservation. This project area is described in the UIC Permit Application Attachment B, with an approximate center at 8-H-37, 450' FSL x 1,100' FWL. Maps of the area have been included in **Appendix A**.

2. Specific Wells Authorized for Construction and Operation
   The following injection wells are specifically authorized by this permit for construction and operation within the permitted area:

EPA ID #	Well Name	Latitude	Longitude
SES0110001	Hollywood IW-1	26° 2' 5.5" N	80° 13' 13.3" W
SES0110002	Hollywood IW-2	26° 2' 8.5" N	80° 13' 13.3" W

   Additionally, the Permittee is required to construct, operate and maintain monitoring wells as required by the monitoring plan laid out in the Technical Specifications in **Appendix B**.

SECTION C. CONSTRUCTION REQUIREMENTS

These requirements specify the approved minimum construction standards for well casing and cement. Technical Specifications of the approved well construction plan for both injection and monitoring wells have been incorporated into this permit as Appendix B. In addition to those specifications, the Permittee must meet the requirements of this section.

1. Postponement of Construction

   The Permittee shall begin construction on this project within one year of the Effective Date of the Permit, or in the case of an Area Permit, within one year of Authorization of each additional well. Authorization to construct and operate shall expire if the construction of the project has not started within one year of the Effective Date of the Permit (or Authorization) and the Permit may be terminated under 40 C.F.R. §144.40, unless the Permittee has notified the Director and requested an extension prior to expiration. Notification shall be in writing, and shall state the reasons for the delay and provide estimated dates of construction commencement and completion. Once authorization has expired under this part, the complete permit process including opportunity for public comment may be required before authorization to construct and operate may be reissued.

2. Reporting Requirements During The Drilling Period

   a. Prior to Commencement of drilling

      The drilling and construction schedule, site layout of drilling pad, and pad monitoring well locations shall be reported in accord with Part II, Section H during site preparation but prior to drilling operation commencement for the injection well system.

   b. Weekly Progress Reports

      Weekly progress reports shall be submitted to the EPA throughout the construction period for each injection well and the Floridan Aquifer monitoring well. These reports, which may be submitted by electronic mail, shall be submitted within 72 hours of the end of the period of record and shall include at a minimum the following information:

      i. A written summary of the daily engineer report, driller's log and a projection for activities in the next reporting period;

      ii. Daily engineers reports and driller's/work logs with detailed descriptions of all drilling progress, cementing, testing, logging, and casing installation activities;

      iii. Description of daily footage drilled by diameter of bit or size of hole opener or reamer being used;

      iv. Description of work during installation and cementing of casing, including amounts of casing and cement used. Descriptions of cementing operations shall include the number of cementing stages, and the following information for each stage of cementing: the volume of cement pumped, the theoretical fill depth, and the actual tag depth. From both the physical tag and the geophysical logs, a percent fill shall be calculated. An explanation of any deviation between actual versus theoretical fill shall be provided.

v. Descriptions of the additions of salt or other materials to suppress well flow, including the date, depth and amount of material used;

vi. Descriptions of testing accomplished including (but not limited to) pumping and packer tests;

vii. Lithologic logs including core descriptions, descriptions of cuttings (which are to be collected every 10 feet), and identified formations and the depths at which they were encountered;

viii. Geophysical logs, video logs, and deviation survey results;

ix. Reports of water quality analyses, including but not limited to the weekly water quality analysis received from the laboratory for the pad monitoring wells; pad monitoring well water levels should also be reported;

x. Well development records;

xi. Description of any construction problems that developed during the reporting period and current status;

xii. Preliminary interpretations included with all test results and logs submitted;

xiii. Documentation of disposal of drilling fluids, cuttings, formation water, or waste as per Part II, Section C, Paragraph 3.a.i., if disposal deviates from plan;

c. Milestone Reporting
Interpretation of data contained in the data reports or progress reports is required at the completion of each significant phase of construction, such as completion of injection well construction, and completion of injection well testing.

d. Selection of Specific Intervals
The final selection of specific injection and monitoring intervals must be approved per Part II, Section C, Paragraph 2. In order to obtain an approval, the permittee shall submit a written request per Part II, Section C, Paragraph 3. All casing seat requests for the injection well(s) and the monitoring well(s) shall be accompanied by technical justification. To the extent possible applicable for each specific casing seat, each request should contain the following items:

i. Lithologic and geophysical logs with interpretations, as the interpretations relate to the casing seat;

ii. Water quality data (including but not necessarily limited to TDS concentrations);

iii. Identification of confining units;

iv. Identification of monitoring zones;

v. Casing depth evaluation (mechanically secure formation, potential for grout seal);

vi. Lithologic drilling rate and weight on bit data, with interpretations (related to the casing seat);

vii. Identification of all underground sources of drinking water (USDWs) using water quality, formation fluid resistivity plots, and geophysical log interpretations;

viii. An evaluation of all submitted logging and test results, submitted with test data;

ix. Transmissivity or specific capacity of proposed monitoring zone from packer testing performed at or near the monitoring zone; and

x. Packer test drawdown curves and interpretation.

e. Geophysical Logs
Appropriate geophysical surveys and other tests shall be conducted during the drilling and construction of new Class I wells and presented in weekly progress reports. Interpretations of the results of such geophysical surveys and tests shall be presented in casing seat requests as appropriate. Such reports shall include field copies of the surveys and test data and analyses results at the level required to support field decisions made during drilling or casing seat requests.

3. Changes to the Approved Construction Plan
Changes to the approved plan that may occur during construction must be approved prior to being physically incorporated.

a. Major Changes
Major changes that necessitate a detailed review by the Director and may lead to changes in operating parameters or corrective action requirements. These include changes in the injection formation and material changes in the setting depth or cementing of the surface casing (casings which are set to protect USDWs). The Director must approve a written description of these changes prior to being physically incorporated.

b. Minor Changes
Minor changes include all other changes. For these changes, it is important that quick approval or disapproval be given by the EPA since delays in construction and completion of the well are very costly to the operator. These changes may be approved by the permit writer via email.

These include but are not limited to:

i. Changes in the number of casing strings;

ii. Changes in the size or material of intermediate and inner casings or liners, which are not the outermost casing present as a well passes through an USDW;

iii. Changes in the completion of the well;

iv. Changes in the exact setting of open hole intervals for monitoring or injection intervals within the permitted injection formation; and

v. Changes in the type of cement used.

c. Summary of Changes
A written summary of all changes in the construction plan, both major and minor must be submitted after construction prior to granting approval to operate the well.

4. Drilling

a. Disposal of Wastes generated by Drilling
The disposal of drilling fluids or cuttings, and the disposal of formation water or waste during testing shall be in a sound environmental manner that avoids violation of all applicable surface and ground water quality standards.

In addition, the Permittee will follow the technical specifications found in Section 13196 in Appendix B, and apply for and receive appropriate permits for all facets of the drilling operation pursuant to all applicable laws and requirements.

b. Drilling Pad
The use of drilling pads is required. The pads will be designed to collect spillage of contaminants and to support the heaviest load that will be encountered during drilling. At locations where the unconfined aquifer contains less than 10,000 mg/l total dissolved solids, monitor wells capable of detecting any contamination of the unconfined aquifer from drilling activities shall be required.

c. Flow Control
Flow control shall be used when drilling into formations in which pressure heads exceed land surface, to prevent uncontrolled release of formation or drilling fluids at land surface.

d. Deviation Surveys
Deviation surveys shall be performed as described in Appendix B to demonstrate that the boreholes and wells are sufficiently plumb so that casings are effectively cemented in the geologic formations to avoid vertical migration of fluids along the boreholes.

e. Identification of Underground Sources of Drinking Water (USDWs)
In the well construction submittals required by Part I, Section H, the Permittee shall address the proposed testing and sampling procedures for adequately defining the depth at which total dissolved solids exceed 10,000 mg/l in formation waters.

f. Geophysical Logging Prior to Setting Casings
Geophysical logs shall be run as described in Appendix B, Section 13198 – Geophysical Logging and Testing, prior to setting surface casing intended to protect USDWs.

5. Casing and Cementing
The Permittee shall case and cement each well and maintain all casing and cement so as to prevent the movement of fluids into or between any underground sources of drinking water (USDWs). The casing and cement used in the construction of a well shall be designed for the life expectancy of the well. Construction of a well shall be performed only with the written approval of the Director as contained in Part I of this permit and according to plans supplied by the Permittee. Should the Permittee wish to permit additional wells under this area permit, they must request and receive approval for a modification under 40 C.F.R. §144.39.

    a. Casing
    The number, thickness, type of materials, and length of casing shall be sufficient to protect the quality of drinking water resources, the integrity of the well, and the confining strata. Exact setting depths of all casings shall be determined in the field based on all available information. Additionall, all casings shall be centralized where possible to facilitate uniform cementing. The casing shall be centralized per the specifications in **Appendix B**.

    b. Cement
    Use of cement additives, water/cement ratio, and the type of water used for mixing shall be determined by the Permittee, provided the integrity, containment, corrosion protection, and structural strength of the cement are not affected to a point where they can no longer meet the designed parameters laid out in **Appendix B**. Cement must be compatible with the injected fluid, native fluids, and the formation, but in no case less than the quality of American Society of Testing and Materials Type 2 or its equivalent (Standard Specification for Portland Cement, American National Standards Institute/American Society of Testing and Materials C 150-78(a), 1978). If an additive is not in the design specifications contained in **Appendix B**, the Permittee shall obtain prior approval for its use. Accurate records shall be kept and all additives used shall be reported

    Prior to cementing, the hole shall be prepared to allow sufficient bonding of the cement to the casing and to the formation, and to prevent channeling. During cementing, adequate pressure differentials shall be maintained between the annulus and the casing to prevent collapse or distortion of the casing.

    c. Monitoring Well Construction
    For monitoring wells used to demonstrate lack of migration resulting from injection of fluids into Class I well, other than annular monitor wells, a nominal thickness of two and one-half (2-1/2) inches of cement surrounding the casings with not less than five (5) inches of overdrill is required, except for the annulus being used for monitoring in wells with open annulus monitoring.

    d. Casing Testing
    The casing testing requirements are presented in Appendix B, Section 13198.

    e. Remedial Construction Measures
    Remedial construction measures may be required if the well is unable to demonstrate mechanical integrity as described in Part II, Section G.

6. Annulus
The annulus between the 16-inch fiberglass reinforced plastic (FRP) tubing and the 24-inch steel casing shall be filled with cement per the technical specifications in Appendix B. The Director has approved this construction style as an alternative to the tubing and packer construction style specified under 40 C.F.R. §146.12(c). A copy of this approval is in **Appendix C**.

7. Injection Tubing
Injection may only take place through the cemented in 16-inch FRP tubing set within the casing no higher than the depth given in **Appendix B**, unless a change was approved through Part II, Section C, Item 3 or an approved casing seat request, for each specific well authorized by this permit under Part II, Section B, Item 2. The tubing shall be maintained in a manner which is compatible with the injection operation specified in Part II, Section D, and which prevents the movement of fluids into or between any USDWs. The injection tubing shall be centralized where possible to facilitate uniform cementing.

8. Injection Zone
Injection zone means "a geological formation, group of formations, or part of a formation receiving fluids through a well." Injection is permitted only within the approved injection zone specified below.

   The injection zone is in the Boulder Zone within the Lower Eocene Oldsmar Formation of the Lower Floridan aquifer. The Boulder Zone consists mainly of fractured dolostones and open cavities. The approximate depth of the injection zone at the project site is 3,000 feet to 3,500 feet below ground surface.

9. Injection Zone Testing
The purpose of testing the injection zone is to demonstrate the zone's capacity for receiving injected fluid. The Permittee shall demonstrate the suitability of a proposed zone by determining the hydraulic characteristics, lithology, thickness, extent, compatibility of injection and formation fluids, temperature. Specific testing requirements prior to receiving authorization to inject are found in **Appendix B, Section 13198, Article 3.08**.

   a. Pumping Injection Test
   Testing of the injection zone shall include an injection test at a flow rate of not less than the maximum design capacity of the well, and of such duration that can demonstrate the trend of the injection pressure on the long-term operating conditions. If an adequate water supply for the injection test does not exist, and data collected during drilling strongly indicate the presence of confining bed(s), the Permittee may use secondary treated domestic wastewater effluent for testing only with prior approval.

   b. Additional Tests
   Testing of the injection zone will be performed as described in **Appendix B**.

10. Confining Zone
The confining zone means a geological formation, group of formations, or part of a formation that is capable of limiting fluid movement above an injection zone, for this permit the confining zone has been identified below.

The injection zone is confined by the confining zone between the base of the deepest USDW and the top of the injection zone is the lower part of the middle confining unit of the Floridan aquifer system, which consists of strata that are part of the Avon Park Formation. The approximate depth interval of the confining zone at the project site is 1,900 feet to 3,000 feet below ground surface. The depth interval of the confining zone will be determined from the information submitted by the Permittee in response to the requirements in Part II, Section C, Item 11.

11. Confining Zone Testing
The Permittee shall provide sufficient data such as geophysical logs, lithologic cores, water samples, and drill stem tests (or aquifer tests) to adequately demonstrate the confining characteristics of the bed.

Specific testing requirements prior to receiving authorization to inject are found in **Appendix D**.

a. Monitoring System
A monitoring system is required. It includes, but is not be limited to, the required one (1) on-site Floridan Aquifer monitor well(s), designed to evaluate the long-term effectiveness of the confining zone.

b. Geophysical Logs
The minimum geophysical logging required to demonstrate the characteristics of the confining zone are presented in Appendix B, Section 13198.

12. Other Sampling and Monitoring Devices
At a minimum, the operator shall maintain in good operating condition:

i. A tap on the discharge line between the injection pump and the wellhead for the purpose of obtaining representative samples of injection fluid; and

ii. Devices to measure and record injection pressure, flow rate, and injection volumes, subject to the following:

iii. Pressure gauges shall be of a design to provide:

(a) A full pressure range of at least fifty (50) percent greater than the anticipated operating pressure; and

(A) A certified deviation accuracy of five (5) percent or less throughout the operating pressure range.

iv. Flow meters shall measure cumulative volumes and be certified for a deviation accuracy of five (5) percent or less throughout the range of injection rates allowed by the permit.

SECTION D. COMMENCING INJECTION

1. Commencing Injection
   Well injection may commence only after all well construction and pre-injection requirements have been met and a written authorization to commence injection has been obtained from the Director.

   In order to obtain written authorization to commence injection, the following must be satisfied:

   a. The Permittee has:
      i. Submitted to the Director a notice of completion of construction and a completed EPA Form 7520-10. If the well construction is different than the approved construction found in **Appendix A**, the Permittee shall also provide a revised well diagram and a description of the modification to the well construction to be incorporated into **Appendix A**;

      ii. Conducted all applicable logging and testing requirements (see **Appendix B**) and submit required records to the Director. The logging and testing requirements include demonstration of mechanical integrity pursuant to 40 C.F.R. §146.8, in accordance with the conditions found in Part II Section C of this permit;

      iii. Submitted a copy of their operation manual(s) described in item (2) of this section.

      iv. Satisfied requirements for corrective actions as outlined in Part II Section D, if applicable; and

   b. The Director has:
      i. Received and reviewed the documentation associated with the requirements in Paragraph 1(a) of this section and finds it is in compliance with the conditions of the Permit; and

      ii. Inspected the injection well and finds it is in compliance with the conditions of the Permit. If the Permittee has not received notice from the Director of his or her intent to inspect the injection well within 13 days of the date of the notice in Paragraph 1(a)(i) above, then prior inspection is waived.

2. Pre-Injection Logs and Tests
   Specific well logging and testing requirements prior to receiving authorization to inject are found in **Appendix D**. The completed wells will be tested to assure that the wells will function as built. Well logs and tests shall be performed according to current EPA-approved procedures. The Director may stipulate specific test methods and criteria best suited for a specific well construction and injection operation.

3. Pre-Injection Reports
   The following tests and reports shall be prepared and submitted to the EPA to demonstrate that a injection well is capable of operating safely:

      i. A copy of all logs run in the well.

ii. Cement tickets and invoice from the contracted cementing service company indicating cement volume, type, additives and a job description summary.

iii. A demonstration of the mechanical integrity of the well is required before injection can be authorized. The demonstration will consist of those procedures described in Part II, Section G.

(A) The Permittee shall contact the EPA to arrange a dates to conduct this test. The EPA reserves the right to have a designated representative present to witness this demonstration.

(B) If the well fails the demonstration, the Permittee will not be given approval to commence injection operations until the problem is corrected and mechanical integrity can be demonstrated.

The Permittee shall prepare a report on the logging and testing programs. It shall contain the procedures, results and interpretations of those results. The report must be submitted in accordance with Part II, Section I, and shall be signed in accordance with Part III, Section E, Item 11, of this permit.

SECTION E. CORRECTIVE ACTION

There is no required corrective action for wells located within the Area of Review (AOR) as required pursuant to 40 C.F.R. §144.55 and 40 C.F.R. §146.7. No wells identified in within the AOR, as shown in **Appendix A**, penetrate the confining zone other than those authorized by this permit. Therefore, no corrective action is required at this time.

SECTION F. OPERATING REQUIREMENTS

1. Operation Manual

The operation and maintenance manual(s) for injection well disposal facilities, or portions thereof, shall be prepared for the use of operators, maintenance personnel, technicians, laboratory personnel and others, as appropriate, and shall consist of:

i. Written instructions provided to the injection system operators for the safe, reliable operation of the system.

ii. Records of the basic engineering design and equipment description.

iii. A program to assure proper maintenance of the system.

iv. Contain detailed procedures for dealing with abnormal events which meet the following requirements:

The Permittee shall provide a copy of the approved manual to the operators, maintenance personnel, technicians, laboratory personnel and others, as appropriate. The manual(s) shall be available for reference at the facility or other approved site.

Revisions to the Manual may be required to reflect any facility modifications performed, in order to comply with the requirements of this permit and any other requirements or to reflect experience resulting from facility operation

2. Injection Operation
Beginning on the date that all items in Part II, Section D are completed and lasting through the term of this permit, the Permittee is authorized to inject only fluids as described in item (d) of this section under the following conditions:

a. Injection is prohibited:
Between the outermost casing protecting the underground sources of drinking water and the well bore.

Through wells designed to monitor the injection zone except when specifically designed as a temporary injection well or approved (in writing) for emergency discharge use.

b. Injection Zone
For each well authorized by this permit under Part II, Section B, Item 2, injection shall be limited to the Injection Zone identified in Part II, Section C, Item 8. The specific injection interval must be approved by the Director in Part II, Section C, Item 3.b.

c. Injection Fluid
The Permittee shall not inject any hazardous waste as defined by 40 C.F.R. §261, nor any other fluids, other than those described in this item unless approved in advance by the Director. The injectate will consist of:

i. Secondary treated domestic wastewater from the Permittee's Hollywood Reservation Wastewater Treatment Plant and

ii. Concentrate from the membrane treatment system at the Permittee's Hollywood Reservation Water Treatment Plant (WTP). Concentrate is used to describe the waste stream generated at the WTP consisting primarily of membrane reject, but also includes, raw water bypass from startup operations and flush from shutdowns.

In cases of stimulation of the well, the Permittee shall provide a list of all products to be used and their chemical composition for approval by the Director in advance of the operation. Additionally, the Permittee shall provide in advance a list of any additives to the injectate that are planned on being used and their chemical composition, including any inhibitors used to prevent scaling, corrosion, or bacterial growth. These lists should also indicate the brand name of the product(s) where appropriate and their manufacturer.

d. Injection Pressure Limitations
The maximum allowable wellhead injection pressure for each specific injection well authorized by this permit under Part II, Section B, Paragraph 2 shall be limited to 70 PSIG as measured at the wellhead. Injection pressure must be continuously monitored at the wellhead. Details of monitoring requirements may be found in Section H of this Part.

The Permittee may request, in writing, a higher injection pressure, provided they can demonstrate that higher pressures will not violate the items below. Any approval granted by the Director for increased injection pressure shall be made part of this permit by minor modification procedures (see 40 C.F.R. §144.41).

i. Preserve the integrity of geologic formations
Injection pressures must not initiate fractures in the confining zone; significantly alter the fluid movement capabilities of the confining zone; or cause the movement of injection or formation fluids into an USDW or into an essential monitoring zone. The permittee may submit information, such as results from injectivity tests, which demonstrate safe injection pressures, which do not initiate fractures in the injection zone. At a maximum, the permitted maximum injection pressure may not exceed 90% of the fracture pressure of the injection interval.

ii. Preserve the mechanical integrity of the well
The integrity of the well structure shall be protected; hence, total pressure shall not exceed the maximum allowable stress of the materials used to construct the well. The permittee may demonstrate through pressure testing of the inner casing or tubing at a pressure of 150% of the desired injection pressure.

e. Injection Rate Limitations
The estimated average rate of injection will be 6.5 MGD, with a maximum allowable injection rate of 8.87 MGD for each of the injection wells authorized under Part II, Section B, Paragraph 2.

The Permittee may request an increase in the maximum rate allowed. Any such request shall be made in writing to the Director. Should any increase in rate be requested, the Permittee shall demonstrate to the satisfaction of the Director that the increase in volume will not interfere with the operation of the facility or its ability to meet conditions described in the permit and would not change its classification, or cause migration of injectate or pressure buildup to occur beyond the AOR.

f. Injection Velocity Limitations
The maximum velocity of injected fluid shall not exceed the point where the mechanical limits of the well design or structure of the formation will be adversely affected. The maximum injection velocity in each well authorized by Part II, Section B, Paragraph 2 shall not exceed 12 feet per second (ft/sec), unless the Permittee can provide reasonable assurances that higher velocities will not compromise the integrity or operation of the well.

3. Annulus Operation
The annulus between the injection tubing and the innermost casing shall be filled with cement per the construction requirements in **Appendix B**.

4. Loss of Mechanical Integrity (MI) During Operation
   The Permittee shall cease injection if a loss of MI as defined at 40 C.F.R. §146.8 becomes evident during a test or operation. The Permittee shall notify the Director within 24 hours (see Part III Section E.12.d of this Permit). Operation shall not be resumed until the Permittee has complied with the provisions of Part II, Section G, of this permit regarding mechanical integrity demonstration and testing.

   Within five days, the Permittee shall submit a follow-up written report that documents circumstances that resulted in the MI loss and how it was addressed. If the MI loss has not been resolved, the Permittee shall provide a report with the proposed plan and schedule to reestablish MI. A demonstration of mechanical integrity shall be re-established within 90 days of any loss of mechanical integrity unless written approval of an alternate time period has been given by the Director.

5. Inability to Comply
   In the event the Permittee is temporarily unable to comply with any of the criteria outlined in this permit, due to breakdown of equipment, power outages, destruction by hazard of fire, wind, or by other cause, the Permittee shall notify the EPA. Notification shall be made to the permit writer within twenty-four (24) hours of breakdown or malfunction - in person, by telephone, or by e-mail.

   A report shall be required within seventy-two (72) hours of the notification referenced in Part II, Section F, Paragraph 4 above. A final written report shall be submitted within two (2) weeks. This report shall describe the nature and cause of the breakdown or malfunction; the steps (underway or planned) to correct the problem and prevent its reoccurrence; emergency procedures in use pending correction of the problem; and the time when the facility will again be operating in compliance with the criteria in this permit.

6. Emergency Discharge
   If the Permittee is unable to use the approved primary disposal method under emergency conditions, the Permittee may use an emergency discharge only if prior approval of the emergency method has been obtained. The Permittee shall address the emergency disposal methods in the plan and the operating manual.

7. Well Redevelopment
   In the event a well must be redeveloped, the Permittee shall address disposal of backwashed fluids. The disposal method shall be approved.

SECTION G. MECHANICAL INTEGRITY

1. Requirement to Maintain Mechanical Integrity
   The Permittee is required to ensure the injection well maintains mechanical integrity (MI) at all times. Injecting into a well that lacks mechanical integrity is prohibited. An injection well has mechanical integrity if it can demonstrate both:

   a. Internal (Part I) Mechanical Integrity
      There is no significant leak in the injection tubing

b. External (Part II) Mechanical Integrity
There is no significant fluid movement into a USDW through vertical channels adjacent to the injection well bore (external Part II).

2. Timing of Demonstration of Mechanical Integrity
The conditions under which the Permittee shall conduct the mechanical integrity testing are as follows:

a. Internal (Part I) Mechanical Integrity
   i. Prior to receiving authorization to inject

   ii. After any rework that compromises the internal mechanical integrity of the well

   iii. After a loss of mechanical integrity

   iv. Periodically at a rate of no less than once every five years

b. External (Part II) Mechanical Integrity
   i. Prior to receiving authorization to inject

   ii. Periodically at a rate of no less than once every five years

   iii. When well-specific conditions require.

3. Notification Prior to Testing
The Permittee shall notify the Director at least 30 calendar days prior to any mechanical integrity test. The Director may allow a shorter notification period if it would be sufficient to enable EPA or a designated representative to witness the mechanical integrity test or EPA declines to witness the test. Notification may be in the form of a yearly or quarterly schedule of planned mechanical integrity tests, or it may be on an individual basis.

The Permittee shall submit a work plan outlining the methods and timetable for performing the Mechanical Integrity Test.

4. Methods for demonstrating Mechanical Integrity
The methods for demonstrating MI are as specified below. The Director may stipulate specific test methods and criteria best suited for a specific well construction and injection operation. In conducting and evaluating the tests enumerated in this subsection, or others to be allowed by the Director, the Permittee shall apply methods and standards generally accepted in the industry.

a. Internal (Part I) Mechanical Integrity
The following test(s) shall be used to evaluate the absence of leaks:

   i. Pressure testing of inner casing or tubing.
   An Internal Pressure Test of final casing to at least 1.5 times the expected injection pressure for one (1) hour with a test tolerance of not greater than plus or minus five percent (5%), over a one-hour test period. The pressure test must be certified by the engineer of record.

b. External (Part II) Mechanical Integrity
The following methods shall be used to determine the absence of fluid movement:

i. Temperature

ii. Radioactive tracer surveys

iii. Monitoring of adjacent overlying aquifers

c. Additional Methods
The following methods shall also be used to determine the condition of the well:

i. Downhole video survey of the injection casing.

ii. Caliper Log

iii. The Director may require additional or alternative tests if the results presented by the operator are not satisfactory to the Director to demonstrate there is no movement of fluid into or between USDWs resulting from the injection activity.

5. Reporting Results of Mechanical Integrity Tests
When the Permittee reports the results of mechanical integrity tests, the Permittee shall include a description of the test(s) and the method(s) used. Monitoring and other test data submitted since the previous evaluation shall be assessed and reviewed. Results of MI tests required by this permit shall be submitted to the Director as soon as possible but no later than ninety (90) days after the test is complete. Results are to be submitted to the Director in accordance with Section H of this part.

SECTION H. MONITORING AND RECORDKEEPING REQUIREMENTS

In addition to those requirements presented in Part III, Section E, Paragraph 10 and Appendix F, the Permittee is required to meet the following requirements. The Permittee may request modifications to the sampling plans, methods, and procedures listed in this Part and in Appendix F as needed to adjust for newer technologies, methods and procedures as warranted.

1. Monitoring Records
Monitoring records must include:

i. the date, time, location and the results of the observation, sampling, measurement, or analysis;

ii. the name of the individual(s) who performed the observation, sampling, measurement, or analysis;

iii. the analytical techniques or methods used for analysis; and

iv. the results of such analysis.

2. Recordkeeping
   The Permittee shall retain the following records and shall have them available at all times for examination by an EPA inspector in accordance with the following:

   i. All monitoring information, including required observations, calibration and maintenance records, recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the permit application; and

   ii. Information on the nature and composition of all injected fluids; and

   iii. Results of the injectate "Hazardous Waste Determination" according to 40 C.F.R. §262.11. Analytical results shall demonstrate that the injectate does not meet the definition of hazardous waste as defined in 40 C.F.R. §261; and

   iv. Results of regular monitoring showing that the secondary treated domestic wastewater component of the injectate meets all applicable standards for secondary treatment; and

   v. Records and results of MITs, any other tests required by EPA, and any well workovers completed.

   vi. The Permittee shall maintain paper or electronic copies (or originals) of all records described in items i through iv, above, during the operating life of the well and shall make such records available at all times for inspection at the facility.

   vii. The Permittee shall only discard the records described in items i through iv if the Regional Administrator grants written approval to discard the records.

3. Monitoring Methods
   Monitoring observations, measurements, samples, etc. taken for the purpose of complying with these requirements shall be representative of the activity or condition being monitored. Appropriate methods include:

   i. Analytical Methods

   ii. The analytic methods used to monitor the nature of the injected fluids must comply with analytical methods cited and described in Appendix F, Table 1 of 40 CFR §136.3 or Appendix III of 40 C.F.R. §261, or by other methods that have been approved in writing by the Director.

   iii. The Permittee shall identify the types of tests and methods used to generate all monitoring data. Reports to be generated from monitoring data are specified in Part I, Section I

a. Operational Monitoring Methods

Injection pressure, Injection Fluid Temperature, injection rate, and cumulative injected volume shall be observed and recorded at the wellhead, and all parameters shall be observed simultaneously to provide a clear depiction of well operation.

Daily observations shall be made over equal time intervals beginning on the date on which the well commences operation. Recordings shall be of representative values.

i. Pressures are to be measured in pounds per square inch (psi) or pounds per square inch gauge (PSIG), as appropriate.

ii. Fluid volumes are to be measured in standard gallons (G) or in millions of gallons (MG), as appropriate.

iii. Injection rates are to be measured in gallons per minute (GPM) or millions of gallons per day (MGD).

b. Continuous Monitoring Devices.

Temperature, and injection pressure shall be measured at the wellhead using equipment of sufficient precision and accuracy. All measurements must be recorded at minimum to a resolution of one tenth of the unit of measure (e.g. injection rate and volume must be recorded to a resolution of a 0.1 MGD or the nearest 100,000 gallons (0.1 million gallons) respectively; pressure must be recorded to a resolution of a tenth of a psig; injection fluid temperature must be recorded to a resolution of a tenth of a degree Fahrenheit). Exact dates and times of measurements, when taken, must be recorded and submitted. Measurements are to be reported to EPA as described in Section I. Injection rate may be measured in the supply line immediately before the wellhead.

c. Calibration and Maintenance of Equipment

All monitoring and recording equipment shall be calibrated yearly (or more frequently if required) and maintained on a regular basis to ensure proper working order of all equipment.

4. Injection Operation Monitoring
The Permittee shall monitor the operation parameters of the injection well as follows:

Parameter	**Minimum Monitoring Frequency**
Injection Rate (psig) for each well	Continuously – Chart or Digital Recorder
	Daily
Wellhead Injection Pressure (psig) for each well	Continuously – Chart or Digital Recorder
	Daily
Cumulative Injection Volume for each well (gallons or Millions of Gallons)	Daily – Digital Totalizer
Injection Fluid Temperature and Air Temperature (Degrees Fahrenheit)	Continuously – Chart or Digital Recorder
	Daily

5. Injection Fluid Analysis
The Permittee shall conduct an injection fluid analysis at least once every three (3) months and whenever changes are made to the sources. Analyses shall be made beginning three (3) months from the start of injection, or three (3) months from the most recent analysis, whichever is later. For wells that resume injection after having been shut in, the Permittee will have thirty (30) days from the date injection resumes for the submission of the injection fluid analysis. An analysis must include:

   i. All analytes and properties listed in Appendix F

   ii. pH, total dissolved solids, and specific gravity; and

   iii. A list of all chemicals and their composition used for any well stimulation during that reporting period; and a list of any additives used and their chemical composition, including any inhibitors used to prevent scaling, corrosion, or bacterial growth. These lists should indicate the brand name of the product and the manufacturer.

6. Specific Injectivity Tests
For each disposal well, a specific injectivity test shall be performed quarterly while the flow rate to the well(s) has been set at a predetermined level and reported as the specific injectivity index (gpm/specific pressure (psig)). The Permittee shall propose which injection rate will be used based on the expected flow, the design of the pump station, including the volume of the wet well and pump type(s), and the type of pump controls used.

7. Fall off Pressure Tests (FOT) And Static Reservoir Pressure Measurements
   As part of the quarterly specific injectivity test, the well shall be shut-in for a period of time necessary to conduct a valid observation of pressure fall-off until it reaches a static equilibrium which represents the static reservoir pressure. During the FOT, wellhead pressure will be recorded at a minimum interval of one (1) minute for a minimum duration of at least ten (10) minutes. This information will be reported with the quarterly monitoring report. Additionally, the static reservoir pressure of the injection zone and its cumulative behavior over time will be plotted on a graphic plot shall be determined and reported with the annual monitoring report.

SECTION I. REPORTING REQUIREMENTS

1. Submission of Reports
   Reports may be submitted by electronic mail with prior approval. Unless otherwise specified, copies of all reports required by this permit in shall be submitted to the Director at the following address:

   ATTN: Ground Water and UIC Section
   Grants and Drinking Water Protection Branch (GDWPB)
   U.S. Environmental Protection Agency, Region 4
   Atlanta Federal Center – Mail Code: 9T25
   61 Forsyth Street, SW
   Atlanta, Georgia 30303-8960

   a. Additional Submittals
      Copies of all Reports shall also be provided to the following:

      ATTN: Water Use Bureau
      Compliance and Technical Services Unit
      South Florida Water Management District
      P.O. Box 24680
      West Palm Beach, Florida 33416-4680

2. Reports on Well Tests and Workovers
   Within ninety (90) days after the completion of the activity, the Permittee shall report to the Director the results of the following:

   a. Mechanical integrity tests, other than those specified in Part II, Section D; and

   b. Any well workover, logging or other test data, other than those specified in Part II, Section D, revealing downhole conditions.

3. Quarterly Reporting
   Quarterly, the Permittee shall submit accurate reports to EPA containing, at a minimum, the following information:

   a. Continuously and weekly monitored values for the parameters specified for the injection well in Part II, Section H, Paragraph 3.a as follows, unless more detailed records are requested by EPA:

i. Monthly cumulative volumes;

ii. Monthly average, minimum, and maximum values for the continuously monitored flow rate, injection pressure, and injected fluid temperature parameters;

b. Quarterly analyses, to be included in the next quarterly report following completion:

i. Injection fluid characteristics for parameters specified in Section H of this part;

ii. When appropriate, Injectate Hazardous Waste Determination according to paragraph Section H of this part.

c. To be included with the next quarterly report immediately following completion, results of any additional MITs or other tests required by EPA, and any well workovers completed.

d. To be included in the quarterly report due in January each year, the following annual analyses:

i. <u>Annual Reporting of Monitoring Results</u>
The Permittee shall submit an Annual Monitoring Report, EPA Form 7520-11, whether injecting fluids or not, to the Director summarizing the results of the monitoring as specified in Part II, Section H of this permit. The first Annual Monitoring Report shall cover the period from the effective date of the Permit through December 31 of that year. Subsequently, the Annual Monitoring Report shall cover the period from January 1 through December 31.

All Annual Monitoring Reports shall be submitted by the January 31 of the following year, unless an extension is requested and granted. All reports submitted to the Director shall indicate the status of the injection well, i.e., active, shut-in, or plugged.

ii. FOT results as required in Section H, paragraph 7 of this part;

iii. <u>Annual Zone of Endangering Influence (ZEI) and AOR Review</u>
Annually, the ZEI calculation shall be reviewed by the Permittee, based on the cumulative data obtained from the disposal of injectate through all wells covered by this permit. The calculation of the ZEI shall incorporate the following elements in a manner similar to the AOR method presented in **Appendix E**:

(A) The total volume pumped;

(B) An assumed porosity of twenty percent (20%) unless other-wise justified by geologic data;

(C) An assumed injection zone thickness of 200 feet unless other-wise justified from geologic data; and

(D) Project future flows for a minimum of at least 10 years.

Copies of the updated ZEI calculations, along with all associated assumptions or justifications, shall be provided to EPA with the annual report due in January, as required in Section H, of this part. The AOR will be revised as necessary to be the greater of the ZEI or a 1-mile radius.

In addition, at least once every year, but more frequently if requested by the Director, the Permittee shall record and report in accordance with Section H of this permit, an update of the location and status of any well with the AOR which penetrates the confining zone. This should include the plugging method of any such well abandoned during the reviewed year.

iv. Implementation of Corrective Actions
If any well within the AOR, which penetrates the confining zone, is found to require corrective action, the locations of such wells along with any pertinent information shall be provided to EPA as soon as possible. If requested by EPA, the Permittee shall submit a plan to re-enter, plug and abandon these wells in such a manner to prevent the migration of fluids into a USDW. The Permittee may not commence corrective action activities without prior written approval from EPA.

4. Reporting of New Wells Drilled Within the Area of Review (AoR)
Within ten (10) days after spud date, the Permittee shall report to the Director by certified mail, return receipt requested, the construction plans for any new well that will penetrate the confining zone or injection zone that is listed in the public records or otherwise known to the Permittee to be within the AoR.

The Director may terminate the permit under 40 C.F.R. §144.40(a)(3), if the construction of the new well will not protect USDWs from contamination or continued injection may endanger human health or the environment.

5. Reporting of Previously Unknown Wells or a Fault or Joint/Fracture System Within the AoR
If the Permittee discovers the existence of any of the below within the AoR that were not disclosed in the original permit application, the Permittee shall within ten (10) days from the date of discovery report such information to the Director and confirm the receipt of such information. These items include:

a. Wells that penetrate (or may potentially penetrate) the confining zone;

b. Faults or joint/fracture systems; or

c. Other features that may allow for a failure of the confining zone to protect USDWs.

Pursuant to 40 C.F.R. §144.40(a), the Director may terminate a permit during its term, or deny a permit renewal application for the following causes: (1) Noncompliance by the Permittee with any condition of the permit; (2) The Permittee's failure in the application or during the permit issuance process to disclose fully all relevant facts, or the Permittee's misrepresentation of any relevant facts at any time; or (3) A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination.

SECTION J. NATURALLY OCCURING RADIOACTIVE MATERIAL

During the operating life of the permitted well, this injection facility may be screened for technologically enhanced naturally occurring radioactive material (NORM) by the EPA or another party. If the Permittee is notified by a party other than the EPA, or becomes aware at any time that elevated levels of NORM have been detected at this injection facility, the Permittee must notify the EPA in writing of that fact no later than 45 days prior to the Permittee's intent to P&A the well. The EPA may require the Permittee to revise the P&A plan to ensure the safe disposal and proper management of elevated levels of NORM waste.

SECTION K. PLUGGING AND ABANDONMENT (P&A) PLAN

The Permittee is required to submit and revise a plan for plugging and abandonment for approval for each well covered by this permit:

a. When requested;

b. At a minimum of at least every five years;

c. With every renewal application; or

d. In order to reflect changes in:

   i. The design or scope of the underground injection operation

   ii. A rise of more than ten percent (10%) in the costs associated with the plan (inflationary, material and/or labor), or

   iii. Other factors resulting from the construction or operation of the injection well system.

Where applicable, the plugging and abandonment plan shall address the proposed post-closure monitoring.

SECTION L. PLUGGING AND ABANDONMENT OF WELLS COVERED BY THIS PERMIT

Plugging and abandonment (P&A) of the permitted injection well shall be in accordance with this section, Part III, Section F, of this permit and 40 C.F.R. §146.10, as well as any plugging and abandonment procedures laid out in Appendix G.

a. A well will be plugged prior to abandonment.

b. A well may be ordered plugged when: it has been abandoned without being plugged, or when it is determined to be a threat to USDWs or surface waters

c. The Permittee shall notify the Director at least hundred eighty (180) days before conversion or abandonment of a Class I well, unless the Director determines that abandonment within a lesser period of time is necessary to protect the surface water or USDWs.

d. In the event a radioactive source tool has been irretrievably lost down an injection well, the Director shall be immediately notified. The well shall not be plugged until all applicable Nuclear Regulatory Commission regulations have been satisfied.

e. Placement of the plugging material shall be accomplished by one of the following methods:

    i. The Balance Method.

    ii. The Dump Bailer Method.

    iii. The Two-Plug method. Or:

    iv. Any other recognized method as effective or more effective than the above which is approved by the Director.

f. The well to be abandoned shall, prior to the placement of the cement plug(s), be in a state of static equilibrium, with the mud weight equalized from top to bottom, either by circulating the mud in the well at least once or by a comparable approved method.

g. For all Class I wells, the final or innermost string of casing shall be filled with neat cement grout, or an approved equivalent, from the bottom of the casing to the surface. The use of other fillers may be allowed in the open hole, provided that the objectives of confining injected fluids to the injection horizon and prevention of migration of injected and/or native fluids between aquifers are satisfied.

h. Upon completion of plugging and abandonment of a well or well field, the Permittee or operator of a well must provide adequate documentation that a well was properly abandoned. The Permittee shall submit a Final Report which includes, but is not limited to, the following:

    Certification of completion in accordance with approved plans and specifications by the engineer of record. Evidence, such as a sealed copy or certification from the county clerk, that a surveyor's plot of the location of the abandoned wells has been recorded in the County public records.

SECTION M. POST-CLOSURE MONITORING

The post closure monitoring plan is located in Appendix H. A revision of the post-closure monitoring plan may be required, when appropriate, in order to reflect changes in the design or scope of the underground injection operation, inflation of costs associated with the plan, or other factors resulting from the construction or operation of the injection well system. The Permittee also may initiate modification of the post-closure monitoring plan, however all modifications are subject to approval of the Director.

The post-closure monitoring plan must be designed to monitor the attenuation of any pressure effects and water quality changes caused by the underground injection operation, both in the injection zone and/or in overlying aquifers. At a minimum, the proposed monitoring plan shall, utilize the injection wells and associated monitor wells, to the extent that they are capable of yielding representative ground water samples. The proposed monitoring plan may also include other accessible wells.

Items to be addressed by the in the proposed post-closure monitoring plan shall include, but not be limited to:

a. Designation of the wells to be used for post-closure monitoring.

b. The parameters to be monitored, by well.

c. The sampling frequency.

d. The proposed duration of the post-closure monitoring period. And:

e. A documented estimate of the total cost of the post-closure monitoring program.

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PART III. CONDITIONS APPLICABLE TO ALL UIC PERMITS

SECTION A. EFFECT OF PERMIT

The Permittee is allowed to engage in underground injection in accordance with the conditions of this permit. The Permittee, authorized by this permit, shall not construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into an Underground Source of Drinking Water (USDW), if the presence of that contaminant may cause a violation of any primary drinking water regulation under Title 40 of the Code of Federal Regulations (40 C.F.R.) Part 142 or may otherwise adversely affect the health of persons. Any underground injection activity not specifically authorized in this permit is prohibited. Compliance with this permit does not constitute a defense to any action brought under the Safe Drinking Water Act (SDWA), or any other common or statutory law or regulation. Issuance of this permit does not convey property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, or invasion of other private rights, or any infringement of State or local law or regulations. Nothing in this permit shall be construed to relieve the Permittee of any duties under applicable regulations.

SECTION B. PERMIT ACTIONS

1. Modification, Revocation, Reissuance and Termination

   The Director may, for cause or upon request from the Permittee, modify, revoke and reissue, or terminate this permit in accordance with 40 C.F.R. §§144.12, 144.39 and 144.40, for any one of the following reasons:

   a. Alterations.

      There are material and substantial alterations or additions to the permitted facility or activity which occurred after permit issuance which justify the inclusion of permit conditions that are different from or absent in the existing permit.

   b. Information.

      The Director has received information which was not available at the time of permit issuance (other than revised regulations, guidance or test methods) and which would have justified the application of different permit conditions at the time of issuance. For UIC area permits, this cause shall include any information indicating that cumulative effects on the environment are unacceptable.

   c. New regulations.

      The standards or regulations on which the permit was based have been changed by promulgation of newer or amended standards or regulations or by judicial decision after the permit was issued.

   d. Compliance schedules.

      The Director determines that good cause exists for modification of a compliance schedule, such as an act of God, strike, flood, or material shortage or other events over which the Permittee has little or no control and for which there is no reasonably available remedy.

   e. Proposed transfer.

      The Director receives notification of a proposed transfer of the permit.

f. Noncompliance.
Noncompliance by the Permittee with any condition of the permit.

g. Relevant facts.
The Permittee's failure in the application or during the permit issuance process to disclose fully all relevant facts, or the Permittee's misrepresentation of any relevant facts at any time.

h. Endangerment.
A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination.

Also, the permit is subject to minor modifications for cause as specified in 40 C.F.R. §144.41. The filing of a request for a permit modification, revocation and reissuance, or termination, or the notification of planned changes, or anticipated noncompliance on the part of the Permittee does not stay the applicability or enforceability of any permit condition.

The submittal of an updated application may be required prior to the Director's granting a request for permit modification.

2. Transfer of Permits
This permit is not transferable to any person except after notice to and approval by the Director, and in compliance with the requirements and conditions of 40 C.F.R. §144.38.

The Director may require modification or revocation and reissuance of the permit to change the name of the Permittee and incorporate such other requirements as may be necessary under the SDWA.

This permit may be transferred to a new owner or operator by modification according to 40 C.F.R. §144.41(d), where the Director determines that no other change in the permit is necessary, provided that written agreement containing a specific date for transfer of permit responsibility, coverage, and liability between the current and new Permittee has been submitted to the Director.

SECTION C. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstances is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

SECTION D. CONFIDENTIALITY

In accordance with 40 C.F.R. Part 2, any information submitted to the EPA pursuant to this permit may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission by stamping the words confidential business information on each page containing such information. If no claim is made at the time of submission, the EPA may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with the procedures in 40 C.F.R. Part 2 (Public Information). Claims of confidentiality for the following information will be denied:

1. The name and address of any permit applicant or Permittee;

2. Information which deals with the existence, absence or level of contaminants in drinking water.

SECTION E. DUTIES AND REQUIREMENTS

1. Duty to Comply
   The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the SDWA and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application; except that the Permittee need not comply with the provisions of this permit to the extent and for the duration such noncompliance is authorized in an emergency permit under 40 C.F.R. §144.34.

2. Penalties for Violations of Permit Conditions
   Any person who violates a permit requirement is subject to civil penalties and other enforcement actions under the SDWA which may include criminal prosecution.

3. Continuation of Expiring Permits.
   a. Duty to Reapply.
      If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must apply for and obtain a new permit.

   b. Permit Extensions.
      The conditions of an expired permit may continue in force in accordance with 5 U.S.C. §558(c) until the effective date of the new permit, if:

      i. The Permittee has submitted a timely application which is a complete application for a new permit; and

      ii. The Director, through no fault of the Permittee, does not issue a new permit with an effective date on or before the expiration date of the previous permit, and

      iii. The new permit has not been denied, or if a denial has been appealed, final agency action has not occurred in accordance with 40 C.F.R. §124.19(f)(1).

   c. Effect.
      Permits continued under 5 U.S.C. §558(c) remain fully effective and enforceable.

   d. Enforcement.
      When the Permittee is not in compliance with the conditions of the expiring or expired permit, the Director may choose to do any or all of the following:

      i. Initiate enforcement action based upon the permit which has been continued;

      ii. Issue a notice of intent to deny the new permit. If the permit is denied, the owner or operator would then be required to cease the activities authorized by the continued permit or be subject to enforcement action for operating without a permit;

      iii. Issue a new permit under 40 C.F.R. Part 124 with appropriate conditions; or

iv. Take other actions authorized by Underground Injection Control regulations.

e. Tribal Continuation
An EPA issued permit does not continue in force beyond its expiration date under Federal law if at that time a Tribe has primary enforcement authority. A Tribe authorized to administer the UIC program may continue either the EPA or Tribe issued permits until the effective date of the new permits, if Tribe law allows. Otherwise, the facility or activity is operating without a permit from the time of expiration of the old permit to the effective date of the Tribe issued new permit.

4. Need to Halt or Reduce Activity not a Defense
It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

5. Duty to Mitigate
The Permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.

6. Proper Operation and Maintenance
The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this permit.

7. Duty to Provide Information
The Permittee shall furnish to the Director, within a time specified, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

8. Inspection and Entry
The Permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law to:

a. Enter upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by SDWA, any substances or parameters at any location.

9. Property Rights
This permit does not convey any property rights of any sort, or any exclusive privilege.

10. Monitoring and Records
a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

b. The Permittee shall retain records of all monitoring information, including the following:

i. Calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report, or application. This period may be extended by request of the Director at any time; and

ii. The nature and composition of all injected fluids until three (3) years after the completion of any plugging and abandonment procedures specified under 40 C.F.R. §144.52(a)(6), or under Part 146, Subpart G, as appropriate. The Director may require the owner or operator to deliver the records to the Director at the conclusion of the retention period. The owner or operator shall continue to retain the records after the three (3) year retention period unless he delivers the records to the Director or obtains written approval from the Director to discard the records.

c. Records of monitoring information shall include:

i. The date, exact place, and time of sampling or measurements;

ii. The individual(s) who performed the sampling or measurements;

iii. The date(s) analyses were performed;

iv. The individual(s) who performed the analyses;

v. The analytical techniques or methods used; and

vi. The results of such analyses.

11. Signatory Requirements
a. All reports or other information submitted to the Director shall be signed and certified in accordance with 40 C.F.R. §144.32, as follows:

i. For a corporation: by a responsible corporate officer. For the purpose of this permit, a responsible corporate officer means: (1) a president, secretary, treasurer or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy - or decision making functions for the corporation, or (2) the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding 25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporation procedures.

ii. For a partnership or sole proprietorship: by a general partner of the proprietor, respectively; or

iii. For a municipality, State, federal, or other public agency: by either a principal executive officer or ranking elected official; or a duly authorized representative.

b. A person is a duly authorized representative only if:

i. The authorization is made in writing by a person described above;

ii. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

iii. The written authorization is submitted to the Director.

c. If an authorization under paragraph (b) above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph (b) of this section must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

d. Any person signing a document under paragraphs 11(a) or 11(b) of this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

12. Reporting Requirements
    a. Planned Changes.
       The Permittee shall give written notice to the Director, as soon as possible, of any planned physical alterations or additions to the permitted facility.

    b. Anticipated Noncompliance.
       The Permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

    c. Compliance Schedules.
       Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than thirty (30) days following each schedule date.

    d. Twenty-four Hour Reporting.
       The Permittee shall report any noncompliance which may endanger health or the environment, including:

       Any monitoring or other information which indicates that any contaminant may cause an endangerment to a USDW; or

       Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between USDWs.

       Any information shall be provided orally within twenty-four (24) hours from the time the Permittee becomes aware of the circumstances. A written submission shall also be provided within five (5) days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

    e. Other Noncompliance.
       The Permittee shall report all instances of noncompliance not reported at the time monitoring reports are submitted. The reports shall contain the information listed in Part III, Section E, Item 12(d)(2) above.

    f. Other Information.
       When the Permittee becomes aware that he failed to submit any relevant facts in the permit application or submitted incorrect information in a permit application or in any report to the Director, the Permittee shall promptly submit such facts or information.

SECTION F. PLUGGING AND ABANDONMENT

1. Notice of Plugging and Abandonment
   The Permittee shall notify the Director no later than forty-five (45) days before conversion or abandonment of the well. The Director may allow a shorter notice period upon written request.

2. Plugging and Abandonment
   The Permittee shall plug and abandon the well consistent with 40 C.F.R. §146.10, as provided for in the plugging and abandonment plan incorporated as part of this permit. Plugging and abandonment shall be completed to ensure that fluids are not allowed to move either into a USDW or from one USDW to another.

   Revisions to the Plugging and Abandonment Plan must be submitted to the Director no less than forty-five (45) days prior to the plugging and abandonment. The Director must approve the revision prior to the start of plugging operations.

   Within sixty (60) days after plugging the well, or at the time of the next quarterly report (whichever is less), the owner or operator shall submit a report to the Director. If the quarterly report is due less than fifteen (15) days before completion of plugging, then the report shall be submitted within sixty (60) days. The report shall be certified as accurate by the person who performed the plugging operation. Such report shall consist of either:

   a. A statement that the well was plugged in accordance with the plan previously submitted to the Director; or

   b. If the actual plugging differed from the approved plan, a statement defining the actual plugging and why the Director should approve such deviation. Any deviation from a previously approved plan may be cause for the Director to require the owner or operator to replug the well or pursue enforcement action.

3. Inactive Wells
   If at any time there is no injection into a well for a period of at least two (2) consecutive years, the Permittee shall plug and abandon the well in accordance with the plan unless he:

   a. Provides notice to the Director including a demonstration that the well will be used in the future; and

   b. Describe actions or procedures, which are deemed satisfactory by the Director, which the Permittee will take to ensure that the well will not endanger USDWs during the period of inactivity. These actions and procedures may include, but are not limited to, a demonstration of mechanical integrity and shall include compliance with the technical and reporting requirements applicable to active injection wells unless waived, in writing, by the Director.

SECTION G. MECHANICAL INTEGRITY

1. Standards
   The owner or operator of a Class I, II, III or V well permitted under this part shall establish, prior to commencing injection or on a schedule determined by the Director, and thereafter maintain mechanical integrity as defined in 40 C.F.R. §146.8. The Director may require by written notice that the owner or operator comply with a schedule describing when mechanical integrity demonstrations shall be made.

2. Prohibition Without Demonstration
   The Permittee shall not commence or continue injection activity after the effective date of this permit unless the Permittee has demonstrated that the well covered by this permit has mechanical integrity in accordance with 40 C.F.R. §146.8 and the Permittee has received written notice from the Director that such demonstration is satisfactory.

3. Subsequent Mechanical Integrity Demonstrations
   A demonstration of mechanical integrity in accordance with 40 C.F.R. §146.8 shall be made no later than five (5) years from the date of the last approved demonstration. Mechanical integrity shall also be demonstrated at any time the tubing is removed from the well, the packer is reset, or a loss of mechanical integrity becomes evident during operation. Furthermore, the Director may by written notice require the Permittee to demonstrate mechanical integrity at any time. The Permittee shall notify the Director of his intent to demonstrate mechanical integrity at least thirty (30) days prior to such demonstration. The Director may allow a shorter time period if it would be sufficient to enable the EPA to adequately respond. The Permittee shall report the results of a mechanical integrity demonstration within ninety (90) days after completion and in accordance with Part III, Section E, Item 11.

4. Loss of Mechanical Integrity
   When the Director determines that a Class I, II, III or V well lacks mechanical integrity pursuant to 40 C.F.R. §146.8, he shall give written notice of his determination to the owner or operator. Unless the Director requires immediate cessation, the owner or operator shall cease injection into the well within forty-eight (48) hours of receipt of the Director's determination. The Director may allow plugging of the well pursuant to the requirements of 40 C.F.R. §146.10 or require the Permittee to perform such additional construction, operation, monitoring, reporting and corrective action as is necessary to prevent the movement of fluid into or between USDWs, caused by the lack of mechanical integrity. The owner or operator may resume injection upon written notification from the Director that the owner or operator has demonstrated mechanical integrity pursuant to 40 C.F.R. §146.8. The Director may allow the owner or operator of a well which lacks mechanical integrity pursuant to 40 C.F.R. §146.8(a)(1) to continue or resume injection, if the owner or operator has made a satisfactory demonstration that there is no movement of fluid into or between USDWs.

5. Test Methods to be Used for Mechanical Integrity Test (MIT).
   A plan for logging and testing the well for mechanical integrity shall be prepared and submitted for the Director's approval at least sixty (60) days prior to each proposed MIT demonstration date. The Director may allow a shorter time period if it would be sufficient to enable the EPA to adequately respond.

   The plan shall propose logs and tests specified in 40 C.F.R. §146.8 (as amended from time to time by the EPA to include additional approved logs and tests, as published in the Federal Register). The plan shall also propose standards that will be used for evaluating the results of logging and testing. Mechanical integrity will be confirmed if the well logs and test data meet or exceed the standards approved as a result of the Director's review of the plan.

SECTION H. FINANCIAL RESPONSIBILITY

1. Financial Responsibility
   The Permittee, including the transferor of a permit, is required to demonstrate and maintain financial responsibility and resources to close, plug, and abandon the underground injection operation in a manner prescribed by the Director until:

   a. The well has been plugged and abandoned in accordance with an approved plugging and abandonment plan pursuant to 40 C.F.R. §§144.51(o) and 146.10, a plugging and abandonment report has been submitted pursuant to 40 C.F.R. §144.51(p); or

   b. The well has been converted in compliance with the requirements of 40 C.F.R. §144.51(n); or

   c. The transferor of a permit has received notice from the Director that the owner or operator receiving transfer of the permit, the new Permittee, has demonstrated financial responsibility for the well.

   The Permittee shall show evidence of such financial responsibility to the Director by the submission of a surety bond, or other adequate assurance, such as a financial statement or other materials acceptable to the Director. The Director may, on a periodic basis, require the holder of a lifetime permit to submit a revised estimate of the resources needed to plug and abandon the well revised to reflect inflation of such costs, and a revised demonstration of financial responsibility, if necessary. The owner or operator of a well injecting hazardous waste must comply with the financial responsibility requirements of subpart F of this part.

2. Insolvency
   In the event of insolvency:

   a. The bankruptcy of the trustee or issuing institution of the financial mechanism, or

   b. Suspension or revocation of the authority of the trustee institution to act as trustee, or

   c. The issuing institution's losing its authority to issue such an instrument, the Permittee must notify the Director, within ten (10) business days of the Permittee's receiving notice of such event. The owner or operator must establish other financial assurance or liability coverage acceptable to the Director, within sixty (60) days after such an event.

   An owner or operator must also notify the Director by certified mail of the commencement of voluntary or involuntary proceedings under Title 11 (Bankruptcy), U.S. Code naming the owner or operator as debtor, within ten (10) business days after commencement of the proceeding. A guarantor of a corporate guarantee must make such a notification if he is named as debtor, as required under the terms of the guarantee.

   An owner or operator who obtains a letter of credit, surety bond or insurance policy will be deemed to be without the required financial assurance or liability coverage in the event of bankruptcy, insolvency, or a suspension or revocation of the license or charter of the issuing institution. The owner or operator must establish other financial assurance or liability coverage within sixty (60) days after such an event.

SECTION I. DEFINITIONS

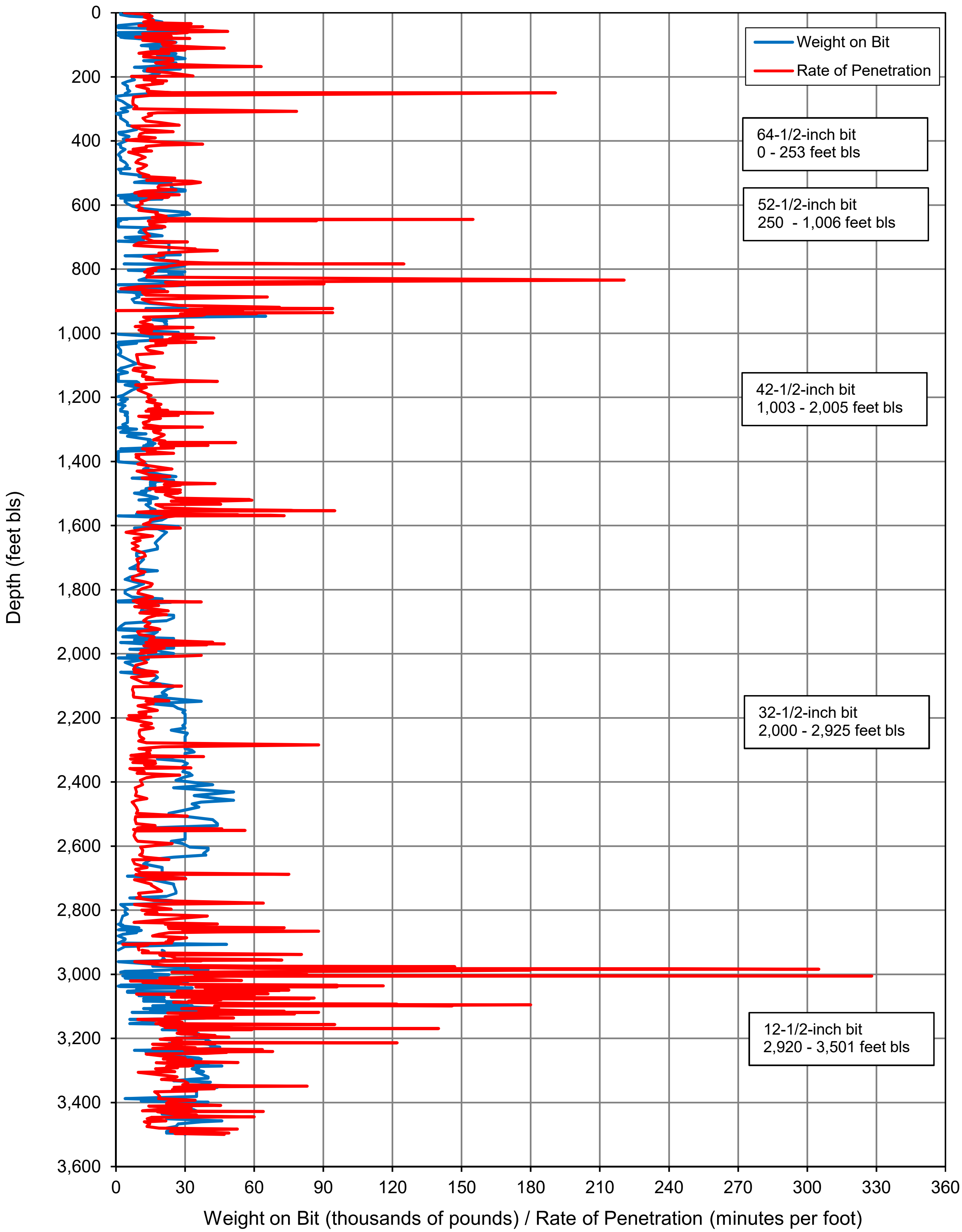
All terms used in this permit, which are not specifically defined in this permit, are defined at 40 C.F.R. parts 144, 145, 146 and 147.

APPENDIX B

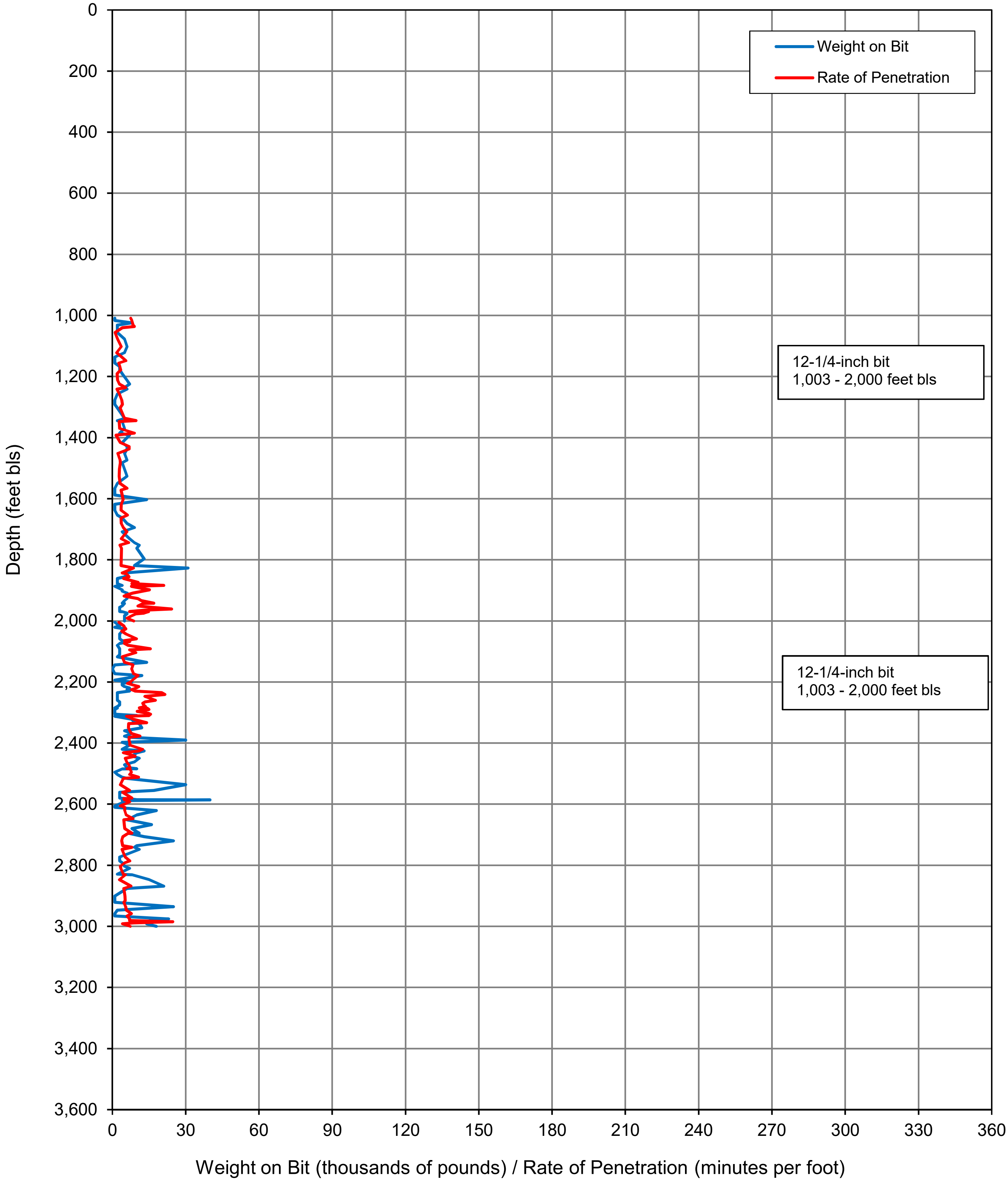
WEIGHT ON BIT AND RATE OF PENETRATION

Hazen

Weight on Bit / Rate of Penetration
IW-1 Various Boreholes 0 to 3,500 Feet BLS
Seminole Tribe of Florida - Hollywood Reservation



Weight on Bit / Rate of Penetration
IW-1 Pilot Holes 1,000 - 2,000 and 2,000 - 3,000 Feet BLS
Seminole Tribe of Florida - Hollywood Reservation



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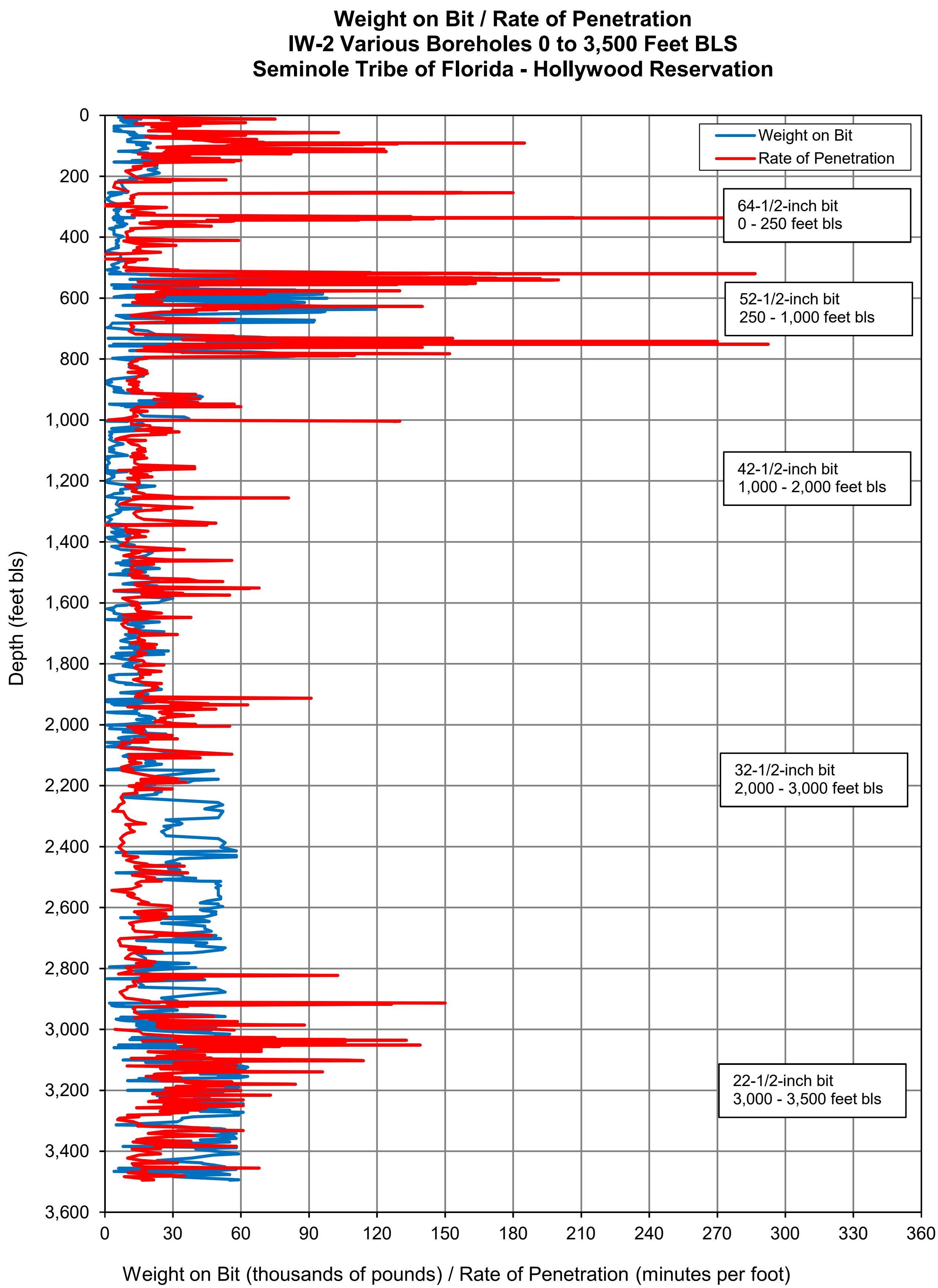
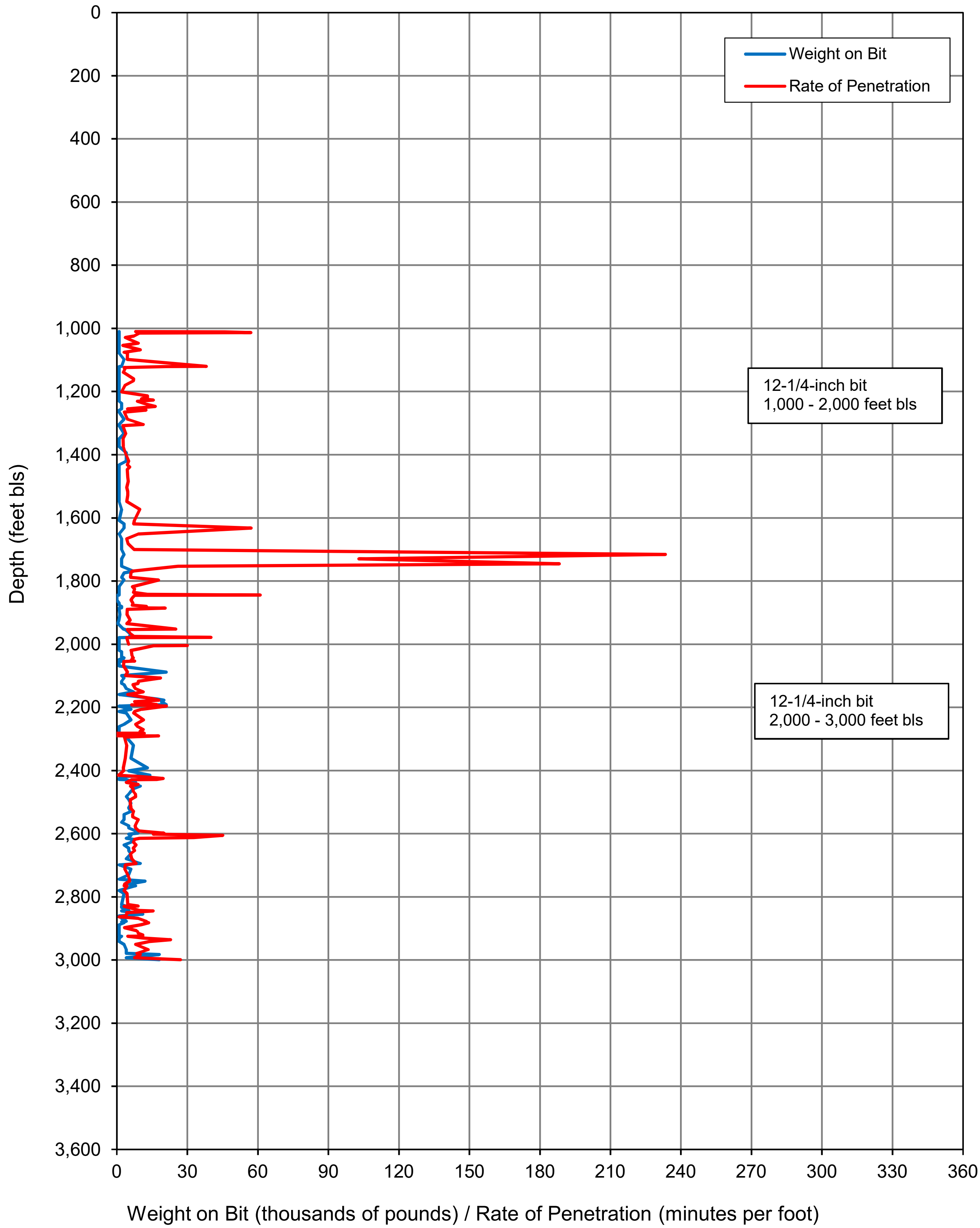


Weight on Bit / Rate of Penetration
IW-2 Various Boreholes 0 to 3,500 Feet BLS
Seminole Tribe of Florida - Hollywood Reservation
Weight on Bit
Rate of Penetration
64-1/2-inch bit
0 - 250 feet bls
52-1/2-inch bit
250 - 1,000 feet bls
42-1/2-inch bit
1,000 - 2,000 feet bls
32-1/2-inch bit
2,000 - 3,000 feet bls
22-1/2-inch bit
3,000 - 3,500 feet bls
Depth (feet bls)
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
2,400
2,600
2,800
3,000
3,200
3,400
3,600
0
30
60
90
120
150
180
210
240
270
300
330
360
Weight on Bit (thousands of pounds) / Rate of Penetration (minutes per foot)

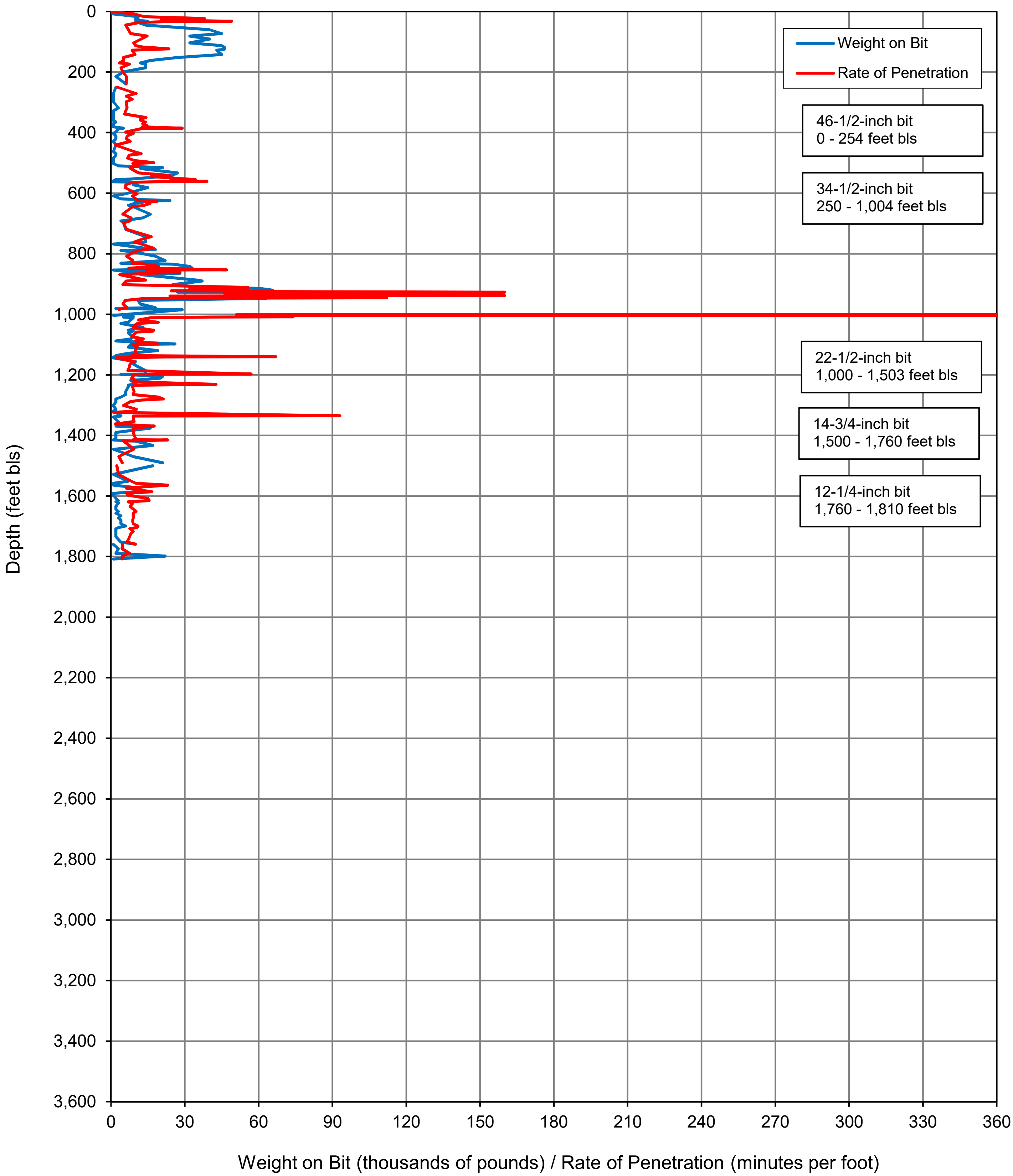
Hazen

Weight on Bit / Rate of Penetration
IW-2 Pilot Holes 1,000 - 2,000 and 2,000 - 3,000 Feet BLS
Seminole Tribe of Florida - Hollywood Reservation

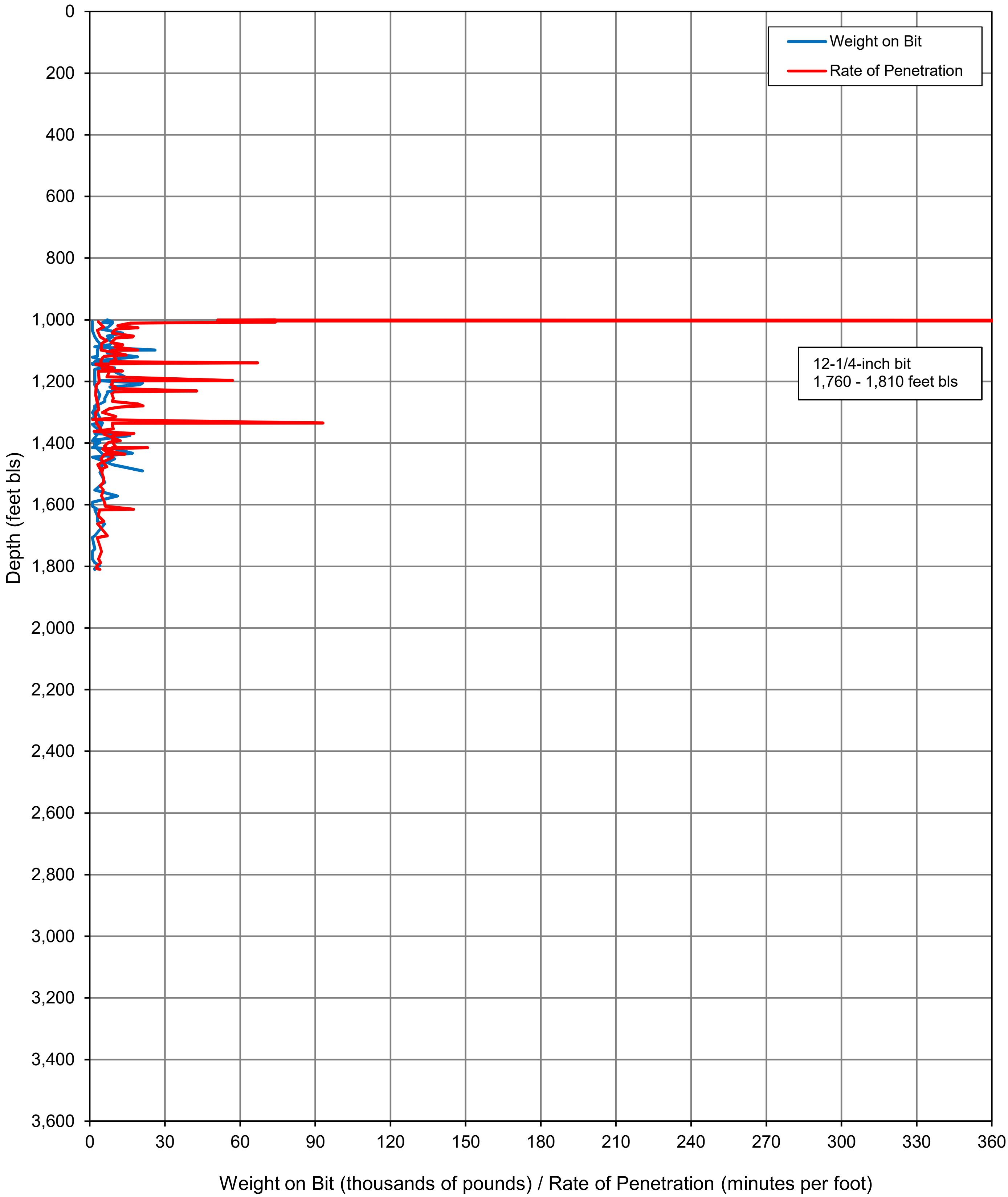


Hazen

Weight on Bit / Rate of Penetration
MW-1 Various Boreholes 0 to 1,810 Feet BLS
Seminole Tribe of Florida - Hollywood Reservation



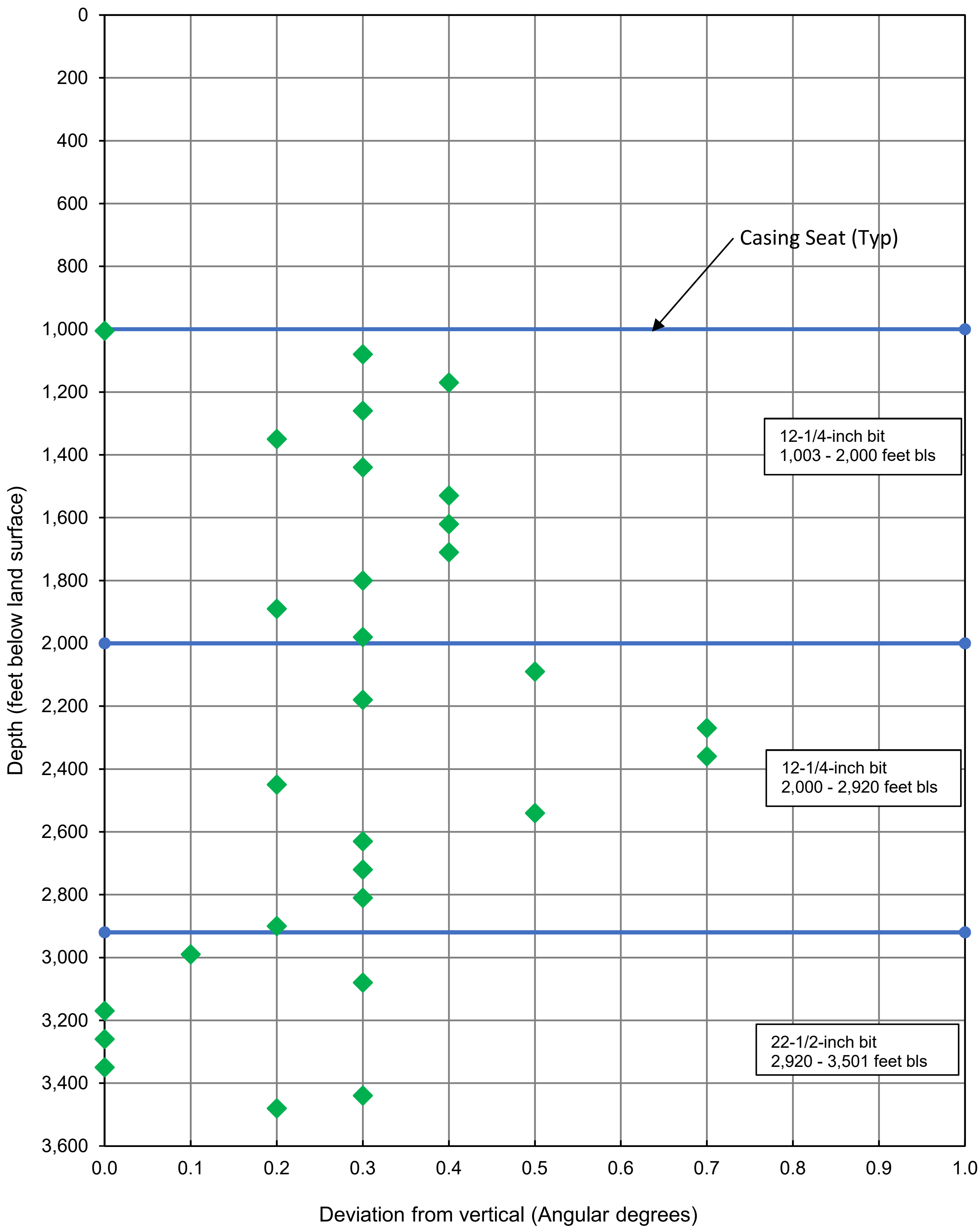
Weight on Bit / Rate of Penetration
MW-1 Pilot Hole 1,000 to 1,810 Feet BLS
Seminole Tribe of Florida - Hollywood Reservation



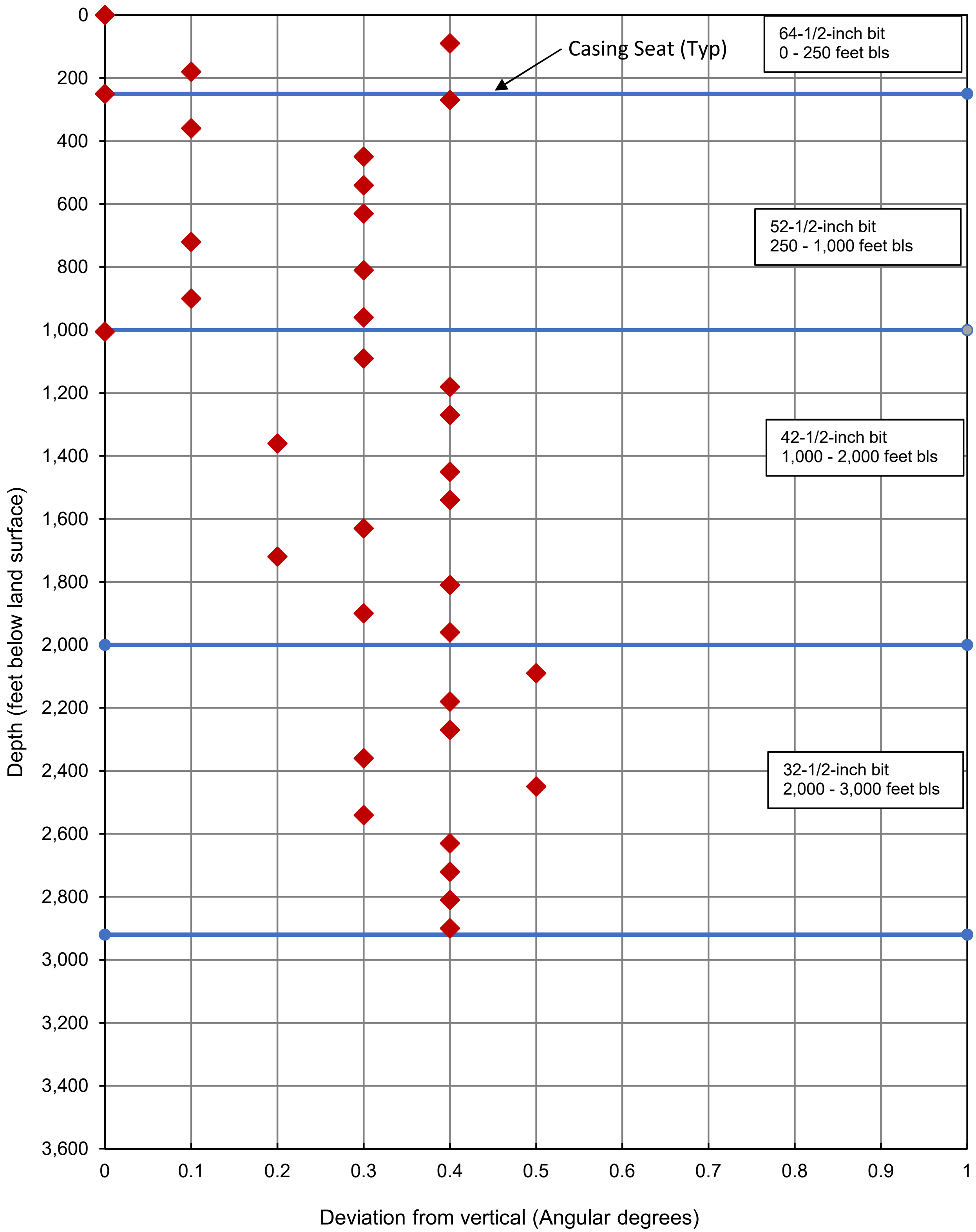
APPENDIX C

INCLINATION SURVEYS

Inclination Surveys
IW-1 Pilot Holes and Open Holes - 1,000 to 3,500 Feet BLS
Seminole Tribe of Florida - Hollywood Reservation

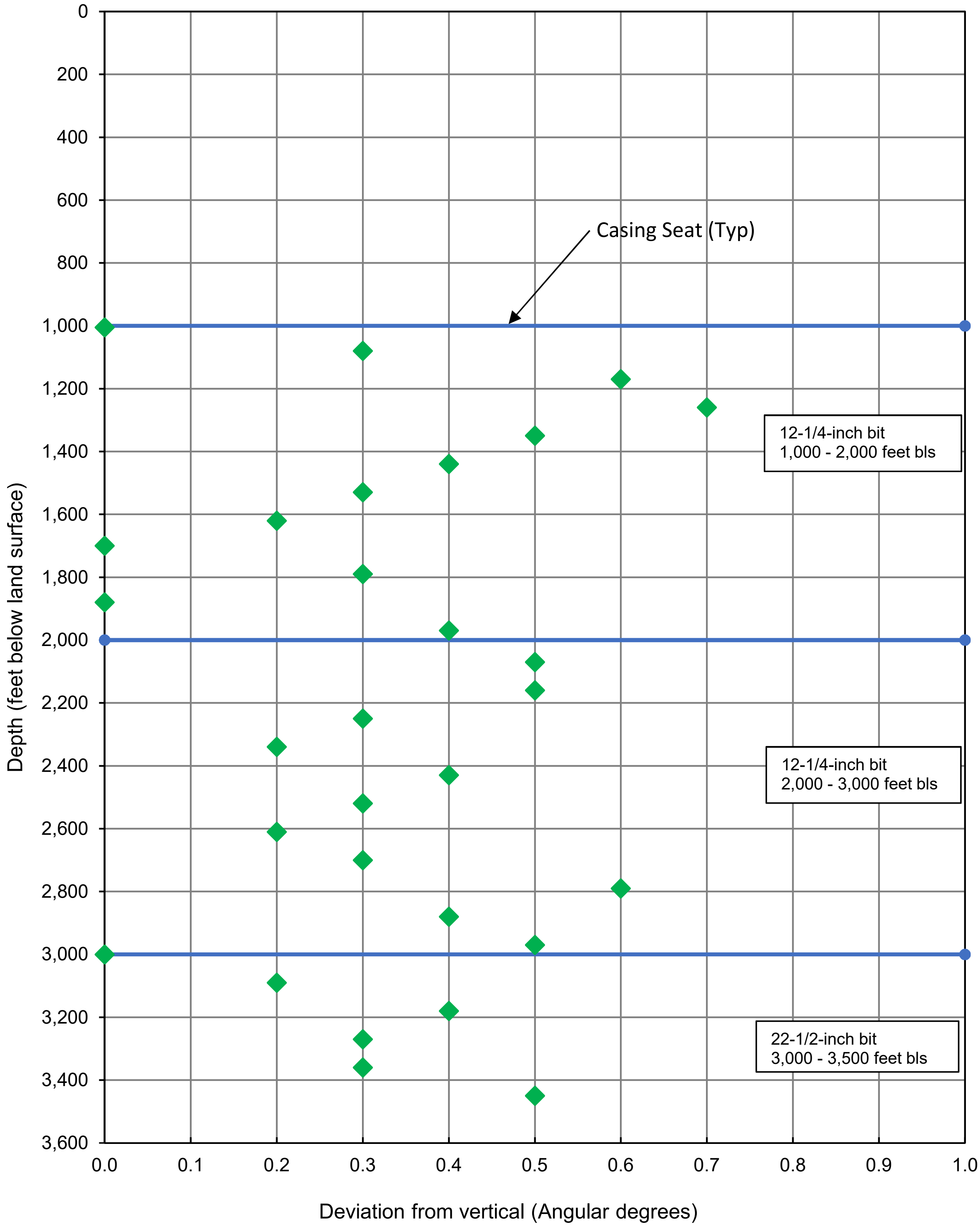


Inclination Surveys
IW-1 Boreholes to Receive Casing - 0 to 3,000 Feet BLS
Seminole Tribe of Florida - Hollywood Reservation

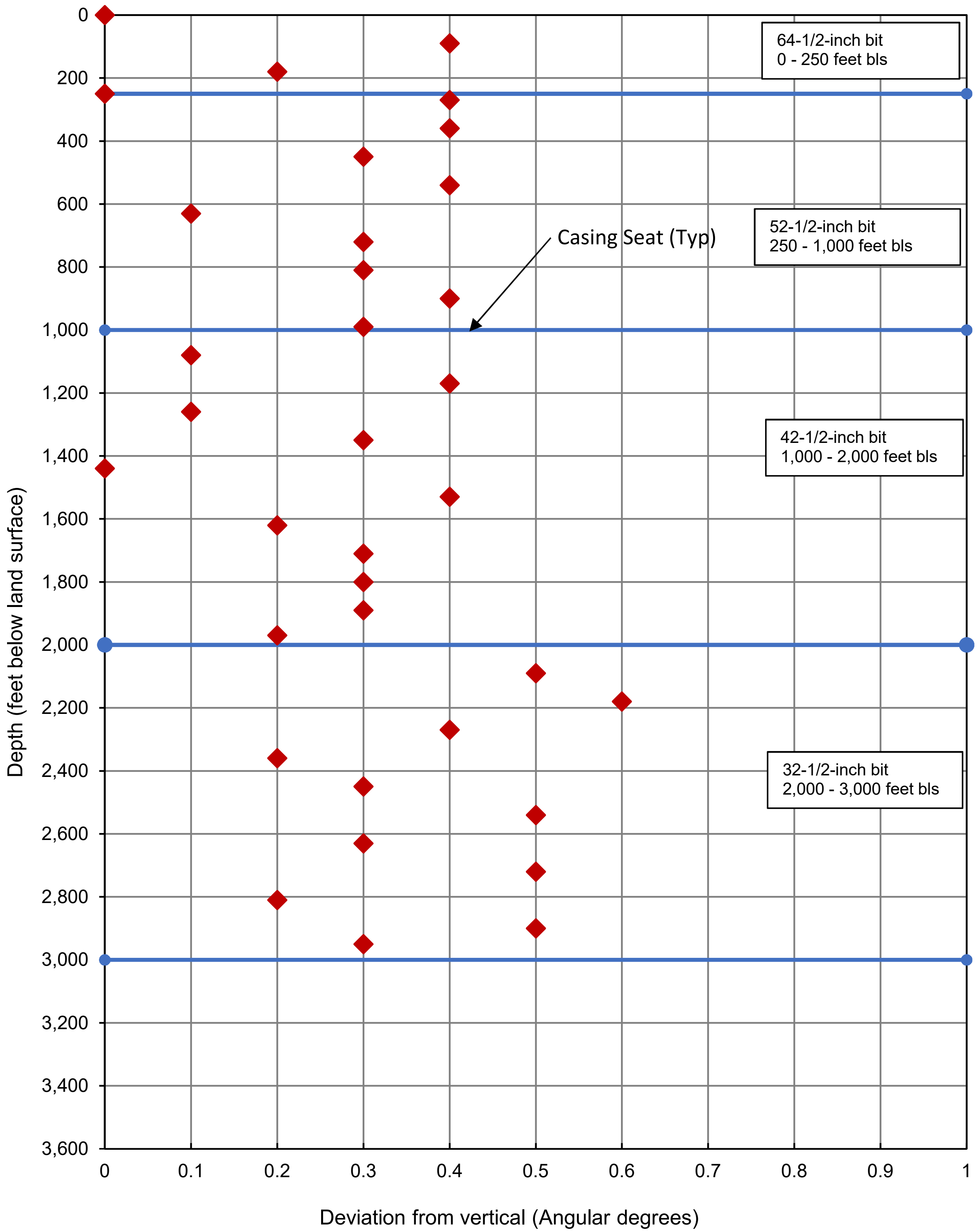


Hazen

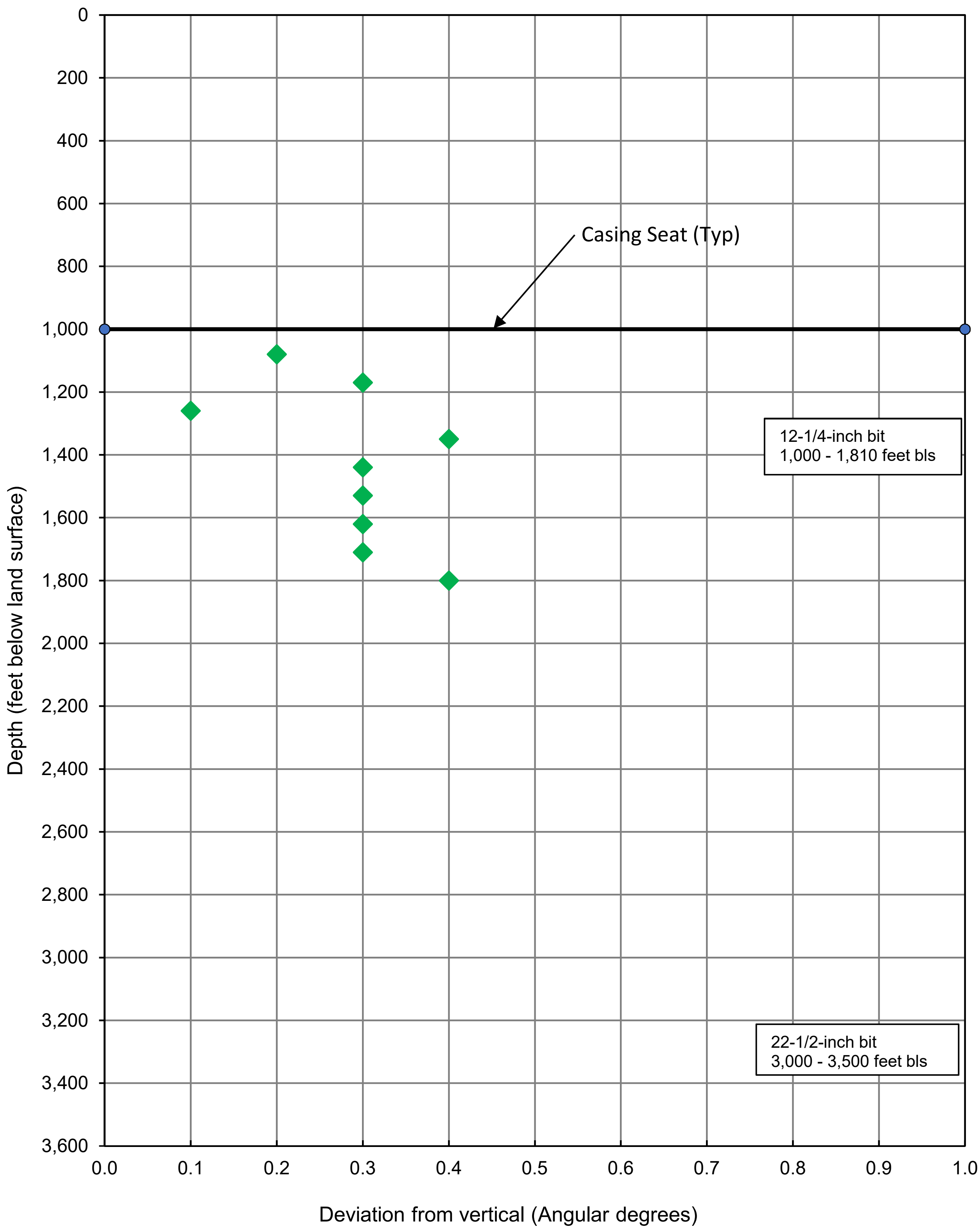
Inclination Surveys
IW-2 Pilot and Open Holes - 1,000 to 3,500 Feet BLS
Seminole Tribe of Florida - Hollywood Reservation



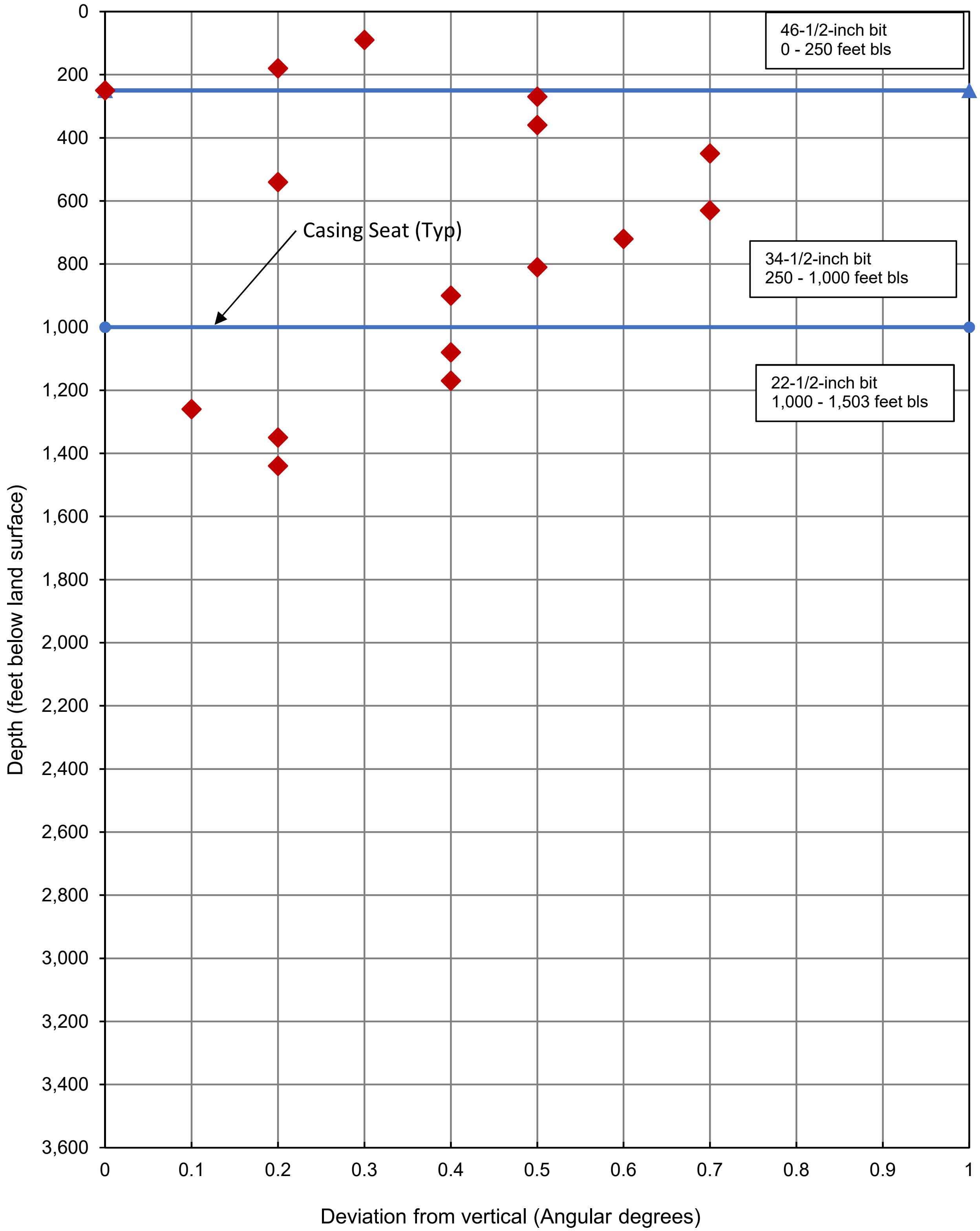
Inclination Surveys
IW-2 Boreholes to Receive Casing - 0 to 3,000 Feet BLS
Seminole Tribe of Florida - Hollywood Reservation



Inclination Surveys
MW-1 Pilot Hole - 1,000 to 1,810 Feet BLS
Seminole Tribe of Florida - Hollywood Reservation



Inclination Surveys
MW-1 Boreholes to Receive Casing - 0 to 1,770 Feet BLS
Seminole Tribe of Florida - Hollywood Reservation



Appendix C – Inclination Surveys
Injection Well IW-1
Seminole Tribe of Florida – Hollywood Reservation

IW-1 – Inclination Surveys in Boreholes to Receive Casing			
Date	Depth (feet)	Deviation (degrees)	Bit Diameter (inches)
7/2/2017	0	0	64.5
7/2/2017	90	0.4	64.5
7/4/2017	180	0.1	64.5
7/9/2017	270	0.4	52.5
7/9/2017	360	0.1	52.5
7/10/2017	450	0.3	52.5
7/12/2017	540	0.3	52.5
7/15/2017	630	0.3	52.5
7/16/2017	720	0.1	52.5
7/18/2017	810	0.3	52.5
7/20/2017	900	0.1	52.5
7/21/2017	960	0.3	52.5
9/28/2017	1090	0.3	42.5
9/29/2017	1180	0.4	42.5
9/30/2017	1270	0.4	42.5
10/2/2017	1360	0.2	42.5
10/3/2017	1450	0.4	42.5
10/5/2017	1540	0.4	42.5
10/6/2017	1630	0.3	42.5
10/7/2017	1720	0.2	42.5

IW-1 – Inclination Surveys in Boreholes to Receive Casing			
Date	Depth (feet)	Deviation (degrees)	Bit Diameter (inches)
10/8/2017	1810	0.4	42.5
10/9/2017	1900	0.3	42.5
10/9/2017	1960	0.4	42.5
11/30/2017	2090	0.5	32.5
11/30/2017	2180	0.4	32.5
12/1/2017	2270	0.4	32.5
12/2/2017	2360	0.3	32.5
12/3/2017	2450	0.5	32.5
12/4/2017	2540	0.3	32.5
12/5/2017	2630	0.4	32.5
12/6/2017	2720	0.4	32.5
12/14/2017	2810	0.4	32.5
12/14/2017	2900	0.4	32.5
1/16/2018	2990	0.1	22.25
1/19/2018	3080	0.3	22.25
1/21/2018	3170	0.0	22.25
1/24/2018	3260	0.0	22.25
1/25/2018	3350	0.0	22.25
1/27/2018	3440	0.3	22.25
1/27/2018	3480	0.2	22.25

Hazen

Appendix C – Inclination Surveys
Injection Well IW-1
Seminole Tribe of Florida – Hollywood Reservation

IW-1 – Inclination Surveys in Pilot and Open Holes			
Date	Depth (feet)	Deviation (degrees)	Bit Diameter (inches)
8/12/2017	1005	0.0	12.25
8/12/2017	1080	0.3	12.25
8/12/2017	1170	0.4	12.25
8/13/2017	1260	0.3	12.25
8/13/2017	1350	0.2	12.25
8/13/2017	1440	0.3	12.25
8/13/2017	1530	0.4	12.25
8/14/2017	1620	0.4	12.25
8/14/2017	1710	0.4	12.25
8/18/2017	1800	0.3	12.25
8/18/2017	1890	0.2	12.25
8/192017	1980	0.3	12.25
10/17/2017	2090	0.5	12.25
10/24/2017	2180	0.3	12.25
10/30/2017	2270	0.7	12.25

IW-1 – Inclination Surveys in Pilot and Open Holes			
Date	Depth (feet)	Deviation (degrees)	Bit Diameter (inches)
10/31/2017	2360	0.7	12.25
11/2/2017	2450	0.2	12.25
11/2/2017	2540	0.5	12.25
11/3/2017	2630	0.3	12.25
11/4/2017	2720	0.3	12.25
11/5/2017	2810	0.3	12.25
11/5/2017	2900	0.2	12.25
1/16/2018	2990	0.1	22.25
1/19/2018	3080	0.3	22.25
1/21/2018	3170	0.0	22.25
1/24/2018	3260	0.0	22.25
1/25/2018	3350	0.0	22.25
1/27/2018	3440	0.3	22.25
1/16/2018	2990	0.1	22.25

Hazen

Appendix C – Inclination Surveys
Injection Well IW-2
Seminole Tribe of Florida – Hollywood Reservation

IW-2 – Inclination Surveys in Boreholes to Receive Casing			
Date	Depth (feet)	Deviation (degrees)	Bit Diameter (inches)
5/15/2017	0	0	64.5
5/20/2017	90	0.4	64.5
5/21/2017	180	0.2	64.5
5/26/2017	270	0.4	52.5
5/29/2017	360	0.4	52.5
5/30/2017	450	0.3	52.5
6/3/2017	540	0.4	52.5
6/6/2017	630	0.1	52.5
6/8/2017	720	0.3	52.5
6/12/2017	810	0.3	52.5
6/13/2017	900	0.4	52.5
6/15/2017	990	0.3	52.5
7/27/2017	1080	0.1	42.5
7/30/2017	1170	0.4	42.5
7/31/2017	1260	0.1	42.5
8/1/2017	1350	0.3	42.5
8/2/2017	1440	0.0	42.5
8/8/2017	1530	0.4	42.5
8/9/2017	1620	0.2	42.5
8/10/2017	1710	0.3	42.5

IW-2 – Inclination Surveys in Boreholes to Receive Casing			
Date	Depth (feet)	Deviation (degrees)	Bit Diameter (inches)
8/11/2017	1800	0.3	42.5
8/13/2017	1890	0.3	42.5
8/14/2017	1970	0.2	42.5
10/17/2017	2090	0.5	32.5
10/19/2017	2180	0.6	32.5
10/19/2017	2270	0.4	32.5
10/20/2017	2360	0.2	32.5
10/21/2017	2450	0.3	32.5
10/22/2017	2540	0.5	32.5
10/23/2017	2630	0.3	32.5
10/25/2017	2720	0.5	32.5
10/26/2017	2810	0.2	32.5
10/28/2017	2900	0.5	32.5
10/29/2017	2950	0.3	32.5
11/17/2017	3000	0	22.25
11/17/2017	3090	0.2	22.25
11/19/2017	3180	0.4	22.25
11/19/2017	3270	0.3	22.25
11/21/2017	3360	0.3	22.25
11/24/2017	3450	0.5	22.25

Hazen

Appendix C – Inclination Surveys
Injection Well IW-2
Seminole Tribe of Florida – Hollywood Reservation

IW-2 – Inclination Surveys in Pilot and Open Holes			
Date	Depth (feet)	Deviation (degrees)	Bit Diameter (inches)
6/29/2017	1005	0.0	12.25
7/1/2017	1080	0.3	12.25
7/2/2017	1170	0.6	12.25
7/2/2017	1260	0.7	12.25
7/2/2017	1350	0.5	12.25
7/3/2017	1440	0.4	12.25
7/3/2017	1530	0.3	12.25
7/4/2017	1620	0.2	12.25
7/4/2017	1700	0.0	12.25
7/7/2017	1790	0.3	12.25
7/9/2017	1880	0.0	12.25
7/10/2017	1970	0.4	12.25

IW-2 – Inclination Surveys in Pilot and Open Holes			
Date	Depth (feet)	Deviation (degrees)	Bit Diameter (inches)
8/29/2017	2070	0.5	12.25
8/31/2017	2160	0.5	12.25
9/2/2017	2250	0.3	12.25
9/3/2017	2340	0.2	12.25
9/4/2017	2430	0.4	12.25
9/4/2017	2520	0.3	12.25
9/19/2017	2610	0.2	12.25
9/19/2017	2700	0.3	12.25
9/19/2017	2790	0.6	12.25
9/23/2017	2880	0.4	12.25
9/25/2017	2970	0.5	12.25

Appendix C – Inclination Surveys
Injection Well MW-1
Seminole Tribe of Florida – Hollywood Reservation

MW-1 – Inclination Surveys in Boreholes to Receive Casing			
Date	Depth (feet)	Deviation (degrees)	Bit Diameter (inches)
12/21/2017	0	0	46.5
12/21/2017	90	0.3	46.5
12/21/2017	180	0.2	46.5
12/28/2017	270	0.5	34.5
12/28/2017	360	0.5	34.5
12/29/2017	450	0.7	34.5
12/29/2017	540	0.2	34.5
12/30/2017	630	0.7	34.5
12/31/2017	720	0.6	34.5
1/6/2018	810	0.5	34.5
1/9/2018	900	0.4	34.5
2/13/2018	1080	0.4	22.25
2/13/2018	1170	0.4	22.25
2/14/2018	1260	0.1	22.25
2/15/2018	1350	0.2	22.25
2/15/2018	1440	0.2	22.25

MW-1 – Inclination Surveys in Pilot and Open Holes			
Date	Depth (feet)	Deviation (degrees)	Bit Diameter (inches)
1/18/2018	1000	0	12.25
1/18/2018	1080	0.2	12.25
1/18/2018	1170	0.3	12.25
1/18/2018	1260	0.1	12.25
1/18/2018	1350	0.4	12.25
1/19/2017	1440	0.3	12.25
1/19/2017	1530	0.3	12.25
1/20/2018	1620	0.3	12.25
1/20/2018	1710	0.3	12.25
1/20/2018	1800	0.4	12.25

APPENDIX D

PILOT HOLE DRILLING FLUID WATER QUALITY

Pilot Hole Drilling Fluid

Water Quality Results in Tabular Form

Hazen

Appendix D – Pilot Hole Drilling Fluid Water Quality Samples
Injection Well IW-1
Seminole Tribe of Florida - Hollywood Reservation

Depth (feet bls)	Chloride (mg/l)	TDS (mg/l)	Conductivity (µS/cm)	Ammonia as N (mg/l)	TKN as N (mg/l)	pH (standard units)
1,032	688	1,500	2,580	0.02	0.13	9.7
1,077	917	2,220	3,620	0.15	0.38	10.4
1,122	788	1,690	2,940	0.05	0.33	10.1
1,167	1,730	3,800	6,290	0.46	0.76	7.8
1,212	959	2,110	3,550	0.10	0.23	8.1
1,257	1,690	3,750	6,010	0.41	0.50	7.8
1,302	1,350	3,170	5,120	0.29	0.60	7.8
1,347	1,420	3,350	5,530	0.29	0.42	7.8
1,392	1,480	3,370	5,520	0.31	0.48	7.8
1,437	1,560	3,260	5,820	0.34	0.43	7.8
1,482	1,560	3,300	5,880	0.32	0.40	7.8
1,527	1,480	3,270	5,670	0.42	0.63	7.8
1,572	1,890	3,980	6,550	0.44	0.77	7.8
1,617	1,850	3,780	6,410	0.35	0.47	7.8
1,662	2,180	4,440	7,360	0.35	0.45	7.8
1,707	2,850	5,540	9,170	0.42	0.66	7.7
1,752	3,620	6,940	11,100	0.41	0.68	7.7
1,797	5,780	10,800	16,800	0.33	0.51	7.9
1,842	8,830	16,500	24,600	0.24	0.25	7.8
1,887	4,480	8,400	13,700	0.28	0.88	7.9
1,932	7,130	13,100	20,400	0.18	0.22	7.8
1,977	9,710	17,800	27,200	0.16	0.80	7.9
2,021	5,110	10,600	22,200	0.17	0.46	12.3
2,066	8,280	15,800	27,000	0.13	0.41	12.1
2,111	25,300	38,600	54,800	0.16	0.88	11.9
2,156	19,300	28,600	47,200	0.09	0.21	11.7
2,201	17,600	n/a	42,700	0.09	0.24	11.6
2,336d	15,600	25,200	42,800	0.02	0.15	11.0
2,381	27,800	41,200	56,300	0.07	0.18	11.2
2,426	24,900	41,000	57,800	0.06	0.27	11.0

Hazen

Depth (feet bls)	Chloride (mg/l)	TDS (mg/l)	Conductivity (µS/cm)	Ammonia as N (mg/l)	TKN as N (mg/l)	pH (standard units)
2,471	18,400	29,400	46,100	< 0.020	0.26	9.2
2,516	21,300	36,000	52,800	< 0.020	0.19	8.4
2,561	17,500	29,600	44,800	< 0.020	0.14	8.3
2,606	18,300	27,400	45,500	< 0.020	0.15	8.0
2,651	19,600	32,200	53,300	< 0.020	< 0.086	8.8
2,696	24,900	40,800	59,600	< 0.020	< 0.086	10.0
2,741	21,900	37,200	56,400	< 0.020	< 0.086	9.0
2,786	24,500	38,800	45,900	< 0.020	0.10	10.3
2,831	18,600	32,600	55,000	< 0.020	0.30	10.6
2,876	18,400	34,400	47,000	< 0.020	0.33	10.6
2,921	18,700	35,600	45,200	< 0.020	0.21	10.1
2,966	19,500	34,700	43,000	< 0.020	0.14	8.8

Hazen

Appendix D – Pilot Hole Drilling Fluid Water Samples
Injection Well IW-2
Seminole Tribe of Florida - Hollywood Reservation

Depth (feet bls)	Chloride (mgl)	TDS (mgl)	Conductivity (µS/cm)	Ammonia as N (mgl)	TKN as N (mgl)	pH (standard units)
1,034	954	2,370	3,970	0.36	0.35	8.7
1,079	841	2,050	3,500	0.18	0.28	8.6
1,124	875	2,120	3,630	0.21	0.28	8.4
1,169	2,110	4,830	7,900	0.68	0.81	7.9
1,214	1,560	3,750	6,200	0.48	0.56	7.8
1,259	1,630	3,880	6,390	0.50	0.65	7.8
1,304	1,160	2,920	4,740	0.30	0.39	8.0
1,349	1,560	3,790	6,110	0.45	0.58	7.9
1,394	1,250	3,120	5,070	0.32	0.51	8.0
1,439	1,650	3,990	6,530	0.45	0.55	7.9
1,484	1,960	4,520	7,500	0.53	0.63	7.8
1,529	1,420	3,450	5,720	0.40	0.44	7.9
1,574	1,560	3,740	6,390	0.42	0.55	7.8
1,619	2,110	4,770	7,780	0.45	0.63	7.5
1,664	1,970	4,480	7,390	0.41	0.54	7.8
1,709	2,340	5,140	8,440	0.38	0.52	7.8
1,754	2,050	4,520	7,430	0.21	0.31	8.0
1,799	3,560	7,940	12,000	0.21	0.35	7.8
1,889 d	3,270	7,400	11,300	0.16	0.37	7.9
1,934	3,000	6,780	10,700	0.19	0.32	8.0
1,979	3,530	7,760	12,200	0.26	0.56	7.9
2,024	39,500	67,800	88,400	0.25	0.23	10.7
2,069	21,500	39,700	54,100	0.18	0.42	10.7
2,114	19,900	35,600	49,600	0.11	0.23	8.5
2,159	16,700	29,400	42,200	0.04	0.20	8.5
2,204	19,700	32,600	50,200	0.02	0.13	8.3
2,249	31,500	55,100	78,800	< 0.02	0.46	8.0
2,294	25,700	48,000	55,100	< 0.02	0.55	7.8
2,339	21,200	39,300	52,100	< 0.02	0.38	8.0

Depth (feet bls)	Chloride (mgl)	TDS (mgl)	Conductivity (µS/cm)	Ammonia as N (mgl)	TKN as N (mgl)	pH (standard units)
2,384	22,000	45,100	55,300	< 0.02	0.13	7.9
2,429	19,900	33,700	48,500	< 0.02	0.25	8.2
2,474	18,400	29,600	45,200	< 0.02	0.83	8.0
2,519	21,500	16,800	51,000	< 0.02	0.24	8.0
2,564	19,400	28,900	43,800	< 0.02	0.30	7.9
2,609	19,400	32,700	46,400	< 0.02	0.13	7.9
2,654	15,100	30,900	42,400	< 0.02	0.23	8.0
2,699	16,400	33,100	43,100	< 0.02	0.26	7.9
2,744	15,000	30,700	41,100	< 0.02	0.21	8.0
2,789	16,000	32,700	42,700	< 0.02	0.20	8.1
2,834	17,000	32,000	42,200	< 0.02	0.18	8.2
2,879	23,600	47,600	63,100	< 0.02	0.13	7.6
2,924	16,600	33,200	45,400	0.04	0.17	7.8
2,969	17,900	34,100	47,900	0.05	0.15	7.7

Appendix D – Pilot Hole Drilling Fluid Water Samples
Injection Well MW-1
Seminole Tribe of Florida - Hollywood Reservation

Depth (feet bls)	Chloride (mgl)	TDS (mgl)	Conductivity (µS/cm)	Ammonia as N (mgl)	TKN as N (mgl)	pH (standard units)
1,032	1,560	3,680	6,250	0.60	0.66	8.4
1,077	934	2,510	4,040	0.23	0.50	9.7
1,122	952	2,460	4,190	0.17	0.41	8.8
1,167	1,840	4,370	7,020	0.65	0.68	8.0
1,212	1,780	3,790	6,980	0.60	0.70	7.8
1,257	1,640	3,750	6,310	0.26	0.41	8.2
1,302	1,710	3,990	7,200	0.53	0.55	7.8
1,347	3,180	6,700	10,900	0.24	0.32	8.7
1,392	3,960	7,520	12,900	0.20	0.29	8.8
1,437	4,880	10,900	15,900	0.24	0.27	8.5
1,482	6,100	12,000	20,600	0.18	0.26	8.0
1,527	4,780	8,560	16,700	0.25	0.32	8.0
1,572	4,610	9,500	16,100	0.26	0.34	8.0
1,617	4,060	8,000	14,200	0.41	0.47	7.7
1,662	4,640	10,600	17,700	0.36	0.46	7.9
1,707	4,560	10,600	17,700	0.35	0.51	7.9
1,752	5,730	11,000	18,600	0.28	0.35	7.9
1,797	8,200	15,900	26,700	0.20	0.32	7.6

Pilot Hole Drilling Fluid

Water Quality Laboratory Results

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

August 21, 2017

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: STOF HWD
Pace Project No.: 35329992

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on August 14, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
Youngquist Brothers INC
Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

SAMPLE SUMMARY

Project: STOF HWD

Pace Project No.: 35329992

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35329992001	**IW-I 1032 FEET**	Water	08/11/17 07:43	08/14/17 08:55
35329992002	**IW-I 1077 FEET**	Water	08/11/17 12:02	08/14/17 08:55
35329992003	**IW-I 1122 FEET**	Water	08/11/17 14:38	08/14/17 08:55
35329992004	**IW-I 1167 FEET**	Water	08/12/17 12:31	08/14/17 08:55
35329992005	**IW-I 1212 FEET**	Water	08/12/17 15:58	08/14/17 08:55
35329992006	**IW-I 1257 FEET**	Water	08/12/17 21:23	08/14/17 08:55
35329992007	**IW-I 1302 FEET**	Water	08/13/17 00:10	08/14/17 08:55
35329992008	**IW-I 1347 FEET**	Water	08/13/17 03:22	08/14/17 08:55
35329992009	**IW-I 1342 FEET**	Water	08/13/17 07:28	08/14/17 08:55
35329992010	**IW-I 1437 FEET**	Water	08/13/17 10:43	08/14/17 08:55
35329992011	**IW-I 1482 FEET**	Water	08/13/17 14:17	08/14/17 08:55
35329992012	**IW-I 1527 FEET**	Water	08/13/17 17:19	08/14/17 08:55
35329992013	**IW-I 1572 FEET**	Water	08/13/17 20:25	08/14/17 08:55
35329992014	**IW-I 1617 FEET**	Water	08/13/17 23:57	08/14/17 08:55
35329992015	**IW-I 1662 FEET**	Water	08/14/17 04:20	08/14/17 08:55

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: STOF HWD
Pace Project No.: 35329992

Sample: IW-I 1032 FEET **Lab ID: 35329992001** Collected: 08/11/17 07:43 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**2580**	umhos/cm	10.0	10.0	1		08/18/17 13:45		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1500**	mg/L	20.0	20.0	1		08/16/17 16:18		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.9**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**9.7**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**688**	mg/L	50.0	25.0	10		08/15/17 08:27	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		08/15/17 14:02	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.13 I**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 11:23	7727-37-9	

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: STOF HWD
Pace Project No.: 35329992

Sample: IW-I 1077 FEET **Lab ID: 35329992002** Collected: 08/11/17 12:02 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**3620**	umhos/cm	10.0	10.0	1		08/18/17 13:45		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**2220**	mg/L	20.0	20.0	1		08/16/17 16:19		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.9**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**10.4**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**917**	mg/L	100	50.0	20		08/15/17 08:52	16887-00-6	M6
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.15**	mg/L	0.050	0.020	1		08/15/17 14:04	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.38 I**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 11:24	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: STOF HWD
Pace Project No.: 35329992

Sample: IW-I 1122 FEET **Lab ID: 35329992003** Collected: 08/11/17 14:38 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**2940**	umhos/cm	10.0	10.0	1		08/18/17 13:45		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1690**	mg/L	20.0	20.0	1		08/16/17 17:45		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.5**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**10.1**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**788**	mg/L	50.0	25.0	10		08/15/17 10:05	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.052**	mg/L	0.050	0.020	1		08/15/17 14:06	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.33 I**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 11:25	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: STOF HWD
Pace Project No.: 35329992

Sample: IW-I 1167 FEET **Lab ID: 35329992004** Collected: 08/12/17 12:31 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**6290**	umhos/cm	10.0	10.0	1		08/18/17 13:45		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3800**	mg/L	50.0	50.0	1		08/16/17 17:46		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.6**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1730**	mg/L	250	125	50		08/15/17 10:29	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.46**	mg/L	0.050	0.020	1		08/15/17 14:08	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.76**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 11:29	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HWD
Pace Project No.: 35329992

Sample: IW-I 1212 FEET **Lab ID: 35329992005** Collected: 08/12/17 15:58 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**3550**	umhos/cm	10.0	10.0	1		08/18/17 13:45		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**2110**	mg/L	20.0	20.0	1		08/16/17 17:47		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.3**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**8.1**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**959**	mg/L	100	50.0	20		08/15/17 10:54	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.097**	mg/L	0.050	0.020	1		08/15/17 14:11	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.23 I**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 11:31	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: STOF HWD
Pace Project No.: 35329992

Sample: IW-I 1257 FEET **Lab ID: 35329992006** Collected: 08/12/17 21:23 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**6010**	umhos/cm	10.0	10.0	1		08/18/17 13:45		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3750**	mg/L	50.0	50.0	1		08/16/17 17:47		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.0**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1690**	mg/L	250	125	50		08/15/17 11:18	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.41**	mg/L	0.050	0.020	1		08/15/17 14:34	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.50**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 11:32	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HWD
Pace Project No.: 35329992

Sample: IW-I 1302 FEET **Lab ID: 35329992007** Collected: 08/13/17 00:10 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**5120**	umhos/cm	10.0	10.0	1		08/18/17 13:45		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3170**	mg/L	20.0	20.0	1		08/16/17 17:49		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.2**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1350**	mg/L	250	125	50		08/15/17 11:43	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.29**	mg/L	0.050	0.020	1		08/15/17 14:36	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.60**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 13:31	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HWD

Pace Project No.: 35329992

Sample: IW-I 1347 FEET **Lab ID: 35329992008** Collected: 08/13/17 03:22 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**5530**	umhos/cm	10.0	10.0	1		08/18/17 13:45		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3350**	mg/L	50.0	50.0	1		08/16/17 17:50		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.2**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1420**	mg/L	250	125	50		08/15/17 12:07	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.29**	mg/L	0.050	0.020	1		08/15/17 14:38	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.42 I**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 11:36	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: STOF HWD
Pace Project No.: 35329992

Sample: IW-I 1342 FEET **Lab ID: 35329992009** Collected: 08/13/17 07:28 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**5520**	umhos/cm	10.0	10.0	1		08/18/17 17:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3370**	mg/L	50.0	50.0	1		08/16/17 17:50		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**25.7**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1480**	mg/L	250	125	50		08/15/17 12:31	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.31**	mg/L	0.050	0.020	1		08/15/17 14:40	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.48 I**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 11:38	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HWD
Pace Project No.: 35329992

Sample: IW-I 1437 FEET **Lab ID: 35329992010** Collected: 08/13/17 10:43 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**5820**	umhos/cm	10.0	10.0	1		08/18/17 17:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3260**	mg/L	50.0	50.0	1		08/16/17 17:51		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**26.9**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1560**	mg/L	250	125	50		08/15/17 12:56	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.34**	mg/L	0.050	0.020	1		08/15/17 14:42	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.43 I**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 11:39	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HWD
Pace Project No.: 35329992

Sample: IW-I 1482 FEET **Lab ID: 35329992011** Collected: 08/13/17 14:17 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**5880**	umhos/cm	10.0	10.0	1		08/18/17 17:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3300**	mg/L	50.0	50.0	1		08/16/17 17:53		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.6**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1560**	mg/L	250	125	50		08/15/17 14:09	16887-00-6	M6
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.32**	mg/L	0.050	0.020	1		08/15/17 14:44	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.40 I**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 11:40	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: STOF HWD
Pace Project No.: 35329992

Sample: IW-I 1527 FEET **Lab ID: 35329992012** Collected: 08/13/17 17:19 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**5670**	umhos/cm	10.0	10.0	1		08/18/17 17:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3270**	mg/L	50.0	50.0	1		08/16/17 17:54		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**26.7**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1480**	mg/L	250	125	50		08/15/17 15:22	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.42**	mg/L	0.050	0.020	1		08/15/17 14:46	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.63**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 11:42	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HWD
Pace Project No.: 35329992

Sample: IW-I 1572 FEET **Lab ID: 35329992013** Collected: 08/13/17 20:25 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**6550**	umhos/cm	10.0	10.0	1		08/18/17 17:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3980**	mg/L	50.0	50.0	1		08/16/17 17:54		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.7**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1890**	mg/L	250	125	50		08/15/17 15:47	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.44**	mg/L	0.050	0.020	1		08/15/17 15:05	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.77**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 11:46	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HWD
Pace Project No.: 35329992

Sample: IW-I 1617 FEET **Lab ID: 35329992014** Collected: 08/13/17 23:57 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**6410**	umhos/cm	10.0	10.0	1		08/18/17 17:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3780**	mg/L	50.0	50.0	1		08/16/17 17:54		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.7**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1850**	mg/L	250	125	50		08/15/17 16:11	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.35**	mg/L	0.050	0.020	1		08/15/17 15:07	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.47 I**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 11:47	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HWD
Pace Project No.: 35329992

Sample: IW-I 1662 FEET **Lab ID: 35329992015** Collected: 08/14/17 04:20 Received: 08/14/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**7360**	umhos/cm	10.0	10.0	1		08/18/17 17:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**4440**	mg/L	50.0	50.0	1		08/16/17 17:55		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.0**	deg C	0.010	0.010	1		08/18/17 17:40		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		08/18/17 17:40		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**2180**	mg/L	250	125	50		08/15/17 16:36	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.35**	mg/L	0.050	0.020	1		08/15/17 15:09	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.45 I**	mg/L	0.50	0.086	1	08/15/17 08:05	08/16/17 11:49	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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954-582-4300

August 25, 2017

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: STOF HWD 201712
Pace Project No.: 35331418

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on August 21, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
Youngquist Brothers INC
Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

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SAMPLE SUMMARY

Project: STOF HWD 201712
Pace Project No.: 35331418

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35331418001	**IW-1 1707 FT**	Water	08/14/17 07:24	08/21/17 08:55
35331418002	**IW-1 1752 FT**	Water	08/14/17 11:18	08/21/17 08:55
35331418003	**IW-1 1797 FT**	Water	08/14/17 17:20	08/21/17 08:55
35331418004	**IW-1 1842 FT**	Water	08/14/17 21:30	08/21/17 08:55
35331418005	**IW-1 1887 FT**	Water	08/18/17 10:21	08/21/17 08:55
35331418006	**IW-1 1932 FT**	Water	08/18/17 22:00	08/21/17 08:55
35331418007	**IW-1 1975 FT**	Water	08/18/17 13:47	08/21/17 08:55

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ANALYTICAL RESULTS

Project: STOF HWD 201712
Pace Project No.: 35331418

Sample: IW-1 1707 FT **Lab ID: 35331418001** Collected: 08/14/17 07:24 Received: 08/21/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**9170**	umhos/cm	10.0	10.0	1		08/24/17 19:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**5540**	mg/L	100	100	1		08/22/17 18:58		Q
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**26.3**	deg C	0.010	0.010	1		08/24/17 19:55		
pH at 25 Degrees C	**7.7**	Std. Units	0.10	0.10	1		08/24/17 19:55		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**2850**	mg/L	500	250	100		08/22/17 18:26	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.42**	mg/L	0.050	0.020	1		08/23/17 14:15	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.66**	mg/L	0.50	0.086	1	08/22/17 06:11	08/22/17 14:12	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HWD 201712
Pace Project No.: 35331418

Sample: IW-1 1752 FT **Lab ID: 35331418002** Collected: 08/14/17 11:18 Received: 08/21/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**11100**	umhos/cm	10.0	10.0	1		08/24/17 19:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**6940**	mg/L	100	100	1		08/22/17 18:59		Q
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**26.4**	deg C	0.010	0.010	1		08/24/17 19:55		
pH at 25 Degrees C	**7.7**	Std. Units	0.10	0.10	1		08/24/17 19:55		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**3620**	mg/L	500	250	100		08/22/17 18:45	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.41**	mg/L	0.050	0.020	1		08/23/17 14:21	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.68**	mg/L	0.50	0.086	1	08/22/17 06:11	08/22/17 14:13	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HWD 201712
Pace Project No.: 35331418

Sample: IW-1 1797 FT **Lab ID: 35331418003** Collected: 08/14/17 17:20 Received: 08/21/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**16800**	umhos/cm	10.0	10.0	1		08/24/17 19:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**10800**	mg/L	100	100	1		08/22/17 18:59		Q
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.2**	deg C	0.010	0.010	1		08/24/17 19:55		
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		08/24/17 19:55		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**5780**	mg/L	1000	500	200		08/22/17 19:05	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.33**	mg/L	0.050	0.020	1		08/23/17 14:19	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.51**	mg/L	0.50	0.086	1	08/22/17 06:11	08/22/17 14:15	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HWD 201712
Pace Project No.: 35331418

Sample: IW-1 1842 FT **Lab ID: 35331418004** Collected: 08/14/17 21:30 Received: 08/21/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**24600**	umhos/cm	10.0	10.0	1		08/24/17 19:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**16500**	mg/L	100	100	1		08/22/17 19:00		Q
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**26.5**	deg C	0.010	0.010	1		08/24/17 19:55		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		08/24/17 19:55		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8830**	mg/L	1000	500	200		08/22/17 19:24	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.24**	mg/L	0.050	0.020	1		08/23/17 14:23	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.25 I**	mg/L	0.50	0.086	1	08/22/17 06:11	08/22/17 14:16	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HWD 201712
Pace Project No.: 35331418

Sample: IW-1 1887 FT **Lab ID: 35331418005** Collected: 08/18/17 10:21 Received: 08/21/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**13700**	umhos/cm	10.0	10.0	1		08/24/17 19:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**8400**	mg/L	100	100	1		08/23/17 18:30		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**26.8**	deg C	0.010	0.010	1		08/24/17 19:55		
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		08/24/17 19:55		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4480**	mg/L	1000	500	200		08/22/17 19:44	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.28**	mg/L	0.050	0.020	1		08/23/17 14:25	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.88**	mg/L	0.50	0.086	1	08/22/17 06:11	08/22/17 14:17	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HWD 201712
Pace Project No.: 35331418

Sample: IW-1 1932 FT **Lab ID: 35331418006** Collected: 08/18/17 22:00 Received: 08/21/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**20400**	umhos/cm	10.0	10.0	1		08/24/17 19:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**13100**	mg/L	100	100	1		08/23/17 18:30		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**26.6**	deg C	0.010	0.010	1		08/24/17 19:55		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		08/24/17 19:55		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**7130**	mg/L	1000	500	200		08/22/17 20:03	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.18**	mg/L	0.050	0.020	1		08/23/17 14:27	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.22 I**	mg/L	0.50	0.086	1	08/22/17 06:11	08/22/17 14:19	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HWD 201712
Pace Project No.: 35331418

Sample: IW-1 1975 FT **Lab ID: 35331418007** Collected: 08/18/17 13:47 Received: 08/21/17 08:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**27200**	umhos/cm	10.0	10.0	1		08/24/17 19:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**17800**	mg/L	100	100	1		08/23/17 18:30		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.9**	deg C	0.010	0.010	1		08/24/17 19:55		
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		08/24/17 19:55		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**9710**	mg/L	1000	500	200		08/22/17 20:23	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.16**	mg/L	0.050	0.020	1		08/23/17 14:29	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.80**	mg/L	0.50	0.086	1	08/22/17 06:11	08/22/17 14:20	7727-37-9	

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QUALITY CONTROL DATA

Project: STOF HWD 201712
Pace Project No.: 35331418

QC Batch: 389759 | Analysis Method: EPA 120.1
QC Batch Method: EPA 120.1 | Analysis Description: 120.1 Specific Conductance
Associated Lab Samples: 35331418001, 35331418002, 35331418003, 35331418004, 35331418005, 35331418006, 35331418007

METHOD BLANK: 2121273 | Matrix: Water
Associated Lab Samples: 35331418001, 35331418002, 35331418003, 35331418004, 35331418005, 35331418006, 35331418007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Specific Conductance	umhos/cm	10.0 U	10.0	10.0	08/24/17 19:06	

LABORATORY CONTROL SAMPLE: 2121274

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Specific Conductance	umhos/cm	1410	1380	97	95-105	

SAMPLE DUPLICATE: 2121275

Parameter	Units	35331436001 Result	Dup Result	RPD	Max RPD	Qualifiers
Specific Conductance	umhos/cm	1130	1130	0	20	

SAMPLE DUPLICATE: 2121276

Parameter	Units	35331436011 Result	Dup Result	RPD	Max RPD	Qualifiers
Specific Conductance	umhos/cm	1260	1260	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

October 31, 2017

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: STOF HW DIW IW-1
Pace Project No.: 35343550

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on October 23, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
Youngquist Brothers INC
Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

Pace Analytical Services, LLC
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954-582-4300

SAMPLE SUMMARY

Project: STOF HW DIW IW-1
Pace Project No.: 35343550

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35343550001	**IW-1 2021 FT**	Water	10/22/17 03:54	10/23/17 17:55
35343550002	**IW-1 2066 FT**	Water	10/22/17 09:54	10/23/17 17:55

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35343550

Sample: IW-1 2021 FT **Lab ID: 35343550001** Collected: 10/22/17 03:54 Received: 10/23/17 17:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**10600**	mg/L	100	100	1		10/24/17 16:11		
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**22200**	umhos/cm	10.0	10.0	1		10/30/17 17:02		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**12.3**	Std. Units	0.10	0.10	1		10/31/17 13:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**5110**	mg/L	1000	500	200		10/24/17 09:57	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.17**	mg/L	0.050	0.020	1		10/25/17 14:16	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.46 I**	mg/L	0.50	0.086	1	10/25/17 09:02	10/26/17 13:12	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35343550

Sample: IW-1 2066 FT **Lab ID: 35343550002** Collected: 10/22/17 09:54 Received: 10/23/17 17:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**15800**	mg/L	100	100	1		10/24/17 16:12		
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**27000**	umhos/cm	10.0	10.0	1		10/30/17 17:03		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**12.1**	Std. Units	0.10	0.10	1		10/31/17 13:52		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8280**	mg/L	1000	500	200		10/24/17 10:19	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.13**	mg/L	0.050	0.020	1		10/25/17 14:18	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.41 I**	mg/L	0.50	0.086	1	10/25/17 09:34	10/26/17 13:29	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

November 03, 2017

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: STOF HW DIW IW-1
Pace Project No.: 35344541

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on October 27, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
Youngquist Brothers INC
Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

SAMPLE SUMMARY

Project: STOF HW DIW IW-1
Pace Project No.: 35344541

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35344541001	**IW-1 2111 FEET**	Water	10/24/17 05:50	10/27/17 09:28
35344541002	**IW-1 2156 FEET**	Water	10/24/17 10:57	10/27/17 09:28
35344541003	**IW-1 2200 FEET**	Water	10/24/17 17:34	10/27/17 09:28

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35344541

Sample: IW-1 2111 FEET **Lab ID: 35344541001** Collected: 10/24/17 05:50 Received: 10/27/17 09:28 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**54800**	umhos/cm	10.0	10.0	1		11/02/17 14:59		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**38600**	mg/L	250	250	1		10/29/17 11:08		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**11.9**	Std. Units	0.10	0.10	1		10/31/17 14:04		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**25300**	mg/L	2500	1250	500		10/29/17 08:53	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.16**	mg/L	0.050	0.020	1		11/01/17 12:36	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.88**	mg/L	0.50	0.086	1	10/28/17 07:08	10/30/17 08:41	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35344541

Sample: IW-1 2156 FEET **Lab ID: 35344541002** Collected: 10/24/17 10:57 Received: 10/27/17 09:28 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**47200**	umhos/cm	10.0	10.0	1		11/02/17 15:01		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**28600**	mg/L	250	250	1		10/29/17 11:08		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**11.7**	Std. Units	0.10	0.10	1		10/31/17 14:15		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19300**	mg/L	2500	1250	500		10/29/17 09:15	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.090**	mg/L	0.050	0.020	1		11/01/17 12:38	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.21 I**	mg/L	0.50	0.086	1	10/28/17 07:08	10/30/17 08:42	7727-37-9	

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Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35344541

Sample: IW-1 2200 FEET **Lab ID: 35344541003** Collected: 10/24/17 17:34 Received: 10/27/17 09:28 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**42700**	umhos/cm	10.0	10.0	1		11/02/17 15:03		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**11.6**	Std. Units	0.10	0.10	1		10/31/17 14:16		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**17600**	mg/L	1000	500	200		10/28/17 20:02	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.092**	mg/L	0.050	0.020	1		11/01/17 12:43	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.24 I**	mg/L	0.50	0.086	1	10/28/17 07:08	10/30/17 08:43	7727-37-9	

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

November 12, 2017

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: STOF HW DIW IW-1
Pace Project No.: 35345708

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on November 02, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
Youngquist Brothers INC
Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

SAMPLE SUMMARY

Project: STOF HW DIW IW-1
Pace Project No.: 35345708

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35345708001	**IW-1 2336 FT**	Water	10/30/17 17:43	11/02/17 11:35
35345708002	**IW-1 2381 FT**	Water	10/31/17 02:27	11/02/17 11:35
35345708003	**IW-1 2426 FT**	Water	10/31/17 08:59	11/02/17 11:35
35345708004	**IW-1 2471 FT**	Water	10/31/17 14:34	11/02/17 11:35
35345708005	**IW-1 2516 FT**	Water	11/02/17 03:50	11/02/17 11:35
35345708006	**IW-1 2561 FT**	Water	11/02/17 07:28	11/02/17 11:35

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1

Pace Project No.: 35345708

Sample: IW-1 2336 FT **Lab ID: 35345708001** Collected: 10/30/17 17:43 Received: 11/02/17 11:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2510B Specific Conduct. Tampa	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**42800**	umhos/cm	10.0	10.0	1		11/07/17 14:32		
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**25200**	mg/L	250	250	1		11/03/17 15:41		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**11.0**	Std. Units	0.10	0.10	1		11/03/17 14:59		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**15600**	mg/L	1000	500	200		11/03/17 13:37	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.022 I**	mg/L	0.050	0.020	1		11/10/17 16:45	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.15 I**	mg/L	0.50	0.086	1	11/04/17 07:49	11/04/17 14:45	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35345708

Sample: IW-1 2381 FT **Lab ID: 35345708002** Collected: 10/31/17 02:27 Received: 11/02/17 11:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2510B Specific Conduct. Tampa	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**56300**	umhos/cm	10.0	10.0	1		11/07/17 14:33		L
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**41200**	mg/L	250	250	1		11/03/17 15:41		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**11.2**	Std. Units	0.10	0.10	1		11/03/17 15:00		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**27800**	mg/L	2000	1000	400		11/04/17 05:24	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.069**	mg/L	0.050	0.020	1		11/10/17 16:47	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.18 I**	mg/L	0.50	0.086	1	11/04/17 07:49	11/04/17 14:46	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35345708

Sample: IW-1 2426 FT **Lab ID: 35345708003** Collected: 10/31/17 08:59 Received: 11/02/17 11:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2510B Specific Conduct. Tampa	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**57800**	umhos/cm	10.0	10.0	1		11/07/17 14:34		L
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**41000**	mg/L	250	250	1		11/03/17 15:42		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**11.0**	Std. Units	0.10	0.10	1		11/03/17 15:01		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**24900**	mg/L	2000	1000	400		11/04/17 05:46	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.063**	mg/L	0.050	0.020	1		11/10/17 16:48	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.27 I**	mg/L	0.50	0.086	1	11/04/17 07:49	11/04/17 15:36	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35345708

Sample: IW-1 2471 FT **Lab ID: 35345708004** Collected: 10/31/17 14:34 Received: 11/02/17 11:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2510B Specific Conduct. Tampa	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**46100**	umhos/cm	10.0	10.0	1		11/07/17 14:35		
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**29400**	mg/L	250	250	1		11/03/17 15:42		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**9.2**	Std. Units	0.10	0.10	1		11/03/17 15:02		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**18400**	mg/L	1000	500	200		11/03/17 14:43	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		11/10/17 16:50	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.26 I**	mg/L	0.50	0.086	1	11/04/17 07:49	11/04/17 14:47	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35345708

Sample: IW-1 2516 FT **Lab ID: 35345708005** Collected: 11/02/17 03:50 Received: 11/02/17 11:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2510B Specific Conduct. Tampa	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**52800**	umhos/cm	10.0	10.0	1		11/07/17 14:36		L
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**36000**	mg/L	250	250	1		11/07/17 16:46		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.4**	Std. Units	0.10	0.10	1		11/03/17 15:04		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**21300**	mg/L	2000	1000	400		11/04/17 06:08	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		11/10/17 16:52	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.19 I**	mg/L	0.50	0.086	1	11/04/17 07:49	11/04/17 14:48	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1

Pace Project No.: 35345708

Sample: IW-1 2561 FT **Lab ID: 35345708006** Collected: 11/02/17 07:28 Received: 11/02/17 11:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2510B Specific Conduct. Tampa	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**44800**	umhos/cm	10.0	10.0	1		11/07/17 14:37		
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**29600**	mg/L	250	250	1		11/07/17 16:46		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.3**	Std. Units	0.10	0.10	1		11/03/17 15:05		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**17500**	mg/L	1000	500	200		11/03/17 15:27	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		11/10/17 16:53	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.14 I**	mg/L	0.50	0.086	1	11/04/17 07:49	11/04/17 14:49	7727-37-9	

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November 16, 2017

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: STOF HW DIW IW-1
Pace Project No.: 35346473

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on November 07, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
Youngquist Brothers INC
Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

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SAMPLE SUMMARY

Project: STOF HW DIW IW-1
Pace Project No.: 35346473

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35346473001	**IW-1 2606 FT**	Water	11/03/17 18:31	11/07/17 08:39
35346473002	**IW-1 2651 FT**	Water	11/03/17 23:14	11/07/17 08:39
35346473003	**IW-1 2696 FT**	Water	11/04/17 03:00	11/07/17 08:39
35346473004	**IW-1 2741 FT**	Water	11/04/17 07:00	11/07/17 08:39
35346473005	**IW-1 2786 FT**	Water	11/04/17 11:26	11/07/17 08:39
35346473006	**IW-1 2831 FT**	Water	11/04/17 15:50	11/07/17 08:39
35346473007	**IW-1 2876 FT**	Water	11/04/17 19:40	11/07/17 08:39
35346473008	**IW-1 2921 FT**	Water	11/04/17 23:53	11/07/17 08:39
35346473009	**IW-1 2966 FT**	Water	11/04/17 23:53	11/07/17 08:39

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35346473

Sample: IW-1 2606 FT **Lab ID: 35346473001** Collected: 11/03/17 18:31 Received: 11/07/17 08:39 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**27400**	mg/L	250	250	1		11/09/17 17:14		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		11/14/17 11:13		Q
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**45500**	umhos/cm	10.0	10.0	1		11/13/17 13:50		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**18300**	mg/L	1000	500	200		11/08/17 14:07	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		11/15/17 20:04	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.15 I**	mg/L	0.50	0.086	1	11/10/17 08:12	11/15/17 16:27	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35346473

Sample: IW-1 2651 FT **Lab ID: 35346473002** Collected: 11/03/17 23:14 Received: 11/07/17 08:39 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**32200**	mg/L	250	250	1		11/09/17 17:14		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.8**	Std. Units	0.10	0.10	1		11/14/17 11:15		Q
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**53300**	umhos/cm	10.0	10.0	1		11/13/17 13:51		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19600**	mg/L	2500	1250	500		11/09/17 06:07	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		11/15/17 20:06	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.086 U**	mg/L	0.50	0.086	1	11/10/17 08:12	11/15/17 16:28	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35346473

Sample: IW-1 2696 FT **Lab ID: 35346473003** Collected: 11/04/17 03:00 Received: 11/07/17 08:39 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**40800**	mg/L	250	250	1		11/09/17 17:15		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**10.0**	Std. Units	0.10	0.10	1		11/14/17 11:16		Q
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**59600**	umhos/cm	10.0	10.0	1		11/13/17 13:53		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**24900**	mg/L	2500	1250	500		11/09/17 06:31	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		11/15/17 20:11	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.086 U**	mg/L	0.50	0.086	1	11/10/17 08:12	11/15/17 16:29	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35346473

Sample: IW-1 2741 FT **Lab ID: 35346473004** Collected: 11/04/17 07:00 Received: 11/07/17 08:39 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**37200**	mg/L	250	250	1		11/09/17 17:15		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**9.0**	Std. Units	0.10	0.10	1		11/14/17 11:17		Q
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**56400**	umhos/cm	10.0	10.0	1		11/13/17 13:54		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**21900**	mg/L	2500	1250	500		11/09/17 09:28	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		11/15/17 20:13	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.086 U**	mg/L	0.50	0.086	1	11/10/17 08:12	11/15/17 16:30	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35346473

Sample: IW-1 2786 FT **Lab ID: 35346473005** Collected: 11/04/17 11:26 Received: 11/07/17 08:39 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**38800**	mg/L	250	250	1		11/09/17 17:15		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**10.3**	Std. Units	0.10	0.10	1		11/14/17 11:18		Q
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**45900**	umhos/cm	10.0	10.0	1		11/13/17 13:57		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**24500**	mg/L	1000	500	200		11/08/17 23:03	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		11/15/17 20:15	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.096 I**	mg/L	0.50	0.086	1	11/10/17 08:12	11/15/17 16:33	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35346473

Sample: IW-1 2831 FT **Lab ID: 35346473006** Collected: 11/04/17 15:50 Received: 11/07/17 08:39 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**32600**	mg/L	250	250	1		11/09/17 17:16		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**10.6**	Std. Units	0.10	0.10	1		11/14/17 11:19		Q
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**55000**	umhos/cm	10.0	10.0	1		11/13/17 13:58		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**18600**	mg/L	2500	1250	500		11/09/17 09:51	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		11/15/17 20:17	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.30 I**	mg/L	0.50	0.086	1	11/10/17 08:12	11/15/17 16:33	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35346473

Sample: IW-1 2876 FT **Lab ID: 35346473007** Collected: 11/04/17 19:40 Received: 11/07/17 08:39 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**34400**	mg/L	250	250	1		11/09/17 17:16		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**10.6**	Std. Units	0.10	0.10	1		11/14/17 11:22		Q
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**47000**	umhos/cm	10.0	10.0	1		11/13/17 13:59		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**18400**	mg/L	2500	1250	500		11/09/17 10:15	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		11/15/17 20:18	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.33 I**	mg/L	0.50	0.086	1	11/10/17 08:12	11/15/17 16:34	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35346473

Sample: IW-1 2921 FT **Lab ID: 35346473008** Collected: 11/04/17 23:53 Received: 11/07/17 08:39 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**35600**	mg/L	250	250	1		11/09/17 17:17		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**10.1**	Std. Units	0.10	0.10	1		11/14/17 11:23		Q
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**45200**	umhos/cm	10.0	10.0	1		11/13/17 14:00		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**18700**	mg/L	2500	1250	500		11/09/17 10:39	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		11/15/17 20:20	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.21 I**	mg/L	0.50	0.086	1	11/10/17 08:12	11/15/17 16:35	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-1
Pace Project No.: 35346473

Sample: IW-1 2966 FT **Lab ID: 35346473009** Collected: 11/04/17 23:53 Received: 11/07/17 08:39 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Diss. Solids Tampa	Analytical Method: SM 2540C								
Total Dissolved Solids	**34700**	mg/L	250	250	1		11/09/17 17:17		
4500H+ pH, Electrometric,Tampa	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.8**	Std. Units	0.10	0.10	1		11/14/17 11:24		Q
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**43000**	umhos/cm	10.0	10.0	1		11/13/17 14:01		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19500**	mg/L	2500	1250	500		11/09/17 11:02	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		11/15/17 20:22	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.14 I**	mg/L	0.50	0.086	1	11/10/17 08:12	11/15/17 16:36	7727-37-9	

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July 11, 2017

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on July 03, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
Youngquist Brothers INC
Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

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SAMPLE SUMMARY

Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35321511001	**IW-2 1034 FT**	Water	06/30/17 22:24	07/03/17 13:40
35321511002	**IW-2 1079 FT**	Water	07/01/17 03:51	07/03/17 13:40
35321511003	**IW-2 1124 FT**	Water	07/01/17 10:22	07/03/17 13:40
35321511004	**IW-2 1169 FT**	Water	07/01/17 14:29	07/03/17 13:40
35321511005	**IW-2 1214 FT**	Water	07/01/17 18:54	07/03/17 13:40
35321511006	**IW-2 1259 FT**	Water	07/02/17 05:18	07/03/17 13:40
35321511007	**IW-2 1304 FT**	Water	07/02/17 10:00	07/03/17 13:40
35321511008	**IW-2 1349 FT**	Water	07/02/17 13:26	07/03/17 13:40
35321511009	**IW-2 1394 FT**	Water	07/02/17 15:50	07/03/17 13:40
35321511010	**IW-2 1439 FT**	Water	07/02/17 20:15	07/03/17 13:40
35321511011	**IW-2 1484 FT**	Water	07/03/17 00:53	07/03/17 13:40
35321511012	**IW-2 15;29 FT**	Water	07/03/17 04:59	07/03/17 13:40
35321511013	**IW-2 1574 FT**	Water	07/03/17 09:20	07/03/17 13:40

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Sample: IW-2 1034 FT **Lab ID: 35321511001** Collected: 06/30/17 22:24 Received: 07/03/17 13:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**3970**	umhos/cm	10.0	10.0	1		07/11/17 09:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**2370**	mg/L	20.0	20.0	1		07/06/17 14:30		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.0**	deg C	0.010	0.010	1		07/11/17 09:50		
pH at 25 Degrees C	**8.7**	Std. Units	0.10	0.10	1		07/11/17 09:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**954**	mg/L	100	50.0	20		07/05/17 14:17	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.36**	mg/L	0.050	0.020	1		07/08/17 17:24	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.35 I**	mg/L	0.50	0.086	1	07/05/17 08:11	07/06/17 10:03	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Sample: IW-2 1079 FT **Lab ID: 35321511002** Collected: 07/01/17 03:51 Received: 07/03/17 13:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**3500**	umhos/cm	10.0	10.0	1		07/11/17 09:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**2050**	mg/L	20.0	20.0	1		07/06/17 14:30		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.0**	deg C	0.010	0.010	1		07/11/17 09:50		
pH at 25 Degrees C	**8.6**	Std. Units	0.10	0.10	1		07/11/17 09:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**841**	mg/L	100	50.0	20		07/05/17 15:22	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.18**	mg/L	0.050	0.020	1		07/10/17 12:28	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.28 I**	mg/L	0.50	0.086	1	07/05/17 08:11	07/06/17 10:04	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Sample: IW-2 1124 FT **Lab ID: 35321511003** Collected: 07/01/17 10:22 Received: 07/03/17 13:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**3630**	umhos/cm	10.0	10.0	1		07/11/17 09:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**2120**	mg/L	20.0	20.0	1		07/06/17 14:30		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.0**	deg C	0.010	0.010	1		07/11/17 09:50		
pH at 25 Degrees C	**8.4**	Std. Units	0.10	0.10	1		07/11/17 09:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**875**	mg/L	100	50.0	20		07/05/17 15:43	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.21**	mg/L	0.050	0.020	1		07/10/17 12:33	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.28 I**	mg/L	0.50	0.086	1	07/05/17 08:11	07/06/17 10:06	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Sample: IW-2 1169 FT **Lab ID: 35321511004** Collected: 07/01/17 14:29 Received: 07/03/17 13:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**7900**	umhos/cm	10.0	10.0	1		07/11/17 09:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**4830**	mg/L	50.0	50.0	1		07/06/17 14:31		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.8**	deg C	0.010	0.010	1		07/11/17 09:50		
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		07/11/17 09:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**2110**	mg/L	250	125	50		07/05/17 16:04	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.68**	mg/L	0.050	0.020	1		07/10/17 12:34	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.81**	mg/L	0.50	0.086	1	07/05/17 08:11	07/06/17 13:04	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Sample: IW-2 1214 FT **Lab ID: 35321511005** Collected: 07/01/17 18:54 Received: 07/03/17 13:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**6200**	umhos/cm	10.0	10.0	1		07/11/17 09:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3750**	mg/L	50.0	50.0	1		07/06/17 14:51		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.1**	deg C	0.010	0.010	1		07/11/17 09:50		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		07/11/17 09:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1560**	mg/L	250	125	50		07/05/17 16:26	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.48**	mg/L	0.050	0.020	1		07/10/17 12:36	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.56**	mg/L	0.50	0.086	1	07/05/17 08:11	07/06/17 10:11	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Sample: IW-2 1259 FT **Lab ID: 35321511006** Collected: 07/02/17 05:18 Received: 07/03/17 13:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**6390**	umhos/cm	10.0	10.0	1		07/11/17 09:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3880**	mg/L	50.0	50.0	1		07/06/17 14:52		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.2**	deg C	0.010	0.010	1		07/11/17 09:50		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		07/11/17 09:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1630**	mg/L	250	125	50		07/05/17 16:47	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.50**	mg/L	0.050	0.020	1		07/10/17 12:38	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.65**	mg/L	0.50	0.086	1	07/05/17 08:11	07/06/17 10:12	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Sample: IW-2 1304 FT **Lab ID: 35321511007** Collected: 07/02/17 10:00 Received: 07/03/17 13:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**4740**	umhos/cm	10.0	10.0	1		07/11/17 09:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**2920**	mg/L	20.0	20.0	1		07/06/17 14:52		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.1**	deg C	0.010	0.010	1		07/11/17 09:50		
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		07/11/17 09:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1160**	mg/L	250	125	50		07/05/17 17:09	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.30**	mg/L	0.050	0.020	1		07/10/17 12:39	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.39 I**	mg/L	0.50	0.086	1	07/05/17 08:11	07/06/17 10:14	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Sample: IW-2 1349 FT **Lab ID: 35321511008** Collected: 07/02/17 13:26 Received: 07/03/17 13:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**6110**	umhos/cm	10.0	10.0	1		07/11/17 09:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3790**	mg/L	50.0	50.0	1		07/06/17 14:53		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.4**	deg C	0.010	0.010	1		07/11/17 09:50		
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		07/11/17 09:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1560**	mg/L	250	125	50		07/05/17 18:56	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.45**	mg/L	0.050	0.020	1		07/10/17 12:44	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.58**	mg/L	0.50	0.086	1	07/05/17 08:11	07/06/17 10:15	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Sample: IW-2 1394 FT **Lab ID: 35321511009** Collected: 07/02/17 15:50 Received: 07/03/17 13:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**5070**	umhos/cm	10.0	10.0	1		07/11/17 09:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3120**	mg/L	20.0	20.0	1		07/06/17 14:53		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.0**	deg C	0.010	0.010	1		07/11/17 09:50		
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		07/11/17 09:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1250**	mg/L	250	125	50		07/05/17 20:00	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.32**	mg/L	0.050	0.020	1		07/10/17 12:53	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.51**	mg/L	0.50	0.086	1	07/05/17 08:11	07/06/17 10:17	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Sample: IW-2 1439 FT **Lab ID: 35321511010** Collected: 07/02/17 20:15 Received: 07/03/17 13:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**6530**	umhos/cm	10.0	10.0	1		07/11/17 09:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3990**	mg/L	50.0	50.0	1		07/06/17 14:53		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.4**	deg C	0.010	0.010	1		07/11/17 09:50		
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		07/11/17 09:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1650**	mg/L	250	125	50		07/05/17 20:21	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.45**	mg/L	0.050	0.020	1		07/10/17 12:54	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.55**	mg/L	0.50	0.086	1	07/05/17 08:11	07/06/17 10:18	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Sample: IW-2 1484 FT **Lab ID: 35321511011** Collected: 07/03/17 00:53 Received: 07/03/17 13:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**7500**	umhos/cm	10.0	10.0	1		07/11/17 09:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**4520**	mg/L	50.0	50.0	1		07/06/17 14:54		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.2**	deg C	0.010	0.010	1		07/11/17 09:50		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		07/11/17 09:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1960**	mg/L	250	125	50		07/05/17 20:43	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.53**	mg/L	0.050	0.020	1		07/10/17 12:56	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.63**	mg/L	0.50	0.086	1	07/05/17 08:11	07/06/17 10:19	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Sample: IW-2 15;29 FT **Lab ID: 35321511012** Collected: 07/03/17 04:59 Received: 07/03/17 13:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**5720**	umhos/cm	10.0	10.0	1		07/11/17 09:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3450**	mg/L	50.0	50.0	1		07/06/17 14:54		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.6**	deg C	0.010	0.010	1		07/11/17 09:50		
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		07/11/17 09:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1420**	mg/L	250	125	50		07/05/17 21:04	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.40**	mg/L	0.050	0.020	1		07/10/17 12:58	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.44 I**	mg/L	0.50	0.086	1	07/05/17 08:11	07/06/17 10:21	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF-HOLLYWOOD
Pace Project No.: 35321511

Sample: IW-2 1574 FT **Lab ID: 35321511013** Collected: 07/03/17 09:20 Received: 07/03/17 13:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**6390**	umhos/cm	10.0	10.0	1		07/11/17 10:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3740**	mg/L	50.0	50.0	1		07/06/17 14:54		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**27.0**	deg C	0.010	0.010	1		07/11/17 09:50		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		07/11/17 09:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1560**	mg/L	250	125	50		07/05/17 21:25	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.42**	mg/L	0.050	0.020	1		07/10/17 12:59	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.55**	mg/L	0.50	0.086	1	07/05/17 08:11	07/06/17 10:22	7727-37-9	

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3610 Park Central Blvd N
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954-582-4300

July 14, 2017

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: STOF HOLLYWOOD
Pace Project No.: 35322367

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on July 07, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
Youngquist Brothers INC
Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

REPORT OF LABORATORY ANALYSIS

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Pompano Beach, FL 33064
954-582-4300

SAMPLE SUMMARY

Project: STOF HOLLYWOOD
Pace Project No.: 35322367

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35322367001	**IW-2 1619 FT**	Water	07/03/17 15:50	07/07/17 11:50
35322367002	**IW-2 1664 FT**	Water	07/03/17 12:46	07/07/17 11:50
35322367003	**IW-2 1709 FT**	Water	07/03/17 16:39	07/07/17 11:50
35322367004	**IW-2 1754 FT**	Water	07/03/17 04:19	07/07/17 11:50

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ANALYTICAL RESULTS

Project: STOF HOLLYWOOD

Pace Project No.: 35322367

Sample: IW-2 1619 FT **Lab ID: 35322367001** Collected: 07/03/17 15:50 Received: 07/07/17 11:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**7780**	umhos/cm	10.0	10.0	1		07/11/17 10:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**4770**	mg/L	50.0	50.0	1		07/07/17 15:41		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.2**	deg C	0.010	0.010	1		07/11/17 19:15		
pH at 25 Degrees C	**7.5**	Std. Units	0.10	0.10	1		07/11/17 19:15		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**2110**	mg/L	250	125	50		07/10/17 13:16	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.45**	mg/L	0.050	0.020	1		07/12/17 16:18	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.63**	mg/L	0.50	0.086	1	07/09/17 22:38	07/10/17 13:00	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HOLLYWOOD
Pace Project No.: 35322367

Sample: IW-2 1664 FT **Lab ID: 35322367002** Collected: 07/03/17 12:46 Received: 07/07/17 11:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**7390**	umhos/cm	10.0	10.0	1		07/11/17 10:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**4480**	mg/L	50.0	50.0	1		07/07/17 15:42		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.3**	deg C	0.010	0.010	1		07/11/17 19:15		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		07/11/17 19:15		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1970**	mg/L	250	125	50		07/10/17 13:38	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.41**	mg/L	0.050	0.020	1		07/12/17 16:14	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.54**	mg/L	0.50	0.086	1	07/09/17 22:38	07/10/17 13:01	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HOLLYWOOD
Pace Project No.: 35322367

Sample: IW-2 1709 FT **Lab ID: 35322367003** Collected: 07/03/17 16:39 Received: 07/07/17 11:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**8440**	umhos/cm	10.0	10.0	1		07/11/17 10:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**5140**	mg/L	100	100	1		07/07/17 15:42		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.5**	deg C	0.010	0.010	1		07/11/17 19:15		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		07/11/17 19:15		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**2340**	mg/L	250	125	50		07/10/17 14:00	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.38**	mg/L	0.050	0.020	1		07/12/17 16:16	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.52**	mg/L	0.50	0.086	1	07/09/17 22:38	07/10/17 13:03	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HOLLYWOOD
Pace Project No.: 35322367

Sample: IW-2 1754 FT **Lab ID: 35322367004** Collected: 07/03/17 04:19 Received: 07/07/17 11:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**7430**	umhos/cm	10.0	10.0	1		07/11/17 10:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**4520**	mg/L	50.0	50.0	1		07/07/17 15:43		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.5**	deg C	0.010	0.010	1		07/11/17 19:15		
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		07/11/17 19:15		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**2050**	mg/L	250	125	50		07/10/17 15:08	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.21**	mg/L	0.050	0.020	1		07/12/17 16:20	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.31 I**	mg/L	0.50	0.086	1	07/09/17 22:38	07/10/17 13:04	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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954-582-4300

July 18, 2017

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: STOF HOLLYWOOD
Pace Project No.: 35322976

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on July 11, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
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Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

Pace Analytical Services, LLC
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Pompano Beach, FL 33064
954-582-4300

SAMPLE SUMMARY

Project: STOF HOLLYWOOD
Pace Project No.: 35322976

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35322976001	**IW-2 1619 Feet**	Water	07/07/17 13:30	07/11/17 17:20
35322976002	**IW-2 1889 Feet**	Water	07/09/17 19:13	07/11/17 17:20
35322976003	**IW-2 1934 Feet**	Water	07/09/17 19:34	07/11/17 17:20
35322976004	**IW-2 1979 Feet**	Water	07/10/17 04:32	07/11/17 17:20

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ANALYTICAL RESULTS

Project: STOF HOLLYWOOD
Pace Project No.: 35322976

Sample: IW-2 1619 Feet **Lab ID: 35322976001** Collected: 07/07/17 13:30 Received: 07/11/17 17:20 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**12000**	umhos/cm	10.0	10.0	1		07/14/17 14:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**7940**	mg/L	100	100	1		07/12/17 16:07		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.6**	deg C	0.010	0.010	1		07/14/17 15:50		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		07/14/17 15:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Bromide	**12.3**	mg/L	2.0	1.4	20		07/15/17 00:04	24959-67-9	
Chloride	**3560**	mg/L	500	250	100		07/12/17 16:27	16887-00-6	
Fluoride	**1.1**	mg/L	1.0	0.68	20		07/15/17 00:04	16984-48-8	
Sulfate	**625**	mg/L	100	50.0	20		07/15/17 00:04	14808-79-8	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.21**	mg/L	0.050	0.020	1		07/17/17 14:00	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.35 I**	mg/L	0.50	0.086	1	07/13/17 20:00	07/14/17 13:02	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HOLLYWOOD
Pace Project No.: 35322976

Sample: IW-2 1889 Feet **Lab ID: 35322976002** Collected: 07/09/17 19:13 Received: 07/11/17 17:20 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**11300**	umhos/cm	10.0	10.0	1		07/14/17 14:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**7400**	mg/L	100	100	1		07/12/17 16:08		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.3**	deg C	0.010	0.010	1		07/14/17 15:50		
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		07/14/17 15:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Bromide	**11.3**	mg/L	2.0	1.4	20		07/15/17 00:26	24959-67-9	
Chloride	**3270**	mg/L	500	250	100		07/12/17 16:49	16887-00-6	
Fluoride	**1.2**	mg/L	1.0	0.68	20		07/15/17 00:26	16984-48-8	
Sulfate	**629**	mg/L	100	50.0	20		07/15/17 00:26	14808-79-8	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.16**	mg/L	0.050	0.020	1		07/17/17 14:12	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.37 I**	mg/L	0.50	0.086	1	07/13/17 20:00	07/14/17 13:07	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: STOF HOLLYWOOD
Pace Project No.: 35322976

Sample: IW-2 1934 Feet **Lab ID: 35322976003** Collected: 07/09/17 19:34 Received: 07/11/17 17:20 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**10700**	umhos/cm	10.0	10.0	1		07/14/17 14:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**6780**	mg/L	100	100	1		07/12/17 16:08		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.4**	deg C	0.010	0.010	1		07/14/17 15:50		
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		07/14/17 15:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Bromide	**10.7**	mg/L	2.0	1.4	20		07/15/17 01:56	24959-67-9	
Chloride	**3000**	mg/L	500	250	100		07/12/17 18:35	16887-00-6	
Fluoride	**1.1**	mg/L	1.0	0.68	20		07/15/17 01:56	16984-48-8	
Sulfate	**590**	mg/L	100	50.0	20		07/15/17 01:56	14808-79-8	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.19**	mg/L	0.050	0.020	1		07/17/17 14:13	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.32 I**	mg/L	0.50	0.086	1	07/13/17 20:00	07/14/17 13:08	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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954-582-4300

ANALYTICAL RESULTS

Project: STOF HOLLYWOOD
Pace Project No.: 35322976

Sample: IW-2 1979 Feet **Lab ID: 35322976004** Collected: 07/10/17 04:32 Received: 07/11/17 17:20 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**12200**	umhos/cm	10.0	10.0	1		07/14/17 14:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**7760**	mg/L	100	100	1		07/12/17 16:14		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.3**	deg C	0.010	0.010	1		07/14/17 15:50		
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		07/14/17 15:50		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Bromide	**12.4**	mg/L	2.0	1.4	20		07/15/17 02:18	24959-67-9	
Chloride	**3530**	mg/L	500	250	100		07/12/17 18:57	16887-00-6	
Fluoride	**1.3**	mg/L	1.0	0.68	20		07/15/17 02:18	16984-48-8	
Sulfate	**666**	mg/L	100	50.0	20		07/15/17 02:18	14808-79-8	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.26**	mg/L	0.050	0.020	1		07/17/17 14:15	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.56**	mg/L	0.50	0.086	1	07/13/17 20:00	07/14/17 13:09	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

September 13, 2017

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: 201712/STOFHW IDW IW-2
Pace Project No.: 35333707

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on September 01, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
Youngquist Brothers INC
Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

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SAMPLE SUMMARY

Project: 201712/STOFHW IDW IW-2
Pace Project No.: 35333707

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35333707001	**IW-2 2024 Feet**	Water	08/26/17 05:23	09/01/17 11:33
35333707002	**IW-2 2069 Feet**	Water	08/29/17 04:36	09/01/17 11:33
35333707003	**IW-2 2114 Feet**	Water	08/29/17 08:14	09/01/17 11:33
35333707004	**IW-2 2159 Feet**	Water	08/29/17 16:27	09/01/17 11:33
35333707005	**IW-2 2204 Feet**	Water	08/31/17 10:03	09/01/17 11:33
35333707006	**IW-2 2249 Feet**	Water	08/31/17 17:45	09/01/17 11:33

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ANALYTICAL RESULTS

Project: 201712/STOFHW IDW IW-2
Pace Project No.: 35333707

Sample: IW-2 2024 Feet **Lab ID: 35333707001** Collected: 08/26/17 05:23 Received: 09/01/17 11:33 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**88400**	umhos/cm	10.0	10.0	1		09/01/17 15:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**67800**	mg/L	250	250	1		09/01/17 17:13		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.5**	deg C	0.010	0.010	1		09/03/17 17:05		
pH at 25 Degrees C	**10.7**	Std. Units	0.10	0.10	1		09/03/17 17:05		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**39500**	mg/L	2500	1250	500		09/05/17 07:52	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.25**	mg/L	0.050	0.020	1		09/05/17 13:36	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.23 I**	mg/L	0.50	0.086	1	09/03/17 22:13	09/05/17 09:58	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 201712/STOFHW IDW IW-2
Pace Project No.: 35333707

Sample: IW-2 2069 Feet **Lab ID: 35333707002** Collected: 08/29/17 04:36 Received: 09/01/17 11:33 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**54100**	umhos/cm	10.0	10.0	1		09/01/17 15:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**39700**	mg/L	250	250	1		09/01/17 17:14		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.5**	deg C	0.010	0.010	1		09/03/17 17:05		
pH at 25 Degrees C	**10.7**	Std. Units	0.10	0.10	1		09/03/17 17:05		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**21500**	mg/L	2500	1250	500		09/05/17 08:39	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.18**	mg/L	0.050	0.020	1		09/05/17 13:38	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.42 I**	mg/L	0.50	0.086	1	09/03/17 22:13	09/05/17 09:59	7727-37-9	

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ANALYTICAL RESULTS

Project: 201712/STOFHW IDW IW-2
Pace Project No.: 35333707

Sample: IW-2 2114 Feet **Lab ID: 35333707003** Collected: 08/29/17 08:14 Received: 09/01/17 11:33 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**49600**	umhos/cm	10.0	10.0	1		09/01/17 15:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**35600**	mg/L	250	250	1		09/01/17 17:15		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.9**	deg C	0.010	0.010	1		09/03/17 17:05		
pH at 25 Degrees C	**8.5**	Std. Units	0.10	0.10	1		09/03/17 17:05		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19900**	mg/L	1000	500	200		09/03/17 01:33	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.11**	mg/L	0.050	0.020	1		09/05/17 13:40	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.23 I**	mg/L	0.50	0.086	1	09/03/17 22:13	09/05/17 10:01	7727-37-9	

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ANALYTICAL RESULTS

Project: 201712/STOFHW IDW IW-2
Pace Project No.: 35333707

Sample: IW-2 2159 Feet **Lab ID: 35333707004** Collected: 08/29/17 16:27 Received: 09/01/17 11:33 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**42200**	umhos/cm	10.0	10.0	1		09/01/17 15:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**29400**	mg/L	250	250	1		09/01/17 17:17		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.7**	deg C	0.010	0.010	1		09/03/17 17:05		
pH at 25 Degrees C	**8.5**	Std. Units	0.10	0.10	1		09/03/17 17:05		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**16700**	mg/L	1000	500	200		09/03/17 04:26	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.039 I**	mg/L	0.050	0.020	1		09/05/17 13:42	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.20 I**	mg/L	0.50	0.086	1	09/03/17 22:13	09/05/17 10:02	7727-37-9	

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ANALYTICAL RESULTS

Project: 201712/STOFHW IDW IW-2
Pace Project No.: 35333707

Sample: IW-2 2204 Feet **Lab ID: 35333707005** Collected: 08/31/17 10:03 Received: 09/01/17 11:33 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**50200**	umhos/cm	10.0	10.0	1		09/03/17 16:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**32600**	mg/L	250	250	1		09/06/17 13:36		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.8**	deg C	0.010	0.010	1		09/03/17 17:05		
pH at 25 Degrees C	**8.3**	Std. Units	0.10	0.10	1		09/03/17 17:05		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19700**	mg/L	1000	500	200		09/03/17 04:48	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/05/17 13:44	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.13 I**	mg/L	0.50	0.086	1	09/03/17 22:13	09/05/17 10:03	7727-37-9	

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ANALYTICAL RESULTS

Project: 201712/STOFHW IDW IW-2
Pace Project No.: 35333707

Sample: IW-2 2249 Feet **Lab ID: 35333707006** Collected: 08/31/17 17:45 Received: 09/01/17 11:33 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**78800**	umhos/cm	10.0	10.0	1		09/03/17 16:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**55100**	mg/L	250	250	1		09/06/17 13:36		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**24.1**	deg C	0.010	0.010	1		09/03/17 17:05		
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		09/03/17 17:05		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**31500**	mg/L	2500	1250	500		09/05/17 13:43	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/05/17 13:52	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.46 I**	mg/L	0.50	0.086	1	09/03/17 22:13	09/05/17 10:05	7727-37-9	

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September 21, 2017

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: STOF HW DIW IW-2/IW-2
Pace Project No.: 35334158

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on September 05, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
Youngquist Brothers INC
Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

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SAMPLE SUMMARY

Project: STOF HW DIW IW-2/IW-2
Pace Project No.: 35334158

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35334158001	**IW-2 2249 FEET**	Water	09/02/17 14:30	09/05/17 14:25
35334158002	**IW-2 2239 FEET**	Water	09/02/17 15:27	09/05/17 14:25
35334158003	**IW-2 2384 FEET**	Water	09/02/17 17:06	09/05/17 14:25
35334158004	**IW-2 2429 FEET**	Water	09/04/17 02:21	09/05/17 14:25
35334158005	**IW-2 2474 FEET**	Water	09/04/17 11:50	09/05/17 14:25
35334158006	**IW-2 2519 FEET**	Water	09/04/17 17:04	09/05/17 14:25
35334158007	**IW-2 2564 FEET**	Water	09/04/17 23:36	09/05/17 14:25
35334158008	**IW-2 2609 FEET**	Water	09/05/17 10:01	09/05/17 14:25
35334158009	**IW-1 PACKER 1898-1916**	Water	09/04/17 16:48	09/05/17 14:25

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-2/IW-2
Pace Project No.: 35334158

Sample: IW-2 2249 FEET **Lab ID: 35334158001** Collected: 09/02/17 14:30 Received: 09/05/17 14:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**48000**	mg/L	250	250	1		09/06/17 13:46		
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**55100**	umhos/cm	10.0	10.0	1		09/13/17 16:00		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**22.9**	deg C	0.010	0.010	1		09/07/17 09:52		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		09/07/17 09:52		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**25700**	mg/L	2500	1250	500		09/13/17 22:52	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/06/17 12:08	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.55**	mg/L	0.50	0.086	1	09/06/17 06:48	09/07/17 13:43	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-2/IW-2
Pace Project No.: 35334158

Sample: IW-2 2239 FEET **Lab ID: 35334158002** Collected: 09/02/17 15:27 Received: 09/05/17 14:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**39300**	mg/L	250	250	1		09/06/17 13:47		
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**52100**	umhos/cm	10.0	10.0	1		09/13/17 16:00		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**22.9**	deg C	0.010	0.010	1		09/07/17 09:52		
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		09/07/17 09:52		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**21200**	mg/L	2500	1250	500		09/13/17 23:14	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/06/17 12:10	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.38 I**	mg/L	0.50	0.086	1	09/06/17 06:48	09/07/17 13:45	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-2/IW-2
Pace Project No.: 35334158

Sample: IW-2 2384 FEET **Lab ID: 35334158003** Collected: 09/02/17 17:06 Received: 09/05/17 14:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**45100**	mg/L	250	250	1		09/06/17 13:47		
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**55300**	umhos/cm	10.0	10.0	1		09/13/17 16:00		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**21.9**	deg C	0.010	0.010	1		09/15/17 10:56		
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		09/15/17 10:56		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**22000**	mg/L	2500	1250	500		09/13/17 07:05	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/06/17 12:12	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.13 I**	mg/L	0.50	0.086	1	09/06/17 06:48	09/07/17 13:46	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-2/IW-2
Pace Project No.: 35334158

Sample: IW-2 2429 FEET **Lab ID: 35334158004** Collected: 09/04/17 02:21 Received: 09/05/17 14:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**48500**	umhos/cm	10.0	10.0	1		09/13/17 16:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**33700**	mg/L	250	250	1		09/07/17 13:57		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**22.5**	deg C	0.010	0.010	1		09/07/17 09:52		
pH at 25 Degrees C	**8.2**	Std. Units	0.10	0.10	1		09/07/17 09:52		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19900**	mg/L	2500	1250	500		09/13/17 23:36	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/06/17 12:14	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.25 I**	mg/L	0.50	0.086	1	09/06/17 06:48	09/07/17 13:50	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-2/IW-2
Pace Project No.: 35334158

Sample: IW-2 2474 FEET **Lab ID: 35334158005** Collected: 09/04/17 11:50 Received: 09/05/17 14:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**45200**	umhos/cm	10.0	10.0	1		09/13/17 16:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**29600**	mg/L	250	250	1		09/07/17 13:58		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**21.6**	deg C	0.010	0.010	1		09/07/17 09:52		
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		09/07/17 09:52		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**18400**	mg/L	2500	1250	500		09/13/17 07:27	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/06/17 12:16	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.83**	mg/L	0.50	0.086	1	09/06/17 06:48	09/07/17 13:52	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-2/IW-2
Pace Project No.: 35334158

Sample: IW-2 2519 FEET **Lab ID: 35334158006** Collected: 09/04/17 17:04 Received: 09/05/17 14:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**51000**	umhos/cm	10.0	10.0	1		09/13/17 16:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**16800**	mg/L	50.0	50.0	1		09/07/17 13:58		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**21.8**	deg C	0.010	0.010	1		09/07/17 09:52		
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		09/07/17 09:52		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**21500**	mg/L	2500	1250	500		09/13/17 23:58	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/06/17 12:18	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.24 I**	mg/L	0.50	0.086	1	09/06/17 06:48	09/07/17 13:53	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-2/IW-2
Pace Project No.: 35334158

Sample: IW-2 2564 FEET **Lab ID: 35334158007** Collected: 09/04/17 23:36 Received: 09/05/17 14:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**43800**	umhos/cm	10.0	10.0	1		09/13/17 16:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**28900**	mg/L	250	250	1		09/07/17 13:58		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**21.7**	deg C	0.010	0.010	1		09/07/17 09:52		
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		09/07/17 09:52		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19400**	mg/L	1000	500	200		09/08/17 11:29	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/06/17 12:19	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.30 I**	mg/L	0.50	0.086	1	09/06/17 06:48	09/07/17 13:54	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DIW IW-2/IW-2

Pace Project No.: 35334158

Sample: IW-2 2609 FEET **Lab ID: 35334158008** Collected: 09/05/17 10:01 Received: 09/05/17 14:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2510B Specific Conductance	Analytical Method: SM 2510B								
Specific Conductance @ 25C	**46400**	umhos/cm	10.0	10.0	1		09/13/17 16:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**32700**	mg/L	250	250	1		09/20/17 08:33		Q
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**21.5**	deg C	0.010	0.010	1		09/07/17 09:52		
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		09/07/17 09:52		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19400**	mg/L	1000	500	200		09/08/17 13:11	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/06/17 12:21	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.13 I**	mg/L	0.50	0.086	1	09/06/17 06:48	09/07/17 13:56	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

September 29, 2017

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: STOF DIW IW-2
Pace Project No.: 35337203

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on September 22, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
Youngquist Brothers INC
Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

SAMPLE SUMMARY

Project: STOF DIW IW-2
Pace Project No.: 35337203

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35337203001	**IW-2 2654 Feet**	Water	09/19/17 02:12	09/22/17 12:25
35337203002	**IW-2 2699 Feet**	Water	09/19/17 08:40	09/22/17 12:25
35337203003	**IW-2 2744 Feet**	Water	09/19/17 12:25	09/22/17 12:25
35337203004	**IW-2 2789 Feet**	Water	09/19/17 17:19	09/22/17 12:25
35337203005	**IW-2 2834 Feet**	Water	09/19/17 22:17	09/22/17 12:25

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954-582-4300

ANALYTICAL RESULTS

Project: STOF DIW IW-2
Pace Project No.: 35337203

Sample: IW-2 2654 Feet **Lab ID: 35337203001** Collected: 09/19/17 02:12 Received: 09/22/17 12:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**42400**	umhos/cm	10.0	10.0	1		09/25/17 12:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**30900**	mg/L	250	250	1		09/25/17 13:44		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.2**	deg C	0.010	0.010	1		09/25/17 17:00		
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		09/25/17 17:00		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**15100**	mg/L	1000	500	200		09/24/17 04:50	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/28/17 09:16	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.23 I**	mg/L	0.50	0.086	1	09/25/17 18:03	09/27/17 12:45	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: STOF DIW IW-2
Pace Project No.: 35337203

Sample: IW-2 2699 Feet **Lab ID: 35337203002** Collected: 09/19/17 08:40 Received: 09/22/17 12:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**43100**	umhos/cm	10.0	10.0	1		09/25/17 12:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**33100**	mg/L	250	250	1		09/26/17 16:00		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.2**	deg C	0.010	0.010	1		09/25/17 17:00		
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		09/25/17 17:00		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**16400**	mg/L	1000	500	200		09/24/17 05:12	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/28/17 09:18	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.26 I**	mg/L	0.50	0.086	1	09/25/17 18:03	09/27/17 12:47	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
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954-582-4300

ANALYTICAL RESULTS

Project: STOF DIW IW-2
Pace Project No.: 35337203

Sample: IW-2 2744 Feet **Lab ID: 35337203003** Collected: 09/19/17 12:25 Received: 09/22/17 12:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**41100**	umhos/cm	10.0	10.0	1		09/25/17 12:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**30700**	mg/L	250	250	1		09/26/17 16:00		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.4**	deg C	0.010	0.010	1		09/25/17 17:00		
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		09/25/17 17:00		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**15000**	mg/L	1000	500	200		09/24/17 05:34	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/27/17 11:11	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.21 I**	mg/L	0.50	0.086	1	09/25/17 18:03	09/27/17 12:48	7727-37-9	

Pace Analytical Services, LLC
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954-582-4300

ANALYTICAL RESULTS

Project: STOF DIW IW-2
Pace Project No.: 35337203

Sample: IW-2 2789 Feet **Lab ID: 35337203004** Collected: 09/19/17 17:19 Received: 09/22/17 12:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**42700**	umhos/cm	10.0	10.0	1		09/25/17 12:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**32700**	mg/L	250	250	1		09/26/17 16:01		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.6**	deg C	0.010	0.010	1		09/25/17 17:00		
pH at 25 Degrees C	**8.1**	Std. Units	0.10	0.10	1		09/25/17 17:00		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**16000**	mg/L	1000	500	200		09/24/17 05:56	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/27/17 11:13	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.20 I**	mg/L	0.50	0.086	1	09/25/17 18:03	09/27/17 12:49	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: STOF DIW IW-2
Pace Project No.: 35337203

Sample: IW-2 2834 Feet **Lab ID: 35337203005** Collected: 09/19/17 22:17 Received: 09/22/17 12:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**42200**	umhos/cm	10.0	10.0	1		09/25/17 12:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**32000**	mg/L	250	250	1		09/26/17 16:01		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**23.4**	deg C	0.010	0.010	1		09/25/17 17:00		
pH at 25 Degrees C	**8.2**	Std. Units	0.10	0.10	1		09/25/17 17:00		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**17000**	mg/L	1000	500	200		09/24/17 06:18	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		09/27/17 11:18	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.18 I**	mg/L	0.50	0.086	1	09/25/17 18:03	09/27/17 12:51	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

October 09, 2017

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: STOF HW DIQ IW-2
Pace Project No.: 35338639

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on September 29, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
Youngquist Brothers INC
Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

SAMPLE SUMMARY

Project: STOF HW DIQ IW-2
Pace Project No.: 35338639

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35338639001	**IW-2 2879 FT**	Water	09/23/17 02:18	09/29/17 11:18
35338639002	**IW-2 2924 FT**	Water	09/23/17 13:07	09/29/17 11:18
35338639003	**IW-2 2969 FT**	Water	09/25/17 07:00	09/29/17 11:18

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: STOF HW DIQ IW-2
Pace Project No.: 35338639

Sample: IW-2 2879 FT **Lab ID: 35338639001** Collected: 09/23/17 02:18 Received: 09/29/17 11:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**63100**	umhos/cm	10.0	10.0	1		10/02/17 15:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**47600**	mg/L	250	250	1		10/02/17 16:15		Q
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**26.1**	deg C	0.010	0.010	1		10/06/17 11:30		
pH at 25 Degrees C	**7.6**	Std. Units	0.10	0.10	1		10/06/17 11:30		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**23600**	mg/L	2500	1250	500		10/02/17 19:50	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.020 U**	mg/L	0.050	0.020	1		10/06/17 14:46	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.13 I**	mg/L	0.50	0.086	1	10/04/17 14:23	10/09/17 16:58	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: STOF HW DIQ IW-2
Pace Project No.: 35338639

Sample: IW-2 2924 FT **Lab ID: 35338639002** Collected: 09/23/17 13:07 Received: 09/29/17 11:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**45400**	umhos/cm	10.0	10.0	1		10/02/17 15:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**33200**	mg/L	250	250	1		10/02/17 16:16		Q
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**26.7**	deg C	0.010	0.010	1		10/06/17 11:30		
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		10/06/17 11:30		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**16600**	mg/L	1000	500	200		10/01/17 20:41	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.038 I**	mg/L	0.050	0.020	1		10/06/17 14:48	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.17 I**	mg/L	0.50	0.086	1	10/04/17 14:23	10/09/17 16:59	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: STOF HW DIQ IW-2
Pace Project No.: 35338639

Sample: IW-2 2969 FT **Lab ID: 35338639003** Collected: 09/25/17 07:00 Received: 09/29/17 11:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance	**47900**	umhos/cm	10.0	10.0	1		10/02/17 15:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**34100**	mg/L	250	250	1		10/02/17 16:56		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
Temperature, Water (C)	**26.8**	deg C	0.010	0.010	1		10/06/17 11:30		
pH at 25 Degrees C	**7.7**	Std. Units	0.10	0.10	1		10/06/17 11:30		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**17900**	mg/L	1000	500	200		10/01/17 21:03	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.046 I**	mg/L	0.050	0.020	1		10/06/17 14:50	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.15 I**	mg/L	0.50	0.086	1	10/04/17 14:23	10/09/17 17:00	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

February 02, 2018

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: STOF HW DZMW-1
Pace Project No.: 35369212

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on January 19, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
Youngquist Brothers INC
Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

SAMPLE SUMMARY

Project: STOF HW DZMW-1
Pace Project No.: 35369212

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35369212001	**MW1-1032 FT**	Water	01/17/18 16:30	01/19/18 12:56
35369212002	**MW1-1077 FT**	Water	01/17/18 22:21	01/19/18 12:56
35369212003	**MW1-1122 FT**	Water	01/18/18 03:05	01/19/18 12:56
35369212004	**MW1-1167 FT**	Water	01/18/18 07:28	01/19/18 12:56
35369212005	**MW1-1212 FT**	Water	01/18/18 11:01	01/19/18 12:56
35369212006	**MW1-1257 FT**	Water	01/18/18 12:55	01/19/18 12:56
35369212007	**MW1-1302 FT**	Water	01/18/18 15:08	01/19/18 12:56
35369212008	**MW1-1347 FT**	Water	01/18/18 17:00	01/19/18 12:56
35369212009	**MW1-1392 FT**	Water	01/18/18 19:58	01/19/18 12:56
35369212010	**MW1-1437 FT**	Water	01/19/18 02:01	01/19/18 12:56

Pace Analytical Services, LLC
3610 Park Central Blvd N
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954-582-4300

ANALYTICAL RESULTS

Project: STOF HW DZMW-1
Pace Project No.: 35369212

Sample: MW1-1032 FT **Lab ID: 35369212001** Collected: 01/17/18 16:30 Received: 01/19/18 12:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**6250**	umhos/cm	2.0	2.0	1		01/25/18 17:13		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3680**	mg/L	50.0	50.0	1		01/30/18 17:02		J(D6),Q
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.4**	Std. Units	0.10	0.10	1		01/25/18 18:25		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1560**	mg/L	500	250	100		01/21/18 00:34	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.60**	mg/L	0.050	0.035	1		01/23/18 10:15	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.66**	mg/L	0.50	0.086	1	01/24/18 07:46	01/24/18 13:20	7727-37-9	

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: STOF HW DZMW-1
Pace Project No.: 35369212

Sample: MW1-1077 FT **Lab ID: 35369212002** Collected: 01/17/18 22:21 Received: 01/19/18 12:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**4040**	umhos/cm	2.0	2.0	1		01/25/18 17:13		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**2510**	mg/L	20.0	20.0	1		01/24/18 17:58		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**9.7**	Std. Units	0.10	0.10	1		01/25/18 18:27		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**934**	mg/L	250	125	50		01/21/18 01:40	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.23**	mg/L	0.050	0.035	1		01/23/18 10:17	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.50**	mg/L	0.50	0.086	1	01/24/18 07:46	01/24/18 13:21	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: STOF HW DZMW-1
Pace Project No.: 35369212

Sample: MW1-1122 FT **Lab ID: 35369212003** Collected: 01/18/18 03:05 Received: 01/19/18 12:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**4190**	umhos/cm	2.0	2.0	1		01/25/18 17:13		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**2460**	mg/L	20.0	20.0	1		01/25/18 17:42		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.8**	Std. Units	0.10	0.10	1		01/25/18 18:31		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**952**	mg/L	250	125	50		01/21/18 02:02	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.17**	mg/L	0.050	0.035	1		01/23/18 10:19	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.41 I**	mg/L	0.50	0.086	1	01/24/18 07:46	01/24/18 13:22	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DZMW-1
Pace Project No.: 35369212

Sample: MW1-1167 FT **Lab ID: 35369212004** Collected: 01/18/18 07:28 Received: 01/19/18 12:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**7020**	umhos/cm	2.0	2.0	1		01/25/18 17:14		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**4370**	mg/L	50.0	50.0	1		01/25/18 17:43		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		01/25/18 18:32		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1840**	mg/L	500	250	100		01/21/18 02:24	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.65**	mg/L	0.050	0.035	1		01/23/18 10:21	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.68**	mg/L	0.50	0.086	1	01/24/18 07:46	01/24/18 13:23	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HW DZMW-1
Pace Project No.: 35369212

Sample: MW1-1212 FT **Lab ID: 35369212005** Collected: 01/18/18 11:01 Received: 01/19/18 12:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**6980**	umhos/cm	2.0	2.0	1		01/25/18 17:14		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3790**	mg/L	50.0	50.0	1		01/25/18 16:45		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		01/25/18 18:34		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1780**	mg/L	500	250	100		01/21/18 02:47	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.60**	mg/L	0.050	0.035	1		01/23/18 10:23	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.70**	mg/L	0.50	0.086	1	01/24/18 07:46	01/24/18 13:26	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DZMW-1
Pace Project No.: 35369212

Sample: MW1-1257 FT **Lab ID: 35369212006** Collected: 01/18/18 12:55 Received: 01/19/18 12:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**6310**	umhos/cm	2.0	2.0	1		01/25/18 17:11		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3750**	mg/L	50.0	50.0	1		01/25/18 16:46		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.2**	Std. Units	0.10	0.10	1		01/25/18 18:34		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1640**	mg/L	250	125	50		01/21/18 09:12	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.26**	mg/L	0.050	0.035	1		01/23/18 10:25	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.41 I**	mg/L	0.50	0.086	1	01/24/18 07:46	01/24/18 13:26	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HW DZMW-1
Pace Project No.: 35369212

Sample: MW1-1302 FT **Lab ID: 35369212007** Collected: 01/18/18 15:08 Received: 01/19/18 12:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**7200**	umhos/cm	2.0	2.0	1		01/25/18 17:14		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3990**	mg/L	50.0	50.0	1		01/25/18 16:46		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.10	1		01/25/18 18:35		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1710**	mg/L	500	250	100		01/21/18 03:31	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.53**	mg/L	0.050	0.035	1		01/23/18 10:30	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.55**	mg/L	0.50	0.086	1	01/24/18 07:46	01/24/18 13:27	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DZMW-1
Pace Project No.: 35369212

Sample: MW1-1347 FT **Lab ID: 35369212008** Collected: 01/18/18 17:00 Received: 01/19/18 12:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**10900**	umhos/cm	2.0	2.0	1		01/25/18 17:18		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**6700**	mg/L	100	100	1		01/25/18 16:47		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.7**	Std. Units	0.10	0.10	1		01/25/18 18:35		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**3180**	mg/L	500	250	100		01/21/18 03:53	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.24**	mg/L	0.050	0.035	1		01/23/18 10:50	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.32 I**	mg/L	0.50	0.086	1	01/24/18 07:46	01/24/18 13:28	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DZMW-1
Pace Project No.: 35369212

Sample: MW1-1392 FT **Lab ID: 35369212009** Collected: 01/18/18 19:58 Received: 01/19/18 12:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**12900**	umhos/cm	2.0	2.0	1		01/25/18 17:19		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**7520**	mg/L	100	100	1		01/25/18 16:47		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.8**	Std. Units	0.10	0.10	1		01/25/18 18:37		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**3960**	mg/L	500	250	100		01/21/18 09:35	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.20**	mg/L	0.050	0.035	1		01/23/18 10:52	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.29 I**	mg/L	0.50	0.086	1	01/24/18 07:46	01/24/18 13:29	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HW DZMW-1
Pace Project No.: 35369212

Sample: MW1-1437 FT **Lab ID: 35369212010** Collected: 01/19/18 02:01 Received: 01/19/18 12:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**15900**	umhos/cm	2.0	2.0	1		01/25/18 17:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**10900**	mg/L	100	100	1		01/25/18 16:48		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.5**	Std. Units	0.10	0.10	1		01/25/18 18:36		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4880**	mg/L	1000	500	200		01/21/18 04:37	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.24**	mg/L	0.050	0.035	1		01/23/18 10:54	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.27 I**	mg/L	0.50	0.086	1	01/24/18 07:46	01/24/18 13:30	7727-37-9	

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January 30, 2018

Charles Reynolds
Youngquist
15465 Pine Ridge Rd
Fort Myers, FL 33908

RE: Project: STOF HWD MW-1
Pace Project No.: 35369499

Dear Charles Reynolds:

Enclosed are the analytical results for sample(s) received by the laboratory on January 22, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rossy Guima
rossy.guima@pacelabs.com
954-582-4300
Project Manager

Enclosures

cc: Odet Diaz
Clay Fergunson, Youngquist Brothers, Inc
Chris Fulbright, Youngquist Brothers, Inc
Youngquist Brothers INC
Bill Musselwhite, Youngquist Brothers
Mwengrenovich
STOF.HW.DIW
Harvey Youngquist, Youngquist Brothers

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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SAMPLE SUMMARY

Project: STOF HWD MW-1
Pace Project No.: 35369499

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35369499001	**MW-1 1482 FEET**	Water	01/19/18 07:18	01/22/18 16:56
35369499002	**MW-1 1527 FEET**	Water	01/19/18 12:02	01/22/18 16:56
35369499003	**MW-1 1572 FEET**	Water	01/19/18 16:47	01/22/18 16:56
35369499004	**MW-1 1617 FEET**	Water	01/19/18 21:30	01/22/18 16:56
35369499005	**MW-1 1662 FEET**	Water	01/20/18 01:09	01/22/18 16:56
35369499006	**MW-1 1707 FEET**	Water	01/20/18 04:31	01/22/18 16:56
35369499007	**MW-1 1752 FEET**	Water	01/20/18 07:21	01/22/18 16:56
35369499008	**MW-1 1797 FEET**	Water	01/20/18 12:09	01/22/18 16:56

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ANALYTICAL RESULTS

Project: STOF HWD MW-1

Pace Project No.: 35369499

Sample: MW-1 1482 FEET **Lab ID: 35369499001** Collected: 01/19/18 07:18 Received: 01/22/18 16:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**20600**	umhos/cm	2.0	2.0	1		01/29/18 16:28		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**12000**	mg/L	100	100	1		01/26/18 18:17		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		01/24/18 10:35		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**6100**	mg/L	1000	500	200		01/23/18 19:46	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.18**	mg/L	0.050	0.035	1		01/23/18 11:27	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.26 I**	mg/L	0.50	0.086	1	01/24/18 07:46	01/24/18 14:01	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HWD MW-1
Pace Project No.: 35369499

Sample: MW-1 1527 FEET **Lab ID: 35369499002** Collected: 01/19/18 12:02 Received: 01/22/18 16:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**16700**	umhos/cm	2.0	2.0	1		01/29/18 16:28		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**8560**	mg/L	100	100	1		01/25/18 16:57		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		01/24/18 10:35		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4780**	mg/L	1000	500	200		01/23/18 20:08	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.25**	mg/L	0.050	0.035	1		01/23/18 11:29	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.32 I**	mg/L	0.50	0.086	1	01/24/18 07:46	01/24/18 14:02	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HWD MW-1
Pace Project No.: 35369499

Sample: MW-1 1572 FEET **Lab ID: 35369499003** Collected: 01/19/18 16:47 Received: 01/22/18 16:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**16100**	umhos/cm	2.0	2.0	1		01/29/18 16:28		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**9500**	mg/L	100	100	1		01/26/18 18:17		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.10	1		01/24/18 10:36		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4610**	mg/L	1000	500	200		01/23/18 20:30	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.26**	mg/L	0.050	0.035	1		01/23/18 11:31	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.34 I**	mg/L	0.50	0.086	1	01/25/18 06:54	01/26/18 09:38	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HWD MW-1
Pace Project No.: 35369499

Sample: MW-1 1617 FEET **Lab ID: 35369499004** Collected: 01/19/18 21:30 Received: 01/22/18 16:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**14200**	umhos/cm	2.0	2.0	1		01/29/18 16:28		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**8000**	mg/L	100	100	1		01/26/18 18:18		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**7.7**	Std. Units	0.10	0.10	1		01/24/18 10:37		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4060**	mg/L	1000	500	200		01/23/18 20:53	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.41**	mg/L	0.050	0.035	1		01/24/18 11:45	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.47 I**	mg/L	0.50	0.086	1	01/25/18 06:54	01/26/18 09:39	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HWD MW-1
Pace Project No.: 35369499

Sample: MW-1 1662 FEET **Lab ID: 35369499005** Collected: 01/20/18 01:09 Received: 01/22/18 16:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**17700**	umhos/cm	2.0	2.0	1		01/29/18 16:28		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**10600**	mg/L	100	100	1		01/26/18 18:19		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		01/24/18 10:37		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4640**	mg/L	1000	500	200		01/23/18 22:43	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.36**	mg/L	0.050	0.035	1		01/24/18 11:50	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.46 I**	mg/L	0.50	0.086	1	01/25/18 06:54	01/26/18 09:40	7727-37-9	

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ANALYTICAL RESULTS

Project: STOF HWD MW-1
Pace Project No.: 35369499

Sample: MW-1 1707 FEET **Lab ID: 35369499006** Collected: 01/20/18 04:31 Received: 01/22/18 16:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**17700**	umhos/cm	2.0	2.0	1		01/29/18 16:28		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**10600**	mg/L	100	100	1		01/26/18 18:19		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		01/24/18 10:38		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4560**	mg/L	1000	500	200		01/23/18 23:06	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.35**	mg/L	0.050	0.035	1		01/24/18 11:52	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.51**	mg/L	0.50	0.086	1	01/25/18 06:54	01/26/18 09:41	7727-37-9	

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: STOF HWD MW-1

Pace Project No.: 35369499

Sample: MW-1 1752 FEET **Lab ID: 35369499007** Collected: 01/20/18 07:21 Received: 01/22/18 16:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**18600**	umhos/cm	2.0	2.0	1		01/29/18 16:28		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**11000**	mg/L	100	100	1		01/26/18 18:19		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.10	1		01/24/18 10:39		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**5730**	mg/L	1000	500	200		01/23/18 23:28	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.28**	mg/L	0.050	0.035	1		01/24/18 11:54	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.35 I**	mg/L	0.50	0.086	1	01/25/18 06:54	01/26/18 09:44	7727-37-9	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: STOF HWD MW-1
Pace Project No.: 35369499

Sample: MW-1 1797 FEET **Lab ID: 35369499008** Collected: 01/20/18 12:09 Received: 01/22/18 16:56 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
120.1 Specific Conductance	Analytical Method: EPA 120.1								
Specific Conductance @ 25C	**26700**	umhos/cm	2.0	2.0	1		01/29/18 16:28		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**15900**	mg/L	100	100	1		01/26/18 18:20		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**7.6**	Std. Units	0.10	0.10	1		01/24/18 10:39		Q
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8200**	mg/L	1000	500	200		01/23/18 23:50	16887-00-6	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.20**	mg/L	0.050	0.035	1		01/24/18 11:56	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**0.32 I**	mg/L	0.50	0.086	1	01/25/18 06:54	01/26/18 09:44	7727-37-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

QUALIFIERS

Project: STOF HW DIW
Pace Project No.: 35349820

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.
ND - Not Detected at or above adjusted reporting limit.
TNTC - Too Numerous To Count
MDL - Adjusted Method Detection Limit.
PQL - Practical Quantitation Limit.
RL - Reporting Limit.
S - Surrogate
1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.
Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.
LCS(D) - Laboratory Control Sample (Duplicate)
MS(D) - Matrix Spike (Duplicate)
DUP - Sample Duplicate
RPD - Relative Percent Difference
NC - Not Calculable.
SG - Silica Gel - Clean-Up
U - Indicates the compound was analyzed for, but not detected.
N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.
Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.
TNI - The NELAC Institute.

LABORATORIES

PASI-O	Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Compound was analyzed for but not detected.
J(M1)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
L	Off-scale high. Actual value is known to be greater than value given.

REPORT OF LABORATORY ANALYSIS

APPENDIX E

LITHOLOGIC DESCRIPTIONS OF SAMPLES

Hazen

Appendix E – Lithologic Description of Samples
Injection Well- IW-1
Seminole Tribe of Florida – Hollywood Reservation
Broward County, Florida

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
Undifferentiated Quaternary Surficial Deposits		
0 - 20	20	SAND – 100% Grayish orange (10YR 7/4), very fine grained, sub-angular to sub-rounded, moderately sorted, unconsolidated, quartz, trace organics
20 - 40	20	SAND – 100% Pale yellowish brown (10YR 6/2), very fine grained, sub-angular to sub-rounded, moderately sorted, unconsolidated, quartz, trace organics
Pliocene-Pleistocene Series		
40 - 60	20	SAND, LIMESTONE, AND SHELL FRAGMENTS – 70% Sand Very pale orange (10YR 8/2), unconsolidated, fine to medium grained, sub-angular quartz. 20% Limestone (wackestone) very pale orange (10YR 8/2), fine grained, moderately hard, moderately indurated. 10% Shell fragments. Trace crystalline carbonate
60 - 80	20	LIMEY SANDSTONE AND LIMESTONE – 70% Limey Sandstone pale yellowish brown (10YR 6/2), fine to medium grained with fine grained detrital carbonate, well cemented with calcite. 30% Limestone (wackestone) grayish orange (10YR 7/4) to yellowish orange (10YR 7/6), fine grained, hard, very well indurated, slightly sandy.
80 - 100	20	LIMEY SANDSTONE – 100% Pale yellowish brown (10YR 6/2) fine grained, hard, well to very well cemented with calcite, abundant detrital carbonate, weakly phosphatic.
100 - 160	60	LIMESTONE AND LIMEY SANDSTONE – 70% Limestone (wackestone) very pale orange (10YR 8/2), fine grained, moderately hard. 30% Limey Sandstone light olive gray (5Y 6/1) to yellowish gray (5Y 8/1), very fine to fine grained quartz with detrital carbonate, well cemented with calcite. Trace crystalline carbonate (calcite).
160 - 170	10	NO SAMPLE
180 - 200	20	SANDY LIMESTONE – 100% (packstone) Light olive gray (5Y 6/1), fine to medium grained, moderately hard, well indurated, weakly phosphatic with fine to medium grained quartz sand and shell fragments.
Hawthorn Group – Peace River Formation		
200 – 220	20	SANDY CLAY – 100% Very light gray (N8), very soft, non-plastic, non-cohesive, weakly phosphatic, with abundant fine to medium grained quartz sand and detrital carbonate
220 – 250	30	SANDY CLAY – 100% Light olive gray (5Y 6/1), very soft, non-plastic, non-cohesive, weakly phosphatic, with abundant fine to medium grained quartz sand and detrital carbonate.
250 – 270	20	SANDY LIMEY CLAY AND SHELL FRAGMENTS – Sandy Clay 80% light olive gray (5Y 6/1) with abundant fine grained quartz sand and detrital carbonate, weakly phosphatic. Shell fragments 20%.

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
270 – 280	10	SANDY CLAY and CHERT- 95% Light olive gray (5Y 6/1), very soft, non-plastic, non-cohesive, weakly phosphatic, with abundant medium grained quartz sand and detrital carbonate. 5% Chert medium light gray (N6), cryptocrystalline, very hard.
280 – 290	10	SANDY LIMEY CLAY AND SHELL FRAGMENTS – Sandy Clay 80% light olive gray (5Y 6/1) with abundant fine grained quartz sand and detrital carbonate, weakly phosphatic. Shell fragments 20%.
290 – 300	10	SANDY CLAY and CHERT- 95% Light olive gray (5Y 6/1), very soft, non-plastic, non-cohesive, weakly phosphatic, with abundant medium grained quartz sand and detrital carbonate. 5% Chert medium light gray (N6), cryptocrystalline, very hard.
300 – 330	30	SANDY LIMEY CLAY AND SHELL FRAGMENTS – Sandy Clay 80% light olive gray (5Y 6/1) with abundant fine grained quartz sand and detrital carbonate, weakly phosphatic. Shell fragments 20%.
330 – 340	10	NO SAMPLE
340 – 350	10	CLAY – 100% Olive gray (5Y 3/2), soft, plastic, cohesive, slightly calcareous, weakly phosphatic.
350 – 380	30	CLAY – 100% Olive gray (5Y 3/2), very soft, weakly to moderately plastic, cohesive, slightly calcareous, weakly phosphatic.
380 – 390	10	SANDY CLAY- 100% Olive gray (5Y 3/1), very soft, plastic, moderately cohesive, weakly phosphatic, with abundant fine grained quartz sand and detrital carbonate.
390 – 400	10	CLAY – 100% Olive gray (5Y 3/2), very soft, weakly to moderately plastic, cohesive, slightly calcareous, weakly phosphatic.
400 – 410	10	SANDY CLAY – 100% Olive gray (5Y 4/1), very soft, weakly plastic, cohesive, slightly phosphatic, moderately calcareous with abundant fine grained quartz sand.
410 – 420	10	SANDY CLAY – 100% Olive gray (5Y 4/1), medium, plastic, cohesive, slightly phosphatic, moderately calcareous with abundant fine grained quartz sand.
420 – 430	10	SANDY CLAY – 100% Dark greenish gray (5GY 5/1), stiff, plastic, cohesive, slightly phosphatic, moderately calcareous with abundant fine grained quartz sand.
430 – 440	10	SANDY CLAY – 100% Olive gray (5Y 5/1), stiff, plastic, cohesive, slightly phosphatic, moderately calcareous with abundant fine grained quartz sand.
440 – 450	10	SANDY CLAY – 100% Olive gray (5Y 4/2), soft, plastic, cohesive, slightly phosphatic with abundant fine grained quartz sand and detrital carbonate.
450 – 460		NO SAMPLE
460 – 500	40	SANDY CLAY – 100% Dark greenish gray (5GY 4/1), soft, plastic, cohesive, slightly phosphatic, slightly calcareous with abundant very fine grained quartz sand.
500 – 510	10	CHERT AND LIMESTONE – 80% Chert Olive black (5Y 2/1), cryptocrystalline, very hard. 20% Limestone (mudstone) Light olive gray (5Y 5/2) to moderate olive gray (5Y 4/2), very fine grained, soft, very well indurated with abundant casts.

Hazen

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
Miocene-Oligocene Series Hawthorn Group – Arcadia Formation		
510 - 520	10	SANDY LIMEY CLAY – 100% Moderate greenish gray (5GY 7/1), medium, plastic, moderately cohesive, highly calcareous, weakly phosphatic. Trace crystalline quartz and detrital carbonate.
520 - 530	10	CLAY – 100% Yellowish gray (5Y 7/2), medium, plastic, cohesive, calcareous, weakly phosphatic.
530 - 560	30	CLAY – 100% Light olive gray (5Y 6/1), soft, plastic, cohesive, calcareous, weakly phosphatic.
560 - 570	10	LIMESTONE AND CLAY – 70% Limestone (mudstone) Yellowish gray (5Y 7/2), fine grained, soft, poorly indurated. 30% Clay Greenish gray (5GY 6/1), soft, plastic, cohesive, calcareous, very weakly phosphatic.
570 - 580	10	CLAY – 100% Light olive gray (5Y 6/1), soft, plastic, cohesive, calcareous, very weakly phosphatic. Trace detrital carbonate.
580 - 600	20	CLAY – 100% Yellowish gray (5Y 7/2), very soft to soft, plastic, cohesive, highly calcareous, very weakly phosphatic.
600 - 620	20	CLAY – 100% Light olive gray (5Y 6/1) to yellowish gray (5Y 7/2), very soft, plastic, cohesive, highly calcareous, very weakly phosphatic. Trace Limestone and detrital carbonate.
620 - 640	20	CLAY – 100% Greenish gray (5GY 6/1), soft, plastic, cohesive, calcareous.
640 - 650	10	CLAY – 100% Yellowish gray (5Y 7/2), stiff, moderately plastic, cohesive, highly calcareous.
650 - 660	10	CLAY – 100% Yellowish gray (5Y 7/2), medium, non-plastic, cohesive, highly calcareous.
660 - 670	10	NO SAMPLE
670 - 680	10	CLAY – 100% Yellowish gray (5Y 7/2), medium, plastic, cohesive, calcareous.
680 - 690	10	SHELL FRAGMENTS AND LIMESTONE – 80% Shell fragments. 20% Limestone (packstone) Very pale orange (10YR 8/2), fine to medium grained, hard, well indurated, locally weakly phosphatic with abundant detrital carbonate (calcite).
690 - 700	10	LIMESTONE AND SHELL FRAGMENTS – 90% Limestone (grainstone) Yellowish gray (5Y 8/1), very fine to medium grained, pelloidal, moderately soft, poorly indurated, weakly phosphatic. 10% Shell fragments. Abundant detrital carbonate (calcite).
700 - 720	20	NO SAMPLE
720 - 730	10	CLAY – 100% Yellowish gray (5Y 7/2), medium, plastic, cohesive, highly calcareous. Trace detrital carbonate.
730 - 740	10	CLAY – 100% Light olive gray (5Y 5/2), soft, plastic, cohesive, calcareous, weakly phosphatic.
740 - 790	50	CLAY – 100% Light olive gray (5Y 5/2), very soft, non-plastic to moderately plastic, cohesive, calcareous, very weakly phosphatic.

Hazen

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
790 - 830	40	CLAY AND LIMESTONE – 90% Clay light olive gray (5Y 5/2), very soft, non-plastic to moderately plastic, cohesive, calcareous, very weakly phosphatic. 10% Limestone (grainstone) Very pale orange (10YR 8/2), fine to medium grained, hard to moderately soft, weakly phosphatic.
830 - 840	10	LIMESTONE AND CLAY – 90% Limestone (grainstone) Very pale orange (10YR 8/2), fine to medium grained, hard to moderately soft, weakly phosphatic. 10% Clay Light olive gray (5Y 5/2), very soft, non-plastic to moderately plastic, cohesive, calcareous, very weakly phosphatic.
840 - 870	30	CLAY AND LIMESTONE – 90% Clay light olive gray (5Y 5/2), very soft, non-plastic to moderately plastic, cohesive, calcareous, very weakly phosphatic. 10% Limestone (grainstone) Very pale orange (10YR 8/2), fine to medium grained, hard to moderately soft, weakly phosphatic.
870 - 900	30	CLAY AND LIMESTONE – 90% Clay light olive gray (5Y 5/2), very soft, non-plastic to moderately plastic, cohesive, calcareous, very weakly phosphatic. 10% Limestone (grainstone) very pale orange (10YR 8/2), fine to medium grained, hard to moderately soft, weakly phosphatic.
900 - 910	10	CLAY – 100% Light olive gray (5Y 5/2), medium, plastic, cohesive, calcareous, weakly phosphatic. Trace very fine grained crystalline quartz
910 - 920	10	CLAY – 100% Light olive gray (5Y 5/2), medium to stiff, plastic, cohesive, calcareous, weakly phosphatic. Trace Limestone
920 - 930	10	CLAY – 100% Light olive gray (5Y 5/2), soft, plastic, cohesive, calcareous, weakly phosphatic
930 - 940	10	CLAY – 100% Grayish olive (10Y 5/2), very soft, plastic, cohesive, calcareous, weakly phosphatic
940 - 950	10	LIMESTONE AND CLAY – 50% Limestone (wackestone to packstone) yellowish gray (5Y 7/2), fine grained, moderately hard, well indurated, weakly phosphatic. 20% (packstone) Light olive gray (5Y 5/2), very fine to fine grained, hard, well indurated, locally weakly vuggy, weakly phosphatic with molds and casts present. 30% Clay pale olive (10Y 6/2), soft, plastic, cohesive, calcareous. Fossils scarce.
950 - 960	10	SANDY LIMESTONE – 100%; 60% (packstone) Yellowish gray (5Y 8/1) to light bluish gray (5B 8/1), fine to medium grained, hard, well indurated, weakly phosphatic with abundant fine grained quartz sand, casts common. 30% (packstone) Yellowish gray (5Y 6/2), fine to medium grained, moderately hard, well indurated, slightly phosphatic with abundant fine grained quartz sand. 10% (packstone) Yellowish gray (5Y 8/1), fine grained, moderately hard, well indurated, weakly phosphatic with abundant fine grained quartz sand
960 - 980	20	SANDY LIMESTONE – 100%; 50% (packstone) Yellowish gray (5Y 8/1) to light bluish gray (5B 8/1), fine to medium grained, hard, well indurated, weakly phosphatic with abundant fine grained quartz sand, casts common. 40% (packstone) Yellowish gray (5Y 8/1), fine to coarse grained, hard, well indurated, moderately phosphatic with abundant fine grained quartz sand, casts at 980. 10% (mudstone to wackestone) Yellowish gray (5Y 8/1), very fine to fine grained, moderately soft, moderately indurated, weakly phosphatic with fine grained quartz sand

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
980 – 1,000	20	SANDY LIMESTONE – 100%; 45% (packstone) Yellowish gray (5Y 8/2), fine to medium grained, moderately hard, well indurated, weakly phosphatic with fine grained quartz sand, casts and molds common. 30% (packstone) Yellowish gray (5Y 8/1), very fine to medium grained, moderately soft, moderately indurated, weakly phosphatic with fine grained quartz. 15% (packstone) Yellowish gray (5Y 8/1), fine to coarse sand grained, hard, well indurated, moderately phosphatic with abundant fine grained quartz sand, 10% (packstone) Yellowish gray (5Y 8/1) to light bluish gray (5B 8/1), very fine to medium grained, hard, well indurated, weakly phosphatic with abundant fine grained quartz sand, casts and molds common. Trace fossils and crystalline carbonate
1,000 – 1,020	20	LIMESTONE – 100%; 75% (packstone) Yellowish gray (5Y 7/2) to light gray (N7), very fine to coarse grained, hard, well indurated with casts and molds common; 15% (mudstone) light olive gray (5Y 7/1), very fine to fine grained, moderately hard, well indurated, weakly phosphatic; 10% (boundstone) very pale orange (10YR 8/2) to light olive gray (5Y 7/1), coarse grained, hard, well indurated
1,020 – 1,030	10	LIMESTONE – 100%; 60% (mudstone) Light olive gray (5Y 5/2) to medium bluish gray (5B 5/1), microcrystalline, hard, well indurated, weakly phosphatic with casts and molds common; 40% (grainstone) very pale orange (10YR 8/2), fine grained, hard, well indurated, pelloidal
Middle Eocene Avon Park Formation		
1,030 – 1,040	10	LIMESTONE – 100%; 70% (grainstone) Very pale orange (10YR 8/2) to yellowish gray (5Y 7/2), fine to coarse grained, hard, moderately to well indurated, pelloidal; 30% (packstone) light olive gray (5Y 6/1), fine to medium grained, hard, well indurated, weakly phosphatic
1,040 – 1,050	10	LIMESTONE – 100%; 80% (grainstone) Very pale orange (10YR 8/2), fine grained, hard, well indurated, pelloidal; 20% (packstone) light olive gray (5Y 7/1), microcrystalline to medium grained, hard, moderately indurated, weakly phosphatic. Trace Echinoids with replacement calcite
1,050 – 1,060	10	LIMESTONE – 100% (grainstone) Very pale orange (10YR 8/2) to yellowish gray (5Y 8/1), fine grained, moderately soft, poorly indurated. Echinoids to 20 mm in diameter
1,060 – 1,070	10	LIMESTONE – 100%; 50% (grainstone) Very pale orange (10YR 8/2), fine grained, hard, well indurated, locally sparry; 40% (wackestone to packstone) yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), fine grained, hard, well indurated, locally weakly phosphatic; 10% (mudstone) medium gray (N5), microcrystalline, soft, well indurated with few shell fragments. Trace Dolomitic limestone
1,070 – 1,080	10	LIMESTONE – 100%; 60% (packstone) Very pale orange (10YR 8/2), very fine to fine grained, soft to hard, moderately indurated, locally sparry; 40% (mudstone to wackestone) pale yellowish brown (10YR 7/2), very fine to fine grained, hard, well indurated, locally sparry, weakly dolomitic. Trace Echinoids
1,080 – 1,090	10	LIMESTONE – 100%; 70% (packstone to grainstone) Very pale orange (10YR 8/2), very fine to medium grained, soft, poorly indurated; 30% (wackestone) pale yellowish brown (10YR 7/2), very fine to fine grained, hard, well indurated, weakly dolomitic. Echinoids to 10 mm in diameter, forams common

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
1,090 – 1,100	10	LIMESTONE – 100%; 90% Limestone (grainstone) Very pale orange (10YR 8/2), medium grained, moderately hard, moderately well indurated, with casts. 20% (mudstone) Light olive gray (5Y 7/1), hard, cryptocrystalline, locally weakly vuggy with casts and molds
1,100 – 1,120	20	LIMESTONE – 100% Limestone (packstone) Very pale orange (10YR 8/2), medium grained, moderately hard, moderately well indurated, pelloidal with casts.
1,120 – 1,130	10	LIMESTONE – 100%; 80% (packstone) Pale yellowish brown (10YR 6/2) medium grained, moderately hard, well indurated. 20% (mudstone) Pale yellowish brown (10YR 6/2) microcrystalline, hard, very well indurated, weakly vuggy. Trace pale yellowish brown (10YR 6/2) very soft, carbonate clay (marl)
1,130 – 1,140	10	LIMESTONE – 100%; 80% (packstone) Yellowish brown (10YR 6/4) fine to medium grained, moderately soft to moderately hard, moderately well indurated 20% (wackestone) Yellowish brown (10YR 6/4), microcrystalline to medium grained, hard, very well indurated, very weakly vuggy
1,140 – 1,150	10	LIMESTONE – 100% (grainstone) Pale yellowish brown 10YR 6/2) to very pale orange (10YR 8/2) medium grained, moderately hard, moderately well indurated. Forams abundant
1,150 – 1,160	10	LIMESTONE – 100% 80% (grainstone) Very pale orange (10YR 8/2) medium grained, moderately hard, moderately well indurated pelloidal 20% (wackestone) Very pale orange (10YR 8/2) fine to very fine grained, hard, moderately indurated, weakly vuggy
1,160 – 1,170	10	LIMESTONE – 100% 70% (packstone) Pale yellowish brown (10YR 6/2) medium to fine grained, moderately hard, moderately indurated, fossiliferous. 20% (wackestone) Very pale orange (10YR 8/2) fine to very fine grained, hard, moderately indurated, weakly vuggy. 10% (mudstone) medium light gray (N6) cryptocrystalline, hard, very well indurated with casts.
1,170 – 1,190	20	LIMESTONE – 100%; 80% (packstone) Pale grayish orange (10YR 6/4) fine grained, moderately soft to moderately hard, well indurated with molds. 20% (mudstone) Pale yellowish brown (10YR 7/2) microcrystalline, hard, well indurated, weakly vuggy
1,190 – 1,200	10	LIMESTONE – 100%; 60% (packstone) Pale grayish orange (10YR 6/4) fine to medium grained, moderately hard, well indurated. 20% (mudstone) Pale yellowish brown (10YR 7/2) fine grained, hard, weakly vuggy. 20% (mudstone) Yellowish gray (5Y 8/1) microcrystalline, hard, very well indurated.
1,200 – 1,210	10	LIMESTONE – 100%; 80% (wackestone to packstone) Pale yellowish brown (10YR 7/2), microcrystalline to fine grained, moderately hard, well indurated, locally sandy, weakly vuggy, fossiliferous. 20% (grainstone) pale yellowish brown (10YR 7/2), fine to medium grained, soft, poorly indurated, fossiliferous
1,210 – 1,220	10	LIMESTONE – 100% (mudstone) Very pale orange (7.5/2), very fine to fine grained, soft, moderately indurated. Trace Limestone (grainstone) very pale orange (10YR 8/2), fine to medium grained, moderately hard, well indurated
1,220 – 1,230	10	LIMESTONE – 100% (packstone) Grayish orange (10YR 7/2), very fine to medium grained, soft, moderately indurated. Trace Echinoids

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
1,230 – 1,240	10	LIMESTONE – 100%; 70% (grainstone) Grayish orange (10YR 7/4), fine to medium grained, soft, moderately indurated. 30% (mudstone) grayish orange (10YR 7/2), cryptocrystalline to microcrystalline, hard, well indurated, weakly dolomitic with few casts and molds
1,240 – 1,250	10	LIMESTONE – 100% (packstone) Grayish orange (10YR 7/2), fine to medium grained, soft, moderately indurated, fossiliferous. Trace Echinoids
1,250 – 1,260	10	LIMESTONE – 100%; 50% (mudstone) Pale yellowish brown (10YR 7/2), cryptocrystalline, hard, well indurated, weakly vuggy. 30% (wackestone) grayish orange (10YR 7/4), cryptocrystalline to medium grained, moderately hard, well indurated, fossiliferous with few molds. 20% (mudstone) white (N9) to yellowish gray (5Y 9/1), microcrystalline, moderately hard, well indurated
1,260 – 1,290	30	LIMESTONE – 100%; 90% (packstone to grainstone) Grayish orange (10YR 7/4), very fine to fine grained, moderately hard, moderately indurated, fossiliferous. 10% (wackestone) grayish orange (10YR 7/2), cryptocrystalline to medium grained, hard, well indurated, locally sandy, weakly vuggy. Trace Limestone (mudstone) medium dark gray (N4), microcrystalline, moderately soft, well indurated at 1,270
1,290 – 1,300	10	LIMESTONE – 100%; 80% (packstone to grainstone) Grayish orange (10YR 7/2) to pale yellowish brown (10YR 6/2), very fine to medium grained, soft, moderately indurated, fossiliferous. 20% (wackestone) pale yellowish brown (10YR 6/2) to light olive gray (5Y 6/1), cryptocrystalline to fine grained, very hard, very well indurated, locally fossiliferous with few black (N1) inclusions (dolomite)
1,300 – 1,320	20	LIMESTONE – 100%; 70% (packstone to grainstone) Pale yellowish brown (10YR 6/2), very fine to medium grained, hard, well to moderately indurated, fossiliferous. 15% (wackestone) Pale yellowish brown (10YR 6/2), medium grained, hard, well indurated, fossiliferous. 15% (packstone) Light olive gray (5Y 5/2) fine grained moderately hard, well indurated with few molds. Trace crystalline carbonate
1,320 – 1,340	20	LIMESTONE – 100%; 70% (packstone to grainstone) Pale yellowish brown (10YR 6/2), very fine to medium grained, hard, well to moderately indurated, fossiliferous. 30% (wackestone) Pale yellowish brown (10YR 6/2), medium grained, hard, well indurated, fossiliferous.
1,340 – 1,350	10	LIMESTONE – 100%, 60% (mudstone) Yellowish gray (5Y 8/1) to pale yellowish brown (10YR 6/2), very fine grained to cryptocrystalline, hard, well indurated, weakly vuggy. 40% (grainstone to packstone) Grayish orange (10YR 7/4) fine to medium grained, moderately soft, moderately indurated.
1,350 – 1,360	10	LIMESTONE – 100% (grainstone to packstone) Grayish orange (10YR 7/4) fine to medium grained, moderately soft, moderately indurated, with forams common. Trace crystalline carbonate and Dolomitic Limestone
1,360 – 1,390	30	LIMESTONE – 100%; 80% (packstone) Pale yellowish brown (10YR 6/2), fine grained, hard, well indurated. 20% (mudstone) Yellowish gray (5Y 8/1) to pale yellowish brown (10YR 6/2), very fine grained to cryptocrystalline, hard, well indurated, weakly vuggy. Forams abundant
1,390 – 1,400	10	LIMESTONE AND LIMEY DOLOSTONE – 40% Limestone (packstone) grayish orange (10YR 7/4), fine to medium grained, moderately soft to moderately hard with few forams. 30% (wackestone) Medium gray (N5), medium grained, hard, weakly vuggy. 30% Limey Dolostone olive gray (5Y 4/1), medium grained, hard, very well indurated.

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
1,400 – 1,410	10	LIMESTONE – 100%; 50% (wackestone to packstone) Very pale orange (10YR 8/2), fine grained, moderately soft, moderately indurated, weakly vuggy. 25% (mudstone) medium light gray (N5.5), cryptocrystalline, moderately soft to hard, well indurated. 25% (packstone) very pale orange (10YR 8/2), fine to medium grained, soft, poorly indurated, fossiliferous
1,410 – 1,430	20	LIMESTONE – 100% Limestone (packstone) grayish orange (10YR 7/2) to light olive gray (5Y 5/1), very fine to coarse grained, soft, poorly to moderately indurated
1,430 – 1,440	10	LIMESTONE – 100% Limestone (grainstone to packstone) very pale orange (10YR 8/2), fine to medium grained, moderately hard to hard, well indurated with few light olive gray (5Y 6/1) inclusions (dolomite)
1,440 – 1,460	20	LIMESTONE AND LIMEY DOLOSTONE – 60% Limestone (mudstone) light olive gray (5Y 6/1) to olive gray (5Y 4/1), cryptocrystalline to microcrystalline, very hard, well indurated. 40% Limey Dolostone pale yellowish brown (10YR 5.5/2) to light olive gray (5Y 6/1), cryptocrystalline, hard, very well indurated. Trace Limestone (grainstone) at 1,460.
1,460 – 1,470	10	LIMESTONE – 100%; 90% (grainstone) Very pale orange (10YR 8/2), fine to medium grained, moderately hard, poorly indurated, peloidal. 10% (wackestone) medium light gray (N6), cryptocrystalline to fine grained, very hard, very well indurated, weakly phosphatic
1,470 – 1,480	10	LIMESTONE – 100%; 80% (wackestone to packstone) Yellowish gray (5Y 8/1), very fine to fine grained, hard, moderately indurated. 20% (mudstone to wackestone) light gray (N6.5), microcrystalline to fine grained, moderately soft, very well indurated, locally fossiliferous
1,480 – 1,490	10	LIMESTONE – 100%; 85% (mudstone) Yellowish gray (5Y 8/1) to very pale orange (10YR 8/2), very fine to fine grained, hard, very well indurated, weakly vuggy. 15% (grainstone) Yellowish gray (5Y 8/1) to very pale orange (10YR 8/2), fine to medium grained, soft to moderately soft, poorly indurated, pelloidal
1,490 – 1,500	10	LIMESTONE – 100% (grainstone) grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), fine to medium grained, very hard, very well indurated, pelloidal
1,500 – 1,520	20	LIMESTONE – 100%; 50% (mudstone to wackestone) Very pale orange (10YR 8/2), microcrystalline to fine grained, moderately hard to hard, well indurated; 50% (mudstone) pale yellowish brown (10YR 6/2), cryptocrystalline, very hard, very well indurated
1,520 – 1,550	30	LIMESTONE – 100%; 70% (packstone) Very pale orange (10YR 8/2) medium grained, soft, moderately well indurated, pelloidal. 30% (wackestone to mudstone) Very pale orange (10YR 8/2) fine grained, hard, well indurated, weakly vuggy.
1,550 – 1,570	20	LIMESTONE – 100%; 70% (packstone) very light gray (N8), very fine to fine grained, hard, vuggy, pelloidal. 20% (wackestone to packstone) White (N9), fine grained, moderately hard to hard, vuggy, pelloidal. 10% (mudstone to wackestone) Medium light gray (N6), cryptocrystalline to fine grained, weakly vuggy.
1,570 – 1,610	40	LIMESTONE – 100%; 70% (wackestone to packstone) Very light gray (N9) to white (N9), very fine to fine grained, hard, vuggy, pelloidal. 30% (mudstone to wackestone) Medium light gray (N6), cryptocrystalline to fine grained, weakly vuggy.

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
1,610 – 1,640	30	LIMESTONE – 100%; 80% (mudstone to wackestone) Medium light gray (N6), cryptocrystalline to fine grained, weakly. 20% (wackestone to packstone) Very light gray (N9) to white (N9), very fine to fine grained, hard, vuggy, pelloidal.
1,640 – 1,650	10	NO SAMPLE
1,650 – 1,660	10	LIMESTONE – 100%; 80% (mudstone to wackestone) Medium light gray (N6), cryptocrystalline to fine grained, weakly vuggy. 20% (wackestone to packstone) Very light gray (N9) to white (N9), very fine to fine grained, hard, vuggy, pelloidal.
1,660 – 1,670	10	LIMESTONE – 100%; 80% (packstone) Very pale orange (10YR 8/2), fine to medium grained, moderately hard to moderately soft, pelloidal. 20% (mudstone to wackestone) Light olive gray (5Y 5/2), very fine to fine grained, hard, weakly vuggy. Forams abundant.
1,670 – 1,680	10	LIMESTONE – 100%; 80% (packstone) Very pale orange (10YR 8/2), fine to medium grained, moderately hard to moderately soft, pelloidal. 20% (mudstone to wackestone) Light olive gray (5Y 5/2), very fine to fine grained, hard, weakly vuggy. Trace Limestone (mudstone) medium dark gray (N4) fine to very fine grained, hard, vuggy
1,680 – 1,690	10	LIMESTONE – 100%; 85% (packstone) Very pale orange (10YR 8/2), fine to medium grained, moderately soft to moderately hard, pelloidal, fossiliferous. 15% (mudstone) Yellowish gray (5GY 8/1), cryptocrystalline, hard, weakly vuggy. Trace Limestone (wackestone) medium light gray (N6) fine grained, hard.
1,690 – 1,700	10	LIMESTONE – 100%; 70% (mudstone to wackestone) Medium light gray (N6), cryptocrystalline to fine grained, weakly vuggy. 30% (wackestone to packstone) Very light gray (N9) to medium dark grey (N4) to white (N9), very fine to fine grained, hard, vuggy, pelloidal.
1,700 – 1,710	10	LIMESTONE – 100%; 80% (packstone) Very pale orange (10YR 8/2), fine grained, moderately hard to moderately soft, pelloidal, fossiliferous. 20% (mudstone) Pale yellowish brown (10YR 6/2), cryptocrystalline, very hard
1,710 – 1,720	10	LIMESTONE – 100%; 50% (mudstone) Medium gray (N5), cryptocrystalline, very hard, weakly vuggy. 50% (wackestone) Yellowish gray (5Y 8/1), very fine grained, hard, locally weakly vuggy. Forams abundant
1,720 – 1,740	20	LIMESTONE – 100%; 50% (mudstone) Medium gray (N5), cryptocrystalline, very hard, weakly vuggy. 50% (wackestone) Yellowish gray (5Y 8/1), very fine grained, hard, locally weakly vuggy. Forams abundant
1,740 – 1,780	40	LIMESTONE – 100%; 85% (wackestone) Yellowish gray (5Y 8/1), very fine grained, hard, locally weakly vuggy. 15% (mudstone) Medium gray (N5), cryptocrystalline, very hard, weakly vuggy. Forams abundant
1,780 – 1,790	10	NO SAMPLE
1,790 – 1,800	10	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to white (N9), fine to medium grained, moderately hard, pelloidal.
1,800 – 1,810	10	LIMESTONE – 100%; 50% (packstone) Very pale orange (10YR 8/2), fine to medium grained, moderately hard, pelloidal. 50% (mudstone) Very pale orange (10YR 8/2), very fine grained, hard, weakly vuggy. Forams abundant

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
1,810 – 1,840	30	LIMESTONE – 100%; 60% (mudstone) Very light gray (N8), microcrystalline to cryptocrystalline, hard. 30% (packstone) Yellowish gray (5Y 8/1), fine to medium grained, moderately hard to hard. 10% (wackestone) Medium gray (N5), very fine grained, very hard
1,840 – 1,850	10	LIMESTONE – 100%; 60% (packstone) yellowish gray (5Y 8/1) fine to medium grained, moderately hard to hard. 30% (mudstone) very pale orange (10YR 8/2) microcrystalline, hard. 10% (wackestone) Medium dark gray (N4) very fine grained, very hard.
1,850 – 1,870	20	LIMESTONE – 90% (mudstone) Pale yellowish brown (10YR 6/2), microcrystalline to cryptocrystalline, hard. 10% (wackestone) Medium gray (N5), very fine grained to cryptocrystalline, very hard.
1,870 – 1,890	20	LIMESTONE – 100%; 60% (mudstone) Very light gray (N8), microcrystalline to cryptocrystalline, hard. 40% (packstone) White (N9), fine to medium grained, moderately hard to hard.
1,890 – 1,900	10	LIMESTONE – 90% (mudstone) Pale yellowish brown (10YR 6/2), microcrystalline to cryptocrystalline, hard. 10% (wackestone) Medium gray (N5), very fine grained to cryptocrystalline, very hard.
1,900 – 1,970	70	LIMESTONE – 100%; 80% (wackestone to mudstone) very light gray (N8) to medium gray (N7), very fine grained to cryptocrystalline, hard, weakly vuggy. 10% (mudstone) medium light gray (N6) cryptocrystalline, hard, weakly vuggy. 10% (wackestone to mudstone) white (N9) very fine grained to microcrystalline, hard, weakly vuggy.
1,970 – 1,980	10	LIMESTONE AND DOLOMITIC LIMESTONE – 80% Limestone; 50% (packstone) very pale orange (10YR 8/2) fine to medium grained, moderately soft, to moderately hard, pelloidal, fossiliferous. 30% (mudstone) Yellowish gray (5Y 8/1) microcrystalline, hard. Dolomitic Limestone 20% (mudstone) Yellowish brown (10YR 6/2) very fine grained, moderately soft, very well indurated, weakly laminated with dark yellowish brown (10YR 4/2) dolostone.
1,980 – 1,990	10	LIMESTONE – 100% 70% (packstone) Very pale orange (10YR 8/2) to grayish orange (10YR 7/4) fine grained, moderately hard, very well indurated, pelloidal, fossiliferous. 20% (mudstone) Very pale orange (10YR 8/2) very fine grained to cryptocrystalline, hard very well indurated. 10% (mudstone) Light gray (N7) very fine grained, hard, very well indurated
1,990 – 2,000	10	LIMESTONE – 100%; 80% (packstone) Pale orange (10YR 7/2) fine to medium grained, moderately soft, moderately indurated, pelloidal, fossiliferous. 20% (mudstone) Light gray (N7) very fine grained, hard, very well indurated. Trace Dolomitic Limestone
2,000 – 2,010	10	LIMESTONE – 100% Limestone (packstone) pale yellowish brown (10YR 7/2), very fine to fine grained, moderately soft, poorly to moderately indurated, pelloidal, weakly fossiliferous
2,010 – 2,020	10	LIMESTONE – 100%; 35% (mudstone) Very pale orange (10YR 8/2) to yellowish gray (5Y 8/2), cryptocrystalline, very hard, very well indurated. 35% (grainstone) Very pale orange (10YR 8/2) to pale yellowish brown (20YR 7/2), fine grained, moderately soft, poorly to moderately indurated, pelloidal. 30% (packstone) Very pale orange (10YR 8/2) to light olive gray (5Y 6/1), cryptocrystalline to microcrystalline, hard, moderately indurated, vuggy

Hazen

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
2,020 – 2,030	10	LIMESTONE – 100%; 50% (mudstone) Pale yellowish brown (10YR 7/2) to light olive gray (5Y 7/1), cryptocrystalline to fine grained, hard, well indurated, locally sandy and vuggy. 25% (grainstone) Very pale orange (10YR 8/2), fine grained, soft to moderately soft, poorly to moderately indurated, weakly pelloidal. 25% (mudstone) Very pale orange (10YR 8/2), microcrystalline, soft, poorly indurated
2,030 – 2,050	20	LIMESTONE – 100%; 65% (mudstone) Very pale orange (10YR 8/2) to yellowish gray (5Y 8/1), cryptocrystalline, hard to very hard, very well indurated. 35% (grainstone) Very pale orange (10YR 8/2) to yellowish gray (5Y 8/1), fine grained, soft to moderately soft, poorly to moderately indurated, weakly pelloidal with abundant forams
2,050 – 2,070	20	LIMESTONE – 100%; 50% (grainstone) Light olive gray (5Y 6/1), fine grained, moderately soft, poorly to moderately indurated, pelloidal. 50% (packstone) Very pale orange (10YR 8/2), microcrystalline to fine grained, moderately soft to moderately hard, poorly indurated
2,070 – 2,080	10	LIMESTONE – 100%; 50% (grainstone) Light olive gray (5Y 6/1), fine grained, moderately soft to moderately hard, poorly to moderately indurated. 50% (packstone) Very pale orange (10YR 8/2), microcrystalline to fine grained, moderately soft to moderately hard, poorly indurated; abundant forams
2,080 – 2,090	10	LIMESTONE AND DOLOMITIC LIMESTONE – 70% Limestone; 60% (packstone) Very pale orange (10YR 8/2), microcrystalline to fine grained, moderately soft to moderately hard, poorly indurated. 40% (grainstone) Light olive gray (5Y 6/1), fine grained, moderately soft to moderately hard, poorly to moderately indurated. 30% Dolomitic Limestone, microcrystalline to crystalline, hard, moderately to well indurated
2,090 – 2,100	10	LIMESTONE AND DOLOSTONE – 80% Limestone; 40% (grainstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), fine grained, moderately soft, poorly to moderately indurated, fossiliferous. 40% (mudstone) Very pale orange (10YR 8/2), cryptocrystalline to microcrystalline, hard, very well indurated, locally silty. 20% Dolostone moderate yellowish brown (10YR 5/4), cryptocrystalline to microcrystalline, hard, very well indurated, vuggy
2,100 – 2,110		NO SAMPLE
2,110 – 2,120	10	LIMESTONE – 100%; 90% (grainstone) Very pale orange (10YR 8/2), fine grained, soft, poorly indurated. 10% (mudstone) Pale yellowish brown (10YR 7/2) to light olive gray (5Y 6/1), cryptocrystalline, very hard, very well indurated
2,120 – 2,130	10	LIMESTONE – 100%; 80% (grainstone) Very pale orange (10YR 8/2), fine grained, soft, poorly indurated. 20% (mudstone) Olive gray (5Y 4/1), cryptocrystalline, very hard, very well indurated with casts and molds common.
2,130 – 2,140	10	LIMESTONE – 100%; 70% (grainstone) Very pale orange (10YR 8/2), fine grained, moderately hard, moderately indurated, fossiliferous. 30% (mudstone) Very pale orange (10YR 8/2) to yellowish gray (5Y 7/1), cryptocrystalline to microcrystalline, hard, very well indurated
2,140 – 2,150	10	LIMESTONE – 100%; 75% (packstone) Very pale orange (10YR 8/2), very fine to fine grained, soft, poorly indurated, pelloidal. 25% (mudstone) Very pale orange (10YR 8/2), cryptocrystalline to microcrystalline, moderately hard to hard, poorly to moderately indurated, vuggy

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
2,150 – 2,160	10	LIMESTONE – 100%; 60% (packstone) Very pale orange (10YR 8/2), very fine to fine grained, soft, poorly indurated, pelloidal. 40% (mudstone) Very pale orange (10YR 8/2) to yellowish gray (5Y 7.5/1), cryptocrystalline, very hard, very well indurated
2,160 – 2,170	10	LIMESTONE – 100% Limestone (packstone) very pale orange (10YR 8/2), very fine to fine grained, moderately soft, moderately indurated
2,170 – 2,180	10	DOLOSTONE – 100% Dolostone moderate yellowish brown (10YR 5/4) to olive black (5Y 2/1), cryptocrystalline to microcrystalline, very hard, very well indurated
2,180 – 2,300	120	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), fine grained, soft, poorly indurated, pelloidal. Trace Limestone (mudstone) cryptocrystalline, very hard, very well indurated. Echinoids to 10 mm in diameter at 2,230. Few casts at 2,260 and 2,270.
2,300 – 2,310	10	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), very fine to fine grained, moderately hard, poorly to moderately indurated, pelloidal with sucrosic subhedral to anhedral Dolomite crystals
2,310 – 2,320	10	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to light olive gray (5Y 5.5/1), fine grained, moderately soft to moderately hard, moderately to moderately well indurated, pelloidal
2,320 – 2,340	20	LIMESTONE – 100% (grainstone to packstone) Very pale orange (10YR 7.5/2) to yellowish gray (5Y 7/1), very fine to fine grained, moderately hard, moderately indurated, pelloidal
2,340 – 2,360	20	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to grayish orange (10YR 7/2), fine grained, soft to moderately hard, moderately indurated, pelloidal
2,360 – 2,370	10	LIMESTONE – 100% (grainstone to packstone) Very pale orange (10YR 8/2), fine grained, moderately soft to moderately hard, moderately indurated, pelloidal, local sucrosic anhedral Dolomite crystals
2,370 – 2,380	10	LIMESTONE AND LIMEY DOLOSTONE – 50% Limestone (packstone) very pale orange (10YR 8/2), fine grained, moderately soft, poorly indurated, pelloidal, sucrosic anhedral Dolomite crystals, locally weakly vuggy with vugs partially filled with euhedral to anhedral Dolomite crystals. 50% Limey Dolostone moderate yellowish brown (10YR 5/4), fine grained, hard, moderately indurated
2,380 – 2,410	30	LIMESTONE AND LIMEY DOLOSTONE – 85% Limestone; 70% (grainstone) Very pale orange (10YR 8/2), fine grained, moderately soft to moderately hard, moderately indurated, pelloidal, few sucrosic subhedral to anhedral Dolomite crystals. 15% (packstone) very pale orange (10YR 8/2), fine grained, moderately soft, poorly indurated, pelloidal, sucrosic anhedral Dolomite crystals, locally weakly vuggy with vugs partially filled with euhedral to anhedral Dolomite crystals. 15% Limey Dolostone moderate yellowish brown (10YR 5/4), fine grained, hard, moderately indurated
2,410 – 2,420	10	LIMESTONE – 100% (grainstone to packstone) Very pale orange (10YR 7.5/2), very fine to fine grained, moderately hard, moderately indurated, pelloidal
2,420 – 2,430	10	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2), very fine to fine grained, moderately hard, poorly to moderately indurated, abundant sucrosic anhedral moderate yellowish brown (10YR 5/2) to grayish black (N2) Dolomite crystals

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
2,430 – 2,440	10	LIMESTONE – 100% (packstone) Very pale orange (10YR 7.5/2), fine to medium grained, moderately soft to moderately hard, moderately indurated, pelloidal, local sucrosic anhedral Dolomite crystals. Forams abundant
2,440 – 2,460	20	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2), very fine to fine grained, moderately hard, poorly to moderately indurated, sucrosic anhedral Dolomite crystals. Trace Limey Dolostone at 2,450
2,460 – 2,480	20	LIMESTONE – 100% (grainstone to packstone) Very pale orange (10YR 7.5/2) to yellowish gray (5Y 6/2), fine grained, hard, moderately to well indurated, pelloidal. Forams scarce
2,480 – 2,490	10	LIMEY DOLOSTONE – 100% Moderate yellowish brown (10YR 5/4), microcrystalline to fine grained, very hard, very well indurated
2,490 – 2,500	10	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), soft to moderately hard, moderately to moderately well indurated, pelloidal, sucrosic anhedral Dolomite crystals. Forams scarce
2,500 – 2,510	10	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7.5/2), fine grained, moderately hard, well indurated, pelloidal with casts and molds common
2,510 – 2,530	20	LIMESTONE – 100%; 80% (packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7.5/2), fine grained, moderately hard, well indurated, pelloidal with casts and molds common. 20% (grainstone) Very pale orange (10YR 7.5/3) fine grained, moderately soft to moderately hard, poorly to moderately indurated, pelloidal
2,530 – 2,570	40	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), fine grained, moderately soft to moderately hard, poorly indurated, pelloidal with local sucrosic anhedral Dolomite crystals. Trace Limey Dolomite very pale orange (10YR 8/2) to moderate yellowish brown (10YR 5/4), microcrystalline to fine grained, very hard, very well indurated
2,570 – 2,580	10	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2), very fine to fine grained, hard, well indurated, pelloidal
2,580 – 2,690	110	LIMESTONE – 100% (packstone) Very pale orange (10YR 7.5/3), microcrystalline to fine grained, moderately hard to hard, moderately to well indurated with degree of induration increasing with depth, pelloidal with local sucrosic anhedral Dolomite crystals, fossil content increasing with depth. Trace Limey Dolostone at 2,650
2,690 – 2,700	10	LIMESTONE – 100% (mudstone) Light olive gray (5Y 6/1) to medium gray (N5.5), cryptocrystalline to microcrystalline, hard, very well indurated, weakly vuggy. Trace Limey Dolostone
2,700 – 2,710	10	LIMESTONE – 100% (wackestone) Very pale orange (10YR 8/2) to light olive gray (5Y 5/1), very fine grained, moderately soft, poorly to moderately indurated
2,710 – 2,720	10	LIMESTONE – 100% Limestone; 60% (wackestone to packstone) Grayish orange (10YR 7/3), cryptocrystalline to microcrystalline, very hard, very well indurated, locally pelloidal. 40% (packstone) Very pale orange (10YR 8/2), very fine to fine grained, moderately soft, moderately indurated, pelloidal

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
2,720 – 2,730	10	LIMESTONE – 100% Limestone; 75% (mudstone) Very pale orange (10YR 7.5/2) to grayish orange (10YR 7/3), very fine to fine grained, moderately soft, poorly indurated, locally weakly sandy. 25% (packstone) Yellowish gray (5Y 8/2) to medium gray (N5), fine to medium grained, moderately soft to moderately hard, poorly to moderately indurated, weakly pelloidal
2,730 – 2,740	10	LIMESTONE – 100% Limestone; 60% (packstone) Very pale orange (10YR 8/2), very fine grained, moderately soft to moderately hard, moderately well indurated, pelloidal. 40% (packstone) Grayish orange (10YR 7/3), cryptocrystalline to fine grained, hard to very hard, very well indurated
2,740 – 2,750	10	LIMESTONE – 100% Limestone; 60% (packstone) Very pale orange (10YR 8/2) to olive gray (5Y 5/1), fine grained, moderately hard to hard, poorly to well indurated, locally weakly pelloidal. 40% (mudstone) Very pale orange (10YR 8/2) to dark gray (N3), cryptocrystalline, very hard, well indurated
2,750 – 2,760	10	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to olive gray (5Y 5/1), fine grained, moderately hard to hard, poorly to well indurated, locally weakly pelloidal. Trace Clay dark greenish gray (5G 4/1), stiff, non-plastic, cohesive, non-calcareous
Lower Eocene Oldsmar Formation		
2,760 – 2,770	10	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to grayish orange (10YR 7/4), very fine to fine grained, soft to hard, poorly to well indurated, pelloidal
2,770 – 2,780	10	LIMESTONE AND CLAY – 85% Limestone (packstone) very pale orange (10YR 8/2) to grayish orange (10YR 7/4), very fine to fine grained, soft to hard, poorly to well indurated, pelloidal. 15% Clay olive gray (5Y 5/1), very stiff, non-plastic, cohesive, non-calcareous with dark gray (N3) mottles
2,780 – 2,790	10	LIMESTONE AND CLAY – 85% Limestone; 50% (wackestone to packstone) Very pale orange (10YR 8/2), very fine to medium grained, soft to moderately hard, poorly to moderately indurated, pelloidal. 35% (mudstone to wackestone) Very pale orange (10YR 8/2) to grayish orange (10YR 7/3), cryptocrystalline to fine grained, hard, well indurated, locally pelloidal. 15% Clay olive gray (5Y 5/1), very stiff, non-plastic, cohesive, non-calcareous with dark gray (N3) mottles
2,790 – 2,820	30	LIMESTONE – 100% Limestone; 90% (wackestone to packstone) Very pale orange (10YR 8/2) to medium gray (N5), microcrystalline to medium grained, soft to moderately hard, poorly to moderately indurated, pelloidal. 10% (mudstone) Medium dark gray (N4) to dark gray (N3), cryptocrystalline to microcrystalline, hard, very well indurated, weakly dolomitic. Trace Clay olive gray (5Y 5/1) to dark greenish gray (5G 4/1), very stiff, non-plastic, cohesive, non-calcareous with dark gray (N3) mottles
2,820 – 2,830	10	LIMESTONE – 100% Limestone; 40% (mudstone to wackestone) Very pale orange (10YR 8/2), microcrystalline to fine grained, moderately hard to hard, poorly to well indurated, weakly pelloidal. 40% (mudstone) Light olive gray (5Y 7/1) to medium dark gray (N4), microcrystalline, hard, very well indurated. 20% (wackestone to packstone) Very pale orange (10YR 8/2) to medium gray (N5), microcrystalline to medium grained, soft to moderately hard, poorly to moderately indurated, pelloidal.
2,830 – 2,860	30	LIMESTONE – 100% (wackestone to packstone) Very pale orange (10YR 8/2), very fine to medium grained, moderately soft to hard, poorly to well indurated, pelloidal, few small fractures partially lined with Dolomite crystals at 2,860.

Hazen

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
2,860 – 2,870	10	LIMESTONE AND LIMEY DOLOSTONE – 65% Limestone; 45% (grainstone to packstone) Very pale orange (10YR 8/2), fine grained, soft, poorly indurated, pelloidal. 20% (mudstone) Very pale orange (10YR 8/2), cryptocrystalline to microcrystalline, very hard, very well indurated. 35% Limey Dolostone very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), microcrystalline to fine grained, very hard, very well indurated, pelloidal
2,870 – 2,900	30	LIMESTONE – 100% (mudstone to wackestone) Very pale orange 10YR 8/2), very fine to fine grained, soft to moderately hard, poorly to well indurated, weakly pelloidal
2,900 – 2,910	10	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2), very fine to fine grained, soft to moderately hard, poorly to moderately indurated, local sucrosic euhedral to subhedral Dolomite crystals
2,910 – 2,920	10	LIMESTONE – 100% (mudstone) Very pale orange (10YR 8/2) to medium dark gray (N4), cryptocrystalline to very fine grained, soft to hard, moderately to well indurated. Trace Limey Dolostone
2,920 – 2,930	10	LIMESTONE – 100% (mudstone) Very pale orange (10YR 8/2), microcrystalline to very fine grained, soft to moderately soft, poorly indurated
2,930 – 2,940	10	DOLOSTONE – 100% Dolostone; 60% Moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2), cryptocrystalline to fine grained, very hard, very well indurated. 30% Moderate yellowish brown (10YR 5/4) to dusky yellowish brown (10YR 3/2), very fine to fine grained, crystalline, very hard, very well indurated, sucrosic. 10% Pale yellowish brown (10YR 7/2), cryptocrystalline to microcrystalline, very hard, well indurated
2,940 – 2,950	10	DOLOSTONE – 100% Dolostone; 70% Pale yellowish brown (10YR 7/2), cryptocrystalline, very hard, very well indurated. 30% Olive gray (5Y 4/1) to olive black (5Y 3/1), microcrystalline to very fine grained, very hard, very well indurated, sucrosic
2,950 – 2,970	20	DOLOSTONE – 100% Moderate yellowish brown (10YR 5/4) to olive gray (5Y 4/1), microcrystalline to medium grained, crystalline, very hard, very well indurated, weakly vuggy, vugginess decreasing with depth, sucrosic, locally limey
2,970 – 2,980	10	DOLOSTONE – 100% Dolostone; 50% Pale yellowish brown (10YR 7/2) to moderate yellowish brown (10YR 5/4), cryptocrystalline to fine grained, very hard, very well indurated, sucrosic. 50% Moderate yellowish brown (10YR 5/2) to dark yellowish brown (10YR 4/2), microcrystalline to fine grained, crystalline, very hard, very well indurated, sucrosic
2,980 – 3,000	20	DOLOSTONE – 100% Moderate yellowish brown (10YR 5/2) to dusky yellowish brown (10YR 2/2), microcrystalline to fine grained, crystalline, very hard, very well indurated, sucrosic
3,000 – 3,080	80	DOLOSTONE AND LIMESTONE – 80% Dolostone very pale orange (10YR 8/2) to dark yellowish brown (10YR 4/2) to olive gray (5Y 3/1), cryptocrystalline to fine grained, very hard, very well indurated; 20% Limestone (packstone) very pale orange (10YR 8/2), fine grained, moderately hard, moderately indurated, weakly dolomitic.
3,080 – 3,210	130	DOLOSTONE AND LIMESTONE – 60% Dolostone very pale orange (10YR 8/2) to dark yellowish brown (10YR 4/2), cryptocrystalline to fine grained, very hard, very well indurated. 40% Limestone (packstone) very pale orange (10YR 8/2), fine grained, moderately soft to moderately hard, moderately indurated, weakly dolomitic.

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
3,210 – 3,220	10	DOLOSTONE – 100% Dolostone; 60% Moderate yellowish brown (10YR 4/4), microcrystalline, very hard, very well indurated, locally sucrosic. 40% Very pale orange (10YR 8/2) to grayish orange (10YR 7/2) to yellowish gray (5Y 8/2), cryptocrystalline, very hard, very well indurated, weakly vuggy
3,220 – 3,230	10	DOLOSTONE – 100% Moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2), fine grained, very hard, very well indurated, sucrosic, abundant very pale orange (10YR 8/2), cryptocrystalline, very hard Dolostone inclusions
3,230 – 3,240	10	DOLOSTONE – 100% Dolostone; 80% Very pale orange (10YR 8/2) to moderate yellowish brown (10YR 5/4), cryptocrystalline, very hard, moderately well to well indurated. 20% Moderate yellowish brown (10YR 5/2) to dark yellowish brown (10YR 4/2), cryptocrystalline to fine grained, hard, very well indurated, sucrosic
3,240 – 3,250	10	DOLOSTONE – 100% Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2) to dark yellowish brown (10YR 4/4), cryptocrystalline, very hard, very well indurated, vuggy
3,250 – 3,260	10	DOLOSTONE – 100% Dolostone; 80% Dark yellowish brown (10YR 4/4), fine grained, hard, very well indurated, sucrosic, abundant very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), cryptocrystalline, very hard inclusions. 20% Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2) to dark yellowish brown (10YR 4/4), cryptocrystalline, very hard, very well indurated
3,260 – 3,280	20	DOLOSTONE – 100% Moderate yellowish brown (10YR 6/4) to dark yellowish brown (10YR 4/2), cryptocrystalline to microcrystalline, very hard, very well indurated, locally sucrosic
3,280 – 3,290	10	DOLOSTONE – 100% Olive gray (5Y 5/1), microcrystalline, hard, moderately well indurated, few casts
3,290 – 3,300	10	LIMEY DOLOSTONE – 100% Very pale orange (10YR 8/2) to light olive gray (5Y 5.5/1), very fine grained, moderately hard, moderately well indurated
3,300 – 3,310	10	DOLOSTONE AND LIMEY DOLOSTONE – 80% Dolostone moderate yellowish brown (10YR 5/2), cryptocrystalline to microcrystalline, hard, very well indurated. 20% Limey Dolostone very pale orange (10YR 8/2) to olive black (5Y 2/1), very fine grained, moderately soft, poorly indurated
3,310 – 3,320	10	LIMEY DOLOSTONE – 100% Moderate yellowish brown (10YR 5/2) to olive gray (5Y 5/1), microcrystalline to very fine grained, hard, poorly to moderately indurated
3,320 – 3,330	10	DOLOSTONE – 100% Pale yellowish brown (10YR 4/2) to olive gray (5Y 4/1), cryptocrystalline, very hard, very well indurated, locally sucrosic
3,330 – 3,350	20	DOLOSTONE – 100% Very pale orange (10YR 8/2) to grayish orange (10YR 7/2) to olive gray (5Y 5/1), cryptocrystalline, very hard, very well indurated
3,350 – 3,400	50	DOLOSTONE – 100% Grayish orange (10YR 6/4) to moderate yellowish brown (10YR 5/4), cryptocrystalline to microcrystalline, very hard, very well indurated, locally weakly vuggy
3,400 – 3,430	30	DOLOSTONE – 100% Pale yellowish brown (10YR 6/2) to light olive gray (5Y 6/1), cryptocrystalline to microcrystalline, very hard, very well indurated, locally weakly vuggy

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-1
3,430 – 3,440	10	DOLOSTONE – 100% Dark yellowish brown (10YR 4/2), microcrystalline, very hard, very well indurated
3,440 – 3,470	30	DOLOSTONE – 100% Moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2), cryptocrystalline to microcrystalline, very hard, very well indurated, locally weakly vuggy
3,470 – 3,500	30	DOLOSTONE – 100% Dark yellowish brown (10YR 4/2), microcrystalline, very hard, very well indurated

Appendix E – Lithologic Description of Samples
Injection Well- IW-2
Seminole Tribe of Florida – Hollywood Reservation
Broward County, Florida

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-2
Undifferentiated Quaternary Surficial Deposits		
0 - 20	20	SAND – 100% Pale yellowish brown (10YR 6/2), very fine grained, sub-angular to sub-rounded, moderately sorted, unconsolidated, quartz, trace organics
20 - 40	20	SAND – 100% Pale yellowish brown (10YR 6/2), fine to medium grained, sub-angular, very well sorted, quartz
40 - 50	10	SAND – 100% Yellowish gray (5Y 7/2), fine to medium grained, sub-angular, very well sorted, quartz
Pliocene-Pleistocene Series		
50 - 60	10	SAND, LIMESTONE, AND SHELL FRAGMENTS – 70% Sand yellowish gray (5Y 7/2), unconsolidated, fine to medium grained, sub-angular quartz. 20% Limestone (wackestone) pale yellowish orange (10YR 8/6), fine grained, moderately hard, moderately indurated. 10% Shell fragments. Trace crystalline carbonate (calcite)
60 – 70	10	LIMEY SANDSTONE AND LIMESTONE – 80% Limey Sandstone pale yellowish brown (10YR 6/2) fine to medium grained with fine grained detrital carbonate, well cemented with calcite. 20% Limestone (wackestone) grayish orange (10YR 7/4) to yellowish orange (10YR 7/6), fine grained, hard, very well indurated, slightly sandy
70 - 100	30	LIMEY SANDSTONE – 100% Pale yellowish brown (10YR 6/2) fine grained, hard, well to very well cemented with calcite, abundant detrital carbonate, weakly phosphatic
100 - 140	40	LIMESTONE AND LIMEY SANDSTONE – 70% Limestone (wackestone) very pale orange (10YR 8/2), fine grained, moderately hard. 30% Limey Sandstone light olive gray (5Y 6/1) to yellowish gray (5Y 8/1), very fine to fine grained quartz with detrital carbonate, well cemented with calcite. Trace crystalline carbonate (calcite)
140 - 150	10	LIMESTONE – 100% (packstone) very pale orange (10YR 8/2), fine grained, moderately hard, well indurated, weakly phosphatic with casts and molds. Trace colorless, coarse grained unconsolidated quartz sand
150 - 170	20	SANDY LIMESTONE – 100% (packstone) very pale orange (10YR 8/2), fine to medium grained, moderately hard, well indurated, weakly phosphatic with fine to medium grained quartz sand and shell fragments.
170 - 200	30	SANDY CLAYEY LIMESTONE – 100% (wackestone to packstone) light olive gray (5Y 6/1) fine grained, moderately soft, fossiliferous, weakly phosphatic, with abundant fine to medium grained quartz sand and shell fragments
200 - 210	10	SHELL FRAGMENTS, LIMEY SANDSTONE, AND SANDY CLAYEY LIMESTONE – 50% Shell fragments. 35% Limey Sandstone light olive gray (5Y 6/1), fine to medium grained quartz sand and shell fragments, weakly phosphatic, soft, well cemented with calcite. 15% Sandy Clayey Limestone (wackestone to packstone) very pale orange (10YR 8/2), very fine to fine grained, moderately hard, well indurated, quartz sand, weakly phosphatic. Fossils scarce

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-2
210 - 220	10	LIMEY SANDSTONE, SANDY LIMESTONE, AND SHELL FRAGMENTS – 45% Limey Sandstone light olive gray (5Y 6/1), fine to medium grained quartz sand and shell fragments, weakly phosphatic, poorly cemented with calcite. 35% Sandy Limestone (packstone) very pale orange (10YR 8/2), fine to medium grained, moderately hard, weakly phosphatic. 20% Shell fragments. Trace grayish olive (10Y 4/2) clay and unconsolidated quartz sand.
220 - 230	30	SANDY LIMESTONE, SANDY CLAYEY LIMESTONE AND SHELL FRAGMENTS – 50% Sandy Limestone (packstone) pale yellowish brown (10YR 7/2), medium grained, hard, very well indurated, locally sparry with fine grained quartz sand and few shell fragments. 40% Sandy Clayey Limestone (wackestone) light olive gray (5Y 6/1), moderately hard, moderately indurated, with abundant fine grained quartz sand and clay, weakly phosphatic. 10% Shell fragments.
Miocene-Oligocene Series Hawthorn Group – Peace River Formation		
230 - 250	20	SANDY CLAY - 100% Light olive gray (5Y 6/1), very soft, non-plastic, non-cohesive, weakly phosphatic, with abundant medium grained quartz sand and detrital carbonate.
250 - 290	20	SANDY LIMEY CLAY AND SHELL FRAGMENTS – 80% Sandy Clay light olive gray (5Y 6/1) with abundant fine grained quartz sand and detrital carbonate, weakly phosphatic. 20% Shell fragments
290 - 300	10	SANDY CLAY AND SHELL FRAGMENTS – 80% Sandy Clay light olive gray (5Y 6/1) with abundant fine grained quartz sand and detrital carbonate, weakly phosphatic. 20% Shell fragments
300 - 310	10	SANDY CLAY – 100% Yellowish gray (5Y 7/2), soft, plastic, slightly cohesive, calcareous, weakly phosphatic with abundant fine grained quartz sand
310 - 330	20	SANDY LIMEY CLAY – 100% Yellowish gray (5Y 7/2), soft, non-plastic, non-cohesive, highly calcareous, weakly phosphatic with abundant fine to very fine grained quartz sand
330 - 340	31	SANDY CLAY – 100% Dark greenish gray (5GY 4/1), soft, plastic, moderately cohesive, slightly to moderately calcareous, weakly phosphatic with abundant very fine grained quartz sand
340 - 360	20	CLAY – 100% Olive gray (5Y 3/2), soft, plastic, cohesive, slightly calcareous, weakly phosphatic
360 - 370	10	SANDY CLAY – 100% Olive gray (5Y 3/2), soft, non-plastic, non-cohesive, weakly phosphatic with abundant very fine grained quartz sand
370 - 420	50	SANDY CLAY – 100% Dark greenish gray (5GY 4/1), soft, low plasticity, cohesive, weakly calcareous, weakly phosphatic with abundant very fine grained quartz sand
420 - 430	10	CLAY – 100% Yellowish gray (5Y 7/2), very soft, plastic, moderately cohesive, highly calcareous, weakly phosphatic
430 - 500	70	SANDY CLAY – 100% Olive gray (5Y 4/1), soft, plastic, cohesive, moderately calcareous, weakly phosphatic with abundant very fine grained quartz sand
500 - 510	10	CHERT – 100% Black (N1) to olive gray (5Y 3/2), cryptocrystalline, very hard. Trace Limestone (mudstone) yellowish gray (5Y 7/1), microcrystalline, hard, very well indurated

Hazen

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-2
Miocene-Oligocene Series Hawthorn Group – Arcadia Formation		
510 - 520	10	CLAY AND CHERT – 90% Clay light olive gray (5Y 6/1), soft, plastic, cohesive, highly calcareous, weakly phosphatic. 10% Chert black (N1) to grayish black (N2), cryptocrystalline, very hard. Trace Limestone (wackestone) yellowish gray (5Y 8/1) to very pale orange (10YR 8/2), fine grained, well indurated, weakly phosphatic, and Limey Sandstone very pale orange (10YR 8/2), fine to medium grained quartz sand, well cemented with calcite cement
520 – 550	30	CLAY – 100% Greenish gray (5GY 7/1), soft, plastic, cohesive, highly calcareous, weakly phosphatic
560 - 580	20	CLAY – 100% Yellowish gray (5Y 7/2), soft, plastic, cohesive, highly calcareous, slightly sandy, weakly phosphatic
580 - 590	10	CLAY – 100% Yellowish gray (5Y 7/2), soft, non-plastic, non-cohesive, highly calcareous, weakly phosphatic
590 - 600	10	CLAY – 100% Yellowish gray (5Y 7/2), soft, calcareous, Trace Limestone
600 - 620	20	CLAY – 100% Yellowish gray (5Y 7/2), soft, non-plastic. Trace Limestone
620 - 650	30	CLAY – 100% Light olive gray (5Y 5/2), soft, non-plastic, calcareous. Trace Limestone
650 - 660	10	CLAY – 100% Yellowish gray (5Y 7/2), soft, plastic, slightly to moderately cohesive, calcareous, Trace Limestone
660 - 670	10	SANDY CLAY – 100% Yellowish gray (5Y 7/2), very soft, non-plastic, calcareous, with abundant very fine grained quartz sand. Trace Limestone
670 - 680	10	SANDY CLAY – 100% Yellowish gray (5Y 7/2), soft, non-plastic, calcareous, with very abundant very fine to medium grained quartz sand. Trace Limestone
680 - 690	10	SANDY CLAY AND CLAYEY SANDY LIMESTONE – 70% Sandy Clay soft, non-plastic, calcareous, with very abundant very fine to medium grained quartz sand. 30% Clayey Sandy Limestone (packstone) yellowish gray (5Y 7/2) medium grained, moderately soft with abundant clay and fine to medium grained quartz sand
690 - 730	40	SANDY CLAY – 100% Yellowish gray (5Y 7/2), soft, non-plastic, highly calcareous, with fine to medium grained quartz sand, weakly phosphatic. Trace Limestone
730 - 760	30	CLAY –100% Light olive gray (5Y 5/2), soft, plastic, calcareous. Trace Limestone.
760 - 770	10	CLAYEY SITLY SAND - 100% dusky yellow (5Y 6/4) soft, non-plastic, abundant fine grained quartz sand. Trace Limestone
770 - 790	20	CLAY – 100% Light olive gray (5Y 5/2), soft, plastic, calcareous. Trace Limestone
790 - 800	10	CLAY AND LIMESTONE – 60% Clay yellowish gray (5Y 7/2), soft, plastic. 40% Limestone (wackestone) yellowish gray (5Y 7/2), medium grained, hard, slightly fossiliferous
800 - 810	10	CLAY – 100% Yellowish gray (5Y 7/2), soft, non-plastic, calcareous

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-2
810 - 840	30	CLAY – 100% Yellowish gray (5Y 7/2), soft, plastic, calcareous. Trace Limestone
840 - 850	10	CLAYEY SILTY LIMESTONE – 100% (wackestone) Yellowish gray (5Y 7/1), very fine to fine grained, moderately indurated, weakly phosphatic
850 - 870	20	CLAY AND CHERT –90% Clay yellowish gray (5Y 6/2), moderately soft, plastic, calcareous, weakly phosphatic. 10% Chert moderate olive brown (5Y 4/4) to pale olive (10Y 6/2), cryptocrystalline, very hard
870 - 880	10	CLAY AND LIMESTONE – 90% Clay yellowish gray (5Y 7/2), moderately soft, plastic, calcareous, weakly phosphatic. 10% Limestone (packstone) yellowish gray (5Y 8/2), fine to medium grained, poorly indurated, weakly phosphatic. Trace Chert
880 - 890	10	CLAYEY SILTY LIMESTONE – 100% Yellowish gray (5Y 7/2), wackestone, very fine to fine grained, poorly indurated, weakly phosphatic.
890 - 900	10	CLAY AND CLAYEY SILTY LIMESTONE –90% Clay yellowish gray (5Y 7/2), moderately soft, plastic, calcareous, weakly phosphatic. 10% Clayey Silty Limestone (wackestone) yellowish gray (5Y 7/2), very fine to fine grained, soft, weakly phosphatic, poorly indurated. Trace Chert
900 - 910	10	CLAYEY LIMESTONE – 100% (packstone) Yellowish gray (5Y 7/2), medium grained, moderately soft, poorly indurated
910 – 940	30	LIMEY CLAY – 100% Light olive gray (5Y 5/2) soft, plastic, cohesive with abundant fine to medium grained detrital carbonate. Trace Chert at 930
940 - 970	30	CLAYEY LIMESTONE – 100% (wackestone to packstone) Light olive gray (5Y 6/2) fine to medium grained, moderately hard to hard, well indurated weakly to moderately phosphatic
970 – 980	10	SANDY LIMESTONE – 100% (packstone) Light olive gray (5Y 6/2) to pale yellowish brown (10YR 6/2) fine to very coarse grained, moderately hard, phosphatic with molds, casts and abundant fine grained quartz sand
980 – 1,010	30	LIMESTONE AND SHELL FRAGMENTS – 90% Limestone (packstone to wackestone) Yellowish gray (5Y 7/1 to 5Y 8/1), fine to medium grained, moderately hard to hard, moderately to very well indurated, locally sandy, locally sparry, with few light olive gray (5Y 6/1), fine grained, hard mudstone inclusions. 10% Shell Fragments
1,010 – 1,020	10	LIMESTONE - 100%; 60% (grainstone) Yellowish gray (5Y 7/2) medium to coarse grained, moderately soft, moderately indurated, locally sandy. 40% (wackestone to mudstone) light olive gray (5Y 6/1) fine grained, hard, well indurated with casts and molds
1,020 – 1,030	10	LIMESTONE – 100% (wackestone) olive gray (5Y 5/1) fine grained, hard, weakly phosphatic with molds
Middle Eocene Avon Park Formation		
1,030 – 1,040	10	LIMESTONE – 100%; 60% Very pale orange (10YR 8/2) medium to fine grained, moderately hard, generally well indurated, pelloidal. 40% (mudstone) very pale orange (10YR 8/2) microcrystalline, hard with few light olive gray (5Y 6/1) inclusions
1,040 – 1,060	20	LIMESTONE – 100%; 90% (grainstone) Very pale orange (10YR 8/2), medium grained, moderately hard, poorly indurated, pelloidal. 10% (mudstone) Light olive gray (5Y 6/1) hard, cryptocrystalline, locally weakly vuggy

Hazen

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-2
1,060 – 1,080	20	LIMESTONE – 100%; 80% Limestone (packstone) Very pale orange (10YR 8/2), very fine to medium grained, moderately hard, well indurated with few light olive gray (5Y 6/1) inclusions. 20% (wackestone) Very pale orange (10YR 8/2), very fine to fine grained, moderately soft, poorly indurated. Echinoids to 10mm in diameter
1,080 – 1,090	10	LIMESTONE – 100%; 90% (packstone) Grayish orange (10YR 7/4), fine to medium grained, moderately soft, well indurated. 10% (mudstone) Light olive gray (5Y 6/1), hard, cryptocrystalline, very well indurated
1,090 – 1,100	10	LIMESTONE – 100%; 80% (grainstone) Very pale orange (10YR 8/2), medium grained, soft, moderately well indurated, with casts and few burrows. 20% (mudstone) Light olive gray (5Y 7/1), hard, cryptocrystalline, locally weakly vuggy with casts and molds
1,100 – 1,120	20	LIMESTONE – 100% Limestone (packstone) Very pale orange (10YR 8/2), medium grained, moderately soft, moderately indurated, pelloidal
1,120 – 1,130	10	LIMESTONE – 100%; 90% (packstone) Grayish orange (10YR 7/4), fine to medium grained, soft, poorly indurated. 10% (packstone) Very pale orange (10YR 7/2), fine grained, moderately hard, well indurated
1,130 – 1,140	10	LIMESTONE – 100%; 80% (packstone) Yellowish brown (10YR 6/4), fine to medium grained, moderately soft to moderately hard, moderately well indurated 20% (wackestone) Yellowish brown (10YR 6/4), microcrystalline to medium grained, hard, very well indurated, very weakly vuggy
1,140 – 1,150	10	LIMESTONE – 100% (grainstone) Pale yellowish brown 10YR 6/2) to very pale orange (10YR 8/2), medium grained, moderately hard, moderately well indurated. Trace Limestone (grainstone) yellowish gray (5Y 8/2), coarse grained, hard, highly fossiliferous
1,150 – 1,160	10	LIMESTONE – 100%; 90% (wackestone to mudstone) Pale yellowish brown (10YR 6/2), very fine grained to cryptocrystalline, hard, weakly vuggy. 10% (grainstone) Pale yellowish brown (10YR 6/2), medium grained, hard, moderately indurated, fossiliferous
1,160 – 1,170	10	LIMESTONE – 100% (wackestone to mudstone) Pale yellowish brown (10YR 6/2), fine grained, hard, well indurated with calcite-filled molds
1,170 – 1,210	40	LIMESTONE – 100%; 80% (packstone) Pale grayish orange (10YR 6/4), fine grained, moderately soft to moderately hard, well indurated with molds. 20% (mudstone) Pale yellowish brown (10YR 7/2), fine grained, hard, weakly vuggy
1,210 – 1,230	20	LIMESTONE – 100%; 70% (packstone) Grayish orange (10YR 7/4), fine to medium grained, moderately soft, moderately well indurated, pelloidal. 30% (mudstone) Grayish orange (10YR 7/4), cryptocrystalline, very hard, weakly vuggy
1,230 – 1,270	40	LIMESTONE – 100%; 80% (grainstone) Grayish orange (10YR 6/4), medium to fine grained, moderately soft, moderately to poorly indurated, fossiliferous with forams common. 20% (mudstone) Grayish orange (10YR 6/4) to yellowish gray (5Y8/1), hard to moderately hard with molds. Trace replacement crystalline carbonate (calcite) at 1,260 and trace Dolomitic Limestone at 1,270
1,270 – 1,280	10	LIMESTONE – 100%; 70% (grainstone) Grayish orange (10YR 6/4), medium to fine grained, moderately soft, moderately to poorly indurated, fossiliferous with forams common. 15% (mudstone) Grayish orange (10YR 6/4), to yellowish gray (5Y8/1), hard, to moderately hard with molds 15% (mudstone) Yellowish gray (5Y 8/1) cryptocrystalline, hard, weakly vuggy. Trace replacement crystalline carbonate (calcite)

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-2
1,280 – 1,300	20	LIMESTONE – 100%; 70% (packstone to grainstone) Pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4), very fine to medium grained, hard, very well indurated, fossiliferous with crystalline carbonate matrix, locally prominently mottled. 20% (mudstone) Pale yellowish brown (10YR 6/2), hard, cryptocrystalline. 10% Yellowish gray (5Y 8/1), cryptocrystalline, hard
1,300 – 1,310	10	LIMESTONE – 100%; 80% (packstone to grainstone) Pale yellowish brown (10YR 6/2), very fine to medium grained, hard, well to moderately indurated, fossiliferous. 20% (mudstone) Pale yellowish brown (10YR 6/2), microcrystalline, hard, well indurated
1.310 – 1,330	20	LIMESTONE – 100%; 70% (packstone to grainstone) Pale yellowish brown (10YR 6/2), very fine to medium grained, hard, well to moderately indurated, fossiliferous. 15% (wackestone) Pale yellowish brown (10YR 6/2), medium grained, hard, well indurated, fossiliferous. 15% (packstone) Light olive gray (5Y 5/2), fine grained, moderately hard, well indurated with few molds
1,330 – 1,350	20	LIMESTONE – 100%, 70% (mudstone) Yellowish gray (5Y 8/1) to pale yellowish brown (10YR 6/2), very fine grained to cryptocrystalline, weakly vuggy. 30% (packstone) Grayish orange (10YR 7/4), fine to medium grained, moderately soft, moderately indurated.
1,350 – 1,370	20	LIMESTONE – 100%; 60% (wackestone to mudstone) Yellowish gray (5Y 7/1) to light olive gray (5Y 6/1), medium to fine grained, hard, well indurated, 30% (packstone) Pale yellowish brown (10YR 6/2), very fine to medium grained, hard, well to moderately indurated, fossiliferous. 10% (packstone) olive gray (5Y 4/1), fine grained, moderately hard
1,380 – 1,390	10	LIMESTONE – 100%; 60% (packstone to grainstone) Pale yellowish brown (10YR 6/2), medium grained, hard, moderately to well indurated. 40% (mudstone) Very pale orange (10YR 8/2), fine grained, moderately hard, moderately well indurated. Trace olive black (5Y 2/1) Dolostone
1,390 – 1,410	20	LIMESTONE – 100%; 60% (packstone), Grayish orange (10YR 7/4), fine to medium grained, moderately soft to moderately hard with few forams. 40% (mudstone to wackestone) Pale yellowish brown (10YR 6/2) to very pale orange (10YR 8/2), very fine grained, hard, vuggy
1,410 – 1,420	10	LIMESTONE – 100%; 60% (packstone), Grayish orange (10YR 7/4), fine to medium grained, moderately soft to moderately hard with few forams. 40% (wackestone) Medium gray (N5), medium grained, hard, weakly vuggy
1,420 – 1,480	60	LIMESTONE – 100%; 70% (packstone to grainstone) Grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), medium grained, moderately hard, moderately to well indurated. 30% (wackestone to packstone) Medium gray (N5), medium grained, hard, weakly vuggy. Trace Dolomitic Limestone at 1,430. Echinoids with replacement calcite at 1,440.
1,480 – 1,520	40	LIMESTONE – 100%; 70% (grainstone) Grayish orange (10YR 7/4), fine to medium grained, moderately soft, poorly to moderately indurated. 30% (mudstone to wackestone) Light olive gray (5Y 6/1), cryptocrystalline to medium grained, weakly vuggy to vuggy, locally fossiliferous with molds
1,520 – 1,530	10	LIMESTONE – 100%; 60% (wackestone) Yellowish gray (5Y 8/1), medium grained, hard, well indurated with casts. 30% (grainstone) Grayish orange (10YR 7/4), fine to medium grained, moderately hard, well indurated. 10% (wackestone) Light olive gray (5Y 6/1) medium grained, hard, very well indurated

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-2
1,530 – 1,550	20	LIMESTONE – 100%; 70% Very pale orange (10YR 8/2), medium grained, soft, moderately well indurated, pelloidal. 30% (wackestone to mudstone) Very pale orange (10YR 8/2) fine grained, hard, well indurated, weakly vuggy. Forams common at 1,550.
1,550 – 1,600	50	LIMESTONE – 100%; 70% (packstone) Very light gray (N8), very fine to fine grained, hard, vuggy, pelloidal. 20% (wackestone to packstone) White (N9), fine grained, moderately hard to hard, vuggy, pelloidal. 10% (mudstone to wackestone) Medium light gray (N6), cryptocrystalline to fine grained, weakly vuggy
1,600 – 1,610	10	LIMESTONE – 100%; 90% (wackestone to packstone) Very light gray (N9) to white (N9), very fine to fine grained, hard, vuggy, pelloidal. 10% (mudstone to wackestone) Medium light gray (N6), cryptocrystalline to fine grained, weakly vuggy
1,610 – 1,640	40	LIMESTONE – 100%; 80% (mudstone to wackestone) Medium light gray (N6), cryptocrystalline to fine grained. 20% (wackestone to packstone) Very light gray (N9) to white (N9), very fine to fine grained, hard, vuggy, pelloidal
1,640 – 1,690	50	LIMESTONE – 100%; 80% (packstone) Very pale orange (10YR 8/2), fine to medium grained, moderately hard to moderately soft, pelloidal. 20% (mudstone to wackestone) Light olive gray (5Y 5/2), very fine to fine grained, hard, weakly vuggy. Trace Limestone (mudstone) medium dark gray (N4) fine to very fine grained, hard, vuggy.
1,690 – 1,710	20	LIMESTONE – 100%; 85% (packstone) Very pale orange (10YR 8/2), fine to medium grained, moderately soft to moderately hard, pelloidal with forams common. 15% (mudstone) Yellowish gray (5GY 8/1), cryptocrystalline, hard, weakly vuggy. Trace Limestone (wackestone) medium light gray (N6), fine grained, hard
1,710 – 1,730	20	LIMESTONE – 100%; 50% (packstone) Very pale orange (10YR 8/2) to dark yellowish orange (10YR 6/6), fine to medium grained, moderately hard to hard, pelloidal, fossiliferous. 40% (wackestone) Very pale orange (10YR 8/2), very fine grained, hard, moderately vuggy. 10% (wackestone) medium dark gray (N4), fine grained to cryptocrystalline, hard
1,730 – 1,760	30	LIMESTONE – 100%; 80% (packstone) Very pale orange (10YR 8/2) fine grained, moderately hard to moderately soft, pelloidal, fossiliferous. 20% (mudstone) Pale yellowish brown (10YR 6/2), cryptocrystalline, very hard
1,760 – 1 ,800	40	LIMESTONE – 100%; 50% (mudstone) Medium gray (N5), cryptocrystalline, very hard, weakly vuggy. 50% (wackestone) Yellowish gray (5Y 8/1) very fine grained, hard, locally weakly vuggy. Forams abundant
1,800 – 1,840	40	LIMESTONE – 100%; 50% (packstone) Very pale orange (10YR 8/2), fine to medium grained, moderately hard, pelloidal. 50% (mudstone) Very pale orange (10YR 8/2), very fine grained, hard, weakly vuggy. Forams abundant
1,840 – 1,880	40	LIMESTONE – 100%; 60% (packstone) Yellowish gray (5Y 8/1), fine to medium grained, moderately hard to hard. 30% (mudstone) Pale yellowish brown (10YR 6/2), microcrystalline to cryptocrystalline, hard. 10% (wackestone) Medium dark gray (N4), very fine grained, very hard.
1,880 – 1,900	20	LIMESTONE – 70% (packstone) Pale yellowish brown (10YR 7/2), fine to coarse grained, moderately hard to moderately soft, fossiliferous, pelloidal. 30% (mudstone to wackestone) White (N9) to medium gray (N5) to light olive gray (5Y 6/1), cryptocrystalline to very fine grained, hard, weakly vuggy to vuggy

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-2
1,900 – 1,930	30	LIMESTONE – 100%; 90% (wackestone to mudstone) Very pale orange (10YR 8/2), very fine grained to cryptocrystalline, hard, weakly. 10% (wackestone to packstone) Yellowish gray (5Y 7/2), medium to fine grained, moderately soft. Trace Limestone (mudstone) medium light gray (N6), cryptocrystalline, hard, weakly vuggy. Forams abundant.
1,930 – 1,970	40	LIMESTONE – 100%; 80% (wackestone to mudstone) Very pale orange (10YR 8/2), very fine grained to cryptocrystalline, hard. 10% (wackestone to packstone) Yellowish gray (5Y 7/2) medium to fine grained, moderately soft, weakly vuggy. 10% (mudstone) Medium light gray (N6) cryptocrystalline, hard, weakly vuggy. Forams abundant.
1,970 – 1,980	10	LIMESTONE – 100%; 70% (packstone) Light gray (N7) to grayish orange (10YR 7/4), fine grained, moderately soft, pelloidal. 30% (wackestone to mudstone) Medium light gray (N6) to medium dark gray (N4), very fine grained, hard, weakly vuggy. Forams abundant.
1,980 – 1,990	10	LIMESTONE – 100%; 70% (wackestone to mudstone) Medium dark gray (N4) to dark gray (N3), very fine grained to cryptocrystalline, hard, weakly vuggy. 30% (packstone) Light gray (N7) to grayish orange (10YR 7/4), fine grained, moderately soft to moderately hard, peloidal. Forams abundant.
1,990 – 2,000	10	LIMESTONE – 100%; 70% (packstone) Light gray (N7) to grayish orange (10YR 7/4), fine grained, moderately soft, pelloidal. 30% (mudstone to wackestone) Medium light gray (N6) to medium dark gray (N4), very fine grained, hard, weakly vuggy. Forams abundant.
2.000 – 2,010	10	LIMESTONE AND DOLOMITIC LIMESTONE – 80% Limestone; 60% (packstone) very pale orange (10YR 8/2), fine to medium grained, moderately soft, to moderately hard, pelloidal, fossiliferous. 20% (mudstone) Yellowish gray (5Y 8/1), microcrystalline hard. 20% Dolomitic Limestone (mudstone) Yellowish brown (10YR 6/2), fine grained, moderately hard, very well indurated with dark yellowish brown (10YR 4/2) Dolostone inclusions.
2,010 – 2,050	40	LIMESTONE – 100%; 80%(packstone) Pale orange (10YR 7/2), fine to medium grained, moderately soft, moderately indurated, pelloidal. 20% (mudstone) Yellowish brown (10YR 6/2), fine grained, moderately hard, very well indurated
2,050 – 2,080	30	LIMESTONE – 100%; 60% (mudstone) Very pale orange (10YR 8/2), microcrystalline to cryptocrystalline, moderately soft to moderately hard. 20% (mudstone) Light gray (N7), microcrystalline to cryptocrystalline, hard, vuggy. 20% (mudstone) White (N9) microcrystalline to cryptocrystalline, moderately hard, vuggy. Forams abundant.
2,080 – 2,110	30	LIMESTONE – 100%; 60% (mudstone) Light gray (N7), microcrystalline to cryptocrystalline, hard, vuggy. 20% (mudstone) Very pale orange (10YR 8/2), microcrystalline to cryptocrystalline, moderately soft to moderately hard. 20% (mudstone) White (N9), microcrystalline to cryptocrystalline, moderately hard. Trace Limestone (mudstone) Yellowish brown (10YR 6/2), microcrystalline to cryptocrystalline, moderately hard to hard, and Limestone (mudstone), medium dark gray (N4), microcrystalline to cryptocrystalline, hard. Forams abundant.
2,110 – 2,130	20	LIMESTONE – 100%; 60% (mudstone) Very pale orange (10YR 8/2) microcrystalline, moderately soft to moderately hard, well indurated. 40% (mudstone) Light gray (N7) to medium dark gray (N4), microcrystalline to cryptocrystalline, hard. Forams abundant.

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-2
2,130 – 2,150	20	LIMESTONE – 100% (mudstone) Very pale orange (10YR 8/2) to light gray (N7), microcrystalline to cryptocrystalline, moderately soft to moderately hard
2,150 – 2,170	20	LIMESTONE – 100% (mudstone) Light gray (N7) to medium light gray (N6) to white (N9), cryptocrystalline, hard, locally vuggy
2,170 – 2,180	10	LIMESTONE – 100% (mudstone) Light gray (N7) to medium light gray (N6) to white (N9), cryptocrystalline, hard, locally vuggy
2,180 – 2,210	30	DOLOSTONE AND LIMESTONE – 60% Dolostone yellowish gray (5Y 7/2), microcrystalline, moderately hard to hard, vuggy, sucrosic euhedral Dolomite crystals. 40% Limestone; 30% (mudstone) Light olive gray (5Y 6/1), cryptocrystalline, hard. 10% (mudstone) White (N9), cryptocrystalline to microcrystalline, hard, locally vuggy
2,210 – 2,240	30	LIMESTONE – 100% (mudstone) Yellowish gray (5Y 8/1), microcrystalline to cryptocrystalline, moderately hard to moderately soft, slightly vuggy. Trace Dolostone yellowish gray (5Y 7/2), microcrystalline, moderately hard to hard, vuggy, sucrosic euhedral Dolomite crystals.
2,240 – 2,260	20	LIMESTONE – 40% (mudstone) Yellowish gray (5Y 8/1), microcrystalline to cryptocrystalline, moderately hard to moderately soft, slightly vuggy. 30% (mudstone) Olive gray (5Y 4/1), microcrystalline to cryptocrystalline, hard, locally vuggy. 30% (mudstone) Greenish gray (5GY 6/1), cryptocrystalline, hard
2,260 – 2,290	30	LIMESTONE – 100% (mudstone) Yellowish gray (5Y 8/1), microcrystalline to cryptocrystalline, moderately hard to moderately soft, slightly vuggy. Fossils abundant
2,290 – 2,320	30	LIMESTONE AND DOLOSTONE – 90% Limestone (mudstone) yellowish gray (5Y 8/1), microcrystalline to cryptocrystalline, moderately hard to moderately soft, slightly vuggy. Fossils abundant. 10% Dolostone moderate yellowish brown (10YR 5/4), microcrystalline, moderately hard to hard, vuggy, sucrosic euhedral Dolomite crystals.
2,320 – 2,380	60	LIMESTONE – 100% (mudstone) Very pale orange (10YR 8/2) to very light gray (N8), microcrystalline to cryptocrystalline, moderately hard to moderately soft, slightly vuggy. Trace Dolostone yellowish gray (5Y 7/2), microcrystalline, moderately hard to hard, vuggy, sucrosic euhedral Dolomite crystals.
2,380 – 2,420	40	LIMESTONE – 100% (mudstone) Yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), microcrystalline to cryptocrystalline, moderately hard to moderately soft, slightly vuggy.
2,420 – 2,430	10	LIMESTONE – 80% (mudstone) Yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), microcrystalline to cryptocrystalline, moderately hard to moderately soft, slightly vuggy. 20% (mudstone) Medium gray (N5), cryptocrystalline, hard.
2,430 – 2,440	10	LIMESTONE – 100%; 90% (grainstone) Pale yellowish brown (10YR 7/2) to light olive gray (5Y 6/1), fine to coarse grained, moderately hard, well indurated, slightly dolomitic with few medium gray (N5) inclusions. 10% (mudstone) medium dark gray (N4) to medium gray (N5), cryptocrystalline, moderately hard, very well indurated.
2,440 – 2,450	10	DOLOMITIC LIMESTONE – 100% Pale yellowish orange (10YR 8/4) to dusky yellowish brown (10YR 2/2), very fine to fine grained, moderately hard to hard, moderately indurated, sucrosic subhedral to euhedral Dolomite crystals with few cryptocrystalline Limestone inclusions.

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-2
2,450 – 2,460	10	LIMESTONE – 100% (grainstone) Very pale orange (10YR 8/2), fine grained, moderately soft to moderately hard, moderately to well indurated, local sucrosic euhedral Dolomite crystals.
2,460 – 2,510	50	LIMESTONE – 100% (grainstone to packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), fine grained, moderately soft to moderately hard, moderately to very well indurated, pelloidal. Sucrosic euhedral Dolomite crystals at 2,480.
2,510 – 2,520	10	LIMESTONE – 100% (grainstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), fine grained, moderately soft to moderately hard, moderately indurated, pelloidal. Echinoids to 15 mm in diameter
2,520 – 2,550	30	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), fine grained, moderately soft, moderately well indurated, pelloidal, few forams, local sucrosic subhedral Dolomite crystals
2,550 – 2,570	20	LIMESTONE AND LIMEY DOLOSTONE – 85% Limestone (packstone) very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), fine grained, moderately soft, moderately indurated, pelloidal, echinoids to 15 mm in diameter at 2,560. 15% Limey Dolostone pale yellowish brown (10YR 7/2) to moderate yellowish brown (10YR 5/4), microcrystalline to fine grained, soft to very hard, very well indurated, sucrosic subhedral to anhedral Dolomite crystals.
2,570 – 2,600	30	LIMESTONE – 100% Limestone (grainstone to packstone) Very pale orange (10YR 8/2), fine grained, moderately hard, moderately well indurated, pelloidal, slightly fossiliferous, sucrosic subhedral to anhedral Dolomite crystals at 2,600.
2,600 – 2,610	10	LIMESTONE – 100% (packstone) Pale yellowish brown (10YR 7/2) to darkish yellow orange (10YR 6/6), fine to medium grained, moderately hard to hard, moderately indurated, pelloidal, locally dolomitic
2,610 – 2,620	10	LIMESTONE – 100% (grainstone to packstone) Very pale orange (10YR 8/2), fine to medium grained, moderately hard to hard, moderately well indurated. Fossils abundant
2,620 – 2,690	70	LIMESTONE – 100% (grainstone to packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), very fine to fine grained, moderately hard to hard, moderately to well indurated, pelloidal, locally weakly dolomitic
2,690 – 2,700	10	LIMESTONE – 100%; 70% (packstone) Light olive gray (5Y 6/1) to medium dark gray (N4), cryptocrystalline to fine grained, hard, very well indurated. 30% (packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), fine grained, moderately hard to hard, moderately indurated, locally weakly dolomitic
2,700 – 2,710	10	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), very fine to fine grained, moderately soft to moderately hard, moderately to well indurated, medium dark gray (N4) mottles
2,710 – 2,730	20	LIMESTONE – 100; 60% (wackestone) Very pale orange (10YR 8/2), cryptocrystalline to very fine grained, moderately hard, moderately well indurated, weakly vuggy, locally silty. 40% (packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), very fine to fine grained, moderately soft to moderately hard, moderately well indurated
2,730 – 2,740	10	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), very fine to fine grained, moderately soft to moderately hard, moderately well indurated

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-2
2,740 – 2,750	10	LIMESTONE – 100%; 60% (packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), very fine to fine grained, moderately soft to moderately hard, moderately well indurated. 40% (wackestone) Very pale orange (10YR 8/2), cryptocrystalline to very fine grained, moderately hard, moderately well indurated, weakly vuggy, locally slightly silty
2,750 – 2,760	10	LIMESTONE – 100% (packstone) Light olive gray (5Y 6/1) to olive gray (5Y 3/1), fine to medium grained, moderately hard to hard, moderately to well indurated, pelloidal with few casts and molds
Lower Eocene Oldsmar Formation		
2,760 – 2,790	30	LIMESTONE – 100%; 60% (mudstone to wackestone) Very pale orange (10YR 8/2), very fine to fine grained, soft, moderately well indurated, slightly silty. 40% (grainstone to packstone) Very pale orange (10YR 8/2), cryptocrystalline to fine grained, moderately hard to hard, moderately well to well indurated, pelloidal. Trace grayish blue green (5BG 4/2) non-calcareous Clay at 2,770.
2,790 – 2,820	30	LIMESTONE – 100%; 70% (packstone) Very pale orange (10YR 8/2), cryptocrystalline to fine grained, moderately hard to hard, moderately to well indurated, pelloidal, locally silty. 30% (wackestone) Medium light gray (N6) to medium dark gray (N4), cryptocrystalline to very fine, very hard, very well indurated
2,820 – 2,830	10	LIMESTONE AND CLAY – 70% Limestone (mudstone) Very pale orange (10YR 8/2), microcrystalline to fine grained, soft to moderately soft, moderately indurated, slightly silty. 30% Clay Greenish gray (5GY 6/1) to dark greenish gray (5G 4/1), very stiff, plastic, cohesive, non-calcareous
2,830 – 2,840	10	LIMESTONE AND CLAY – 90% Limestone; 50% (packstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), cryptocrystalline to fine grained, very hard, very well indurated, vuggy. 40% (grainstone to wackestone) Very pale orange (10YR 8/2) to yellowish gray (5Y 8/2), very fine to fine grained, moderately soft to moderately hard, moderately indurated. 10% Clay greenish gray (5GY 6/1) to dark greenish gray (5G 4/1), very stiff, plastic, cohesive, non-calcareous
2,840 – 2,850	10	LIMESTONE – 100%; 85% (mudstone) White (N9), very fine grained, moderately soft, moderately well indurated. 15% (mudstone) Medium dark gray (N4) to dark gray (N3), microcrystalline, very hard, very well indurated
2,850 – 2,860	10	LIMESTONE – 100%; 50% (grainstone) Yellowish gray (5Y 8/1) to light gray (N7), fine grained, moderately soft, moderately to moderately well indurated. 35% (wackestone) Very light gray (N8.5) to light gray (N7), microcrystalline to fine grained, moderately hard to hard, well indurated, locally weakly vuggy. 15% (mudstone) White (N9), microcrystalline to very fine grained, moderately hard, moderately well to well indurated
2,860 – 2,870	10	LIMESTONE AND CLAY – 75% Limestone; 50% (grainstone) Very pale orange (10YR 8/2), fine grained, moderately soft, poorly to moderately indurated. 25% (mudstone to wackestone) Medium dark gray (N4), microcrystalline to fine grained, very hard, very well indurated. 25% Clay Greenish gray (5GY 6/1) to dark greenish gray (5G 4/1), stiff to very stiff, plastic, cohesive, non-calcareous

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-2
2,870 – 2,880	10	LIMESTONE – 100%; 50% (mudstone) Medium gray (N5) to medium dark gray (N4), cryptocrystalline to microcrystalline, very hard, very well indurated. 50% (wackestone to packstone) Very pale orange (10YR 8/2), very fine to fine grained, moderately soft, moderately to moderately well indurated
2,880 – 2,890	10	LIMESTONE – 100%; 85% (grainstone) Very pale orange (10YR 8/2), fine grained, moderately soft, moderately well indurated. 15% (mudstone) White (N9) to very pale orange (10YR 8/2), microcrystalline to fine grained, moderately soft, moderately well indurated, locally slightly sandy
2,890 – 2,900	10	LIMESTONE – 100% (mudstone) White (N9) to very pale orange (10YR 8/2), microcrystalline to fine grained, moderately soft to moderately hard, moderately well to well indurated, locally slightly sandy
2,900 – 2,910	10	LIMESTONE – 100%; 80% (mudstone) White (N9) to very pale orange (10YR 8/2), microcrystalline to fine grained, moderately soft, moderately well indurated, locally slightly sandy. 20% (grainstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), fine grained, moderately soft, moderately well indurated.
2,910 – 2,920	10	LIMESTONE -- 100%; 40% (mudstone) White (N9) to very pale orange (10YR 8/2), microcrystalline to fine grained, moderately soft, moderately well indurated, locally slightly sandy. 35% (mudstone) Pale yellowish brown (10YR 7/2) to medium dark gray (N4), cryptocrystalline to fine grained, hard to very hard, very well indurated. 25% (grainstone) Very pale orange (10YR 8/2) to pale yellowish brown (10YR 7/2), fine grained, moderately soft, moderately well indurated.
2,920 – 2,940	20	LIMESTONE – 100%; 50% (packstone) Very pale orange (10YR 8/2) to light olive gray (5Y 5/1), fine grained, moderately soft, moderately indurated. 50% (mudstone) Medium light gray (N6.5) to medium dark gray (N4), microcrystalline, very hard, very well indurated, weakly vuggy with few casts and molds
2,940 – 2,950	10	LIMESTONE – 100%; 60% (grainstone) Very pale orange (10YR 8/2) to light olive gray (5Y 6/1), fine grained, moderately soft, moderately indurated. 40% (mudstone) Very pale orange (10YR 8/2) to yellowish gray (5Y 8/1), very fine to fine grained, soft to moderately soft, moderately indurated, slightly sandy
2,950 – 2,960	10	DOLOSTONE, LIMEY DOLOSTONE, AND LIMESTONE – 45% Dolostone pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4), cryptocrystalline, very hard, very well indurated, weakly vuggy with vuggs commonly filled with dark yellowish brown (10YR 4/2), very fine grained, subhedral to anhedral Dolomite crystals. 30% Limey Dolostone olive gray (5Y 3/1) to grayish black (N2.5), very fine to fine grained, hard to very hard, very well indurated. 25% Limestone (mudstone) very pale orange (10YR 8/2) to yellowish gray (5Y 8/1), very fine to fine grained, soft to moderately soft, moderately indurated with few sucrosic subhedral to anhedral Dolomite crystals.
2,960 – 2,980	20	LIMESTONE – 100%; 85% (mudstone to wackestone) Very pale orange (10YR 8/2), very fine grained, moderately soft, moderately indurated with few fractures filled with dark yellowish brown (10YR 4/2) anhedral Dolomite crystals at 2,970. 15% (grainstone) Very pale orange (10YR 8/2), fine grained, moderately hard, moderately indurated.

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Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-2
2,980 – 2,990	10	LIMESTONE AND DOLOSTONE – 70% Limestone (grainstone) very pale orange (10YR 8/2) to grayish orange (10YR 7/2), fine grained, moderately hard, moderately to moderately well indurated, locally pelloidal. 30% Dolostone pale yellowish brown (10YR 6/2) to moderately yellowish brown (10YR 6/4), cryptocrystalline, very hard, very well indurated, weakly vuggy and fractured with vuggs and fractures filled with dark yellowish brown (10YR 4/2) microcrystalline Dolomite crystals.
2,990 – 3,000	10	LIMESTONE AND DOLOSTONE – 70% Limestone (packstone) very pale orange (10YR 8/2), fine grained, moderately soft to moderately hard, moderately indurated, pelloidal, locally weakly dolomitic. 30% Dolostone very pale orange (10YR 8/2) to dark yellowish brown (10YR 4/2), cryptocrystalline to fine grained, very hard, very well indurated.
3,000 – 3,040	40	LIMESTONE AND DOLOSTONE – 60% Limestone (packstone) very pale orange (10YR 8/2), fine grained, moderately soft to moderately hard, moderately indurated, locally weakly dolomitic. 40% Dolostone very pale orange (10YR 8/2) to dark yellowish brown (10YR 4/2), cryptocrystalline to crystalline, very hard, very well indurated, local euhedral Dolomitic crystals.
3,040 – 3,050	10	DOLOSTONE – 100% dark yellowish brown (10YR 4/2) to olive gray (5Y 3/1), cryptocrystalline to crystalline, very hard, very well indurated.
3,050 – 3,200	150	DOLOSTONE AND LIMESTONE – 60% Dolostone very pale orange (10YR 8/2) to dark yellowish brown (10YR 4/2), cryptocrystalline to fine grained, very hard, very well indurated. 40% Limestone (packstone) very pale orange (10YR 8/2), fine grained, moderately soft to moderately hard, moderately indurated, locally weakly dolomitic.
3,200 – 3,230	30	DOLOSTONE AND LIMESTONE – 70% Dolostone very pale orange (10YR 8/2) to dark yellowish brown (10YR 4/2) to olive gray (5Y 3/1), cryptocrystalline to fine grained, very hard, very well indurated. 30% Limestone (packstone) very pale orange (10YR 8/2), fine grained, moderately soft to moderately hard, moderately indurated, locally weakly dolomitic.
3,230 – 3,340	110	DOLOSTONE AND LIMESTONE – 80% Dolostone very pale orange (10YR 8/2) to dark yellowish brown (10YR 4/2) to olive gray (5Y 3/1), cryptocrystalline to fine grained, very hard, very well indurated. 20% Limestone (packstone) very pale orange (10YR 8/2), fine grained, moderately hard, moderately indurated, locally weakly dolomitic.
3,340 – 3,390	50	DOLOSTONE AND LIMESTONE – 70% Dolostone very pale orange (10YR 8/2) to dark yellowish brown (10YR 4/2), cryptocrystalline to fine grained, very hard, very well indurated. 30% Limestone (packstone) very pale orange (10YR 8/2), fine grained, moderately hard, moderately indurated, locally weakly dolomitic.
3,390 – 3,410	20	LIMESTONE AND DOLOSTONE – 50% Limestone (packstone) very pale orange (10YR 8/2), fine grained, moderately soft to moderately hard, moderately indurated, locally weakly dolomitic. 50% Dolostone very pale orange (10YR 8/2) to dark yellowish brown (10YR 4/2), cryptocrystalline to crystalline, very hard, very well indurated, local euhedral Dolomitic crystals.
3,410 – 3,420	10	DOLOSTONE AND LIMESTONE – 80% Dolostone very pale orange (10YR 8/2) to dark yellowish brown (10YR 4/2), cryptocrystalline to fine grained, very hard, very well indurated. 20% Limestone (packstone) very pale orange (10YR 8/2), fine grained, moderately hard, moderately indurated, locally weakly dolomitic.
3,420 – 3,440	20	DOLOSTONE – 100% dark yellowish brown (10YR 4/2) to olive gray (5Y 3/1), cryptocrystalline to microcrystalline, very hard, very well indurated.

Depth (feet bls)	Thickness (feet)	Description Injection Well- IW-2
3,440 – 3,500	60	LIMESTONE AND DOLOSTONE – 90% Dolostone dark yellowish brown (10YR 4/2) to olive gray (5Y 3/1), cryptocrystalline to fine grained, very hard, very well indurated. 10% Limestone (packstone) very pale orange (10YR 8/2), fine grained, moderately hard, moderately indurated, locally weakly dolomitic.

Hazen

Appendix E – Lithologic Description of Samples
Dual-Zone Monitor Well MW-1
Seminole Tribe of Florida – Hollywood Reservation
Broward County, Florida

Depth (feet bls)	Thickness (feet)	Description Dual-Zone Monitor Well MW-1
Undifferentiated Quaternary Surficial Deposits		
0 – 10	10	SAND – 100% Pale yellowish brown (10YR 6/2), very fine grained, sub-angular to sub-rounded, moderately sorted, unconsolidated, quartz, trace organics
10 – 30	20	SAND – 100% Pale yellowish brown (10YR 6/2), fine to medium grained, sub-angular, very well sorted, quartz
30 – 50	20	SAND – 100% Yellowish gray (5Y 7/2), fine to medium grained, sub-angular, very well sorted, quartz
50 – 60	10	SAND AND SHELL FRAGMENTS – 90% Sand pale yellowish brown (10YR 6/2), fine to medium grained, sub-angular, very well sorted, quartz. 10% Shell fragments.
Pliocene-Pleistocene Series		
60 – 70	10	SAND, LIMESTONE, AND SHELL FRAGMENTS – 70% Sand yellowish gray (5Y 7/2), unconsolidated, fine to medium grained, sub-angular quartz. 20% Limestone (wackestone) pale yellowish orange (10YR 8/6), fine grained, moderately hard, moderately indurated. 10% Shell fragments. Trace crystalline carbonate (calcite)
70 – 80	10	LIMEY SANDSTONE AND LIMESTONE – 80% Limey Sandstone pale yellowish brown (10YR 6/2), fine to medium grained with fine grained detrital carbonate, well cemented with calcite. 20% Limestone (wackestone) grayish orange (10YR 7/4) to yellowish orange (10YR 7/6), fine grained, hard, very well indurated, slightly sandy.
80 – 90	10	LIMEY SANDSTONE – 100% Pale yellowish brown (10YR 6/2) fine grained, hard, well to very well cemented with calcite, abundant detrital carbonate, weakly phosphatic.
90 – 130	40	LIMESTONE AND LIMEY SANDSTONE – 70% Limestone (wackestone) very pale orange (10YR 8/2), fine grained, moderately hard. 30% Limey Sandstone light olive gray (5Y 6/1) to yellowish gray (5Y 8/1), very fine to fine grained quartz with detrital carbonate, well cemented with calcite. Trace crystalline carbonate (calcite).
130 – 190	60	SANDY CLAYEY LIMESTONE – 100% (wackestone to packstone) light olive gray (5Y 6/1), fine grained, moderately soft, fossiliferous, weakly phosphatic, with fine to medium grained quartz sand. Shell fragments abundant.
190 – 200	10	SHELL FRAGMENTS, LIMEY SANDSTONE, AND SANDY CLAYEY LIMESTONE – 50% Shell fragments. 35% Limey Sandstone light olive gray (5Y 6/1), fine to medium grained quartz sand and shell fragments, weakly phosphatic, soft, well cemented with calcite. 15% Sandy Clayey Limestone (wackestone to packstone) very pale orange (10YR 8/2), very fine to fine grained, moderately hard, well indurated, quartz sand, weakly phosphatic.

Hazen

Depth (feet bls)	Thickness (feet)	Description Dual-Zone Monitor Well MW-1
200 – 230	30	LIMEY SANDSTONE, SANDY LIMESTONE, AND SHELL FRAGMENTS – 45% Limey Sandstone light olive gray (5Y 6/1), fine to medium grained quartz sand and shell fragments, weakly phosphatic, poorly cemented with calcite. 35% Sandy Limestone (packstone) very pale orange (10YR 8/2), fine to medium grained, moderately hard, weakly phosphatic. 20% Shell fragments. Trace grayish olive (10Y 4/2) Clay and unconsolidated quartz sand.
Miocene-Oligocene Series Hawthorn Group – Peace River Formation		
230 – 270	40	SANDY CLAY - 100% Light olive gray (5Y 6/1), very soft, non-plastic, non-cohesive, weakly phosphatic, with abundant medium grained quartz sand and detrital carbonate.
270 – 280	10	LIMEY SANDSTONE AND SANDY LIMESTONE – 90% Limey Sandstone pale yellowish orange (10YR 8/4) to light olive gray (5Y 6/1), fine to medium grained, well cemented with calcite. 10% Sandy Limestone very pale orange (10YR 8/2) to yellowish gray (5Y 8/1), fine to medium grained, moderately soft to moderately hard, moderately well to well indurated, weakly phosphatic with abundant very fine grained quartz sand
280 – 320	40	SANDY CLAY - 100% Light olive gray (5Y 6/1) to olive gray (5Y 5/1), very soft, non-plastic, non-cohesive, weakly phosphatic, with abundant very fine to fine grained quartz sand and detrital carbonate.
320 – 330	10	SANDY CLAY – 100% Grayish olive (10Y 5/2), very soft, non-plastic, non-cohesive, weakly phosphatic, weakly calcareous with abundant fine to medium grained quartz sand
330 – 340	10	SANDY CLAY – 100% Dark greenish gray (5GY 4/1), soft, plastic, cohesive, weakly phosphatic, weakly calcareous with abundant fine to medium grained quartz sand
340 – 360	20	CLAY – 100% Dark greenish gray (5G 4/1), soft, plastic, cohesive, weakly phosphatic, weakly calcareous
360 – 370	10	SANDY CLAY – 100% Dark greenish gray (5G 4/1), soft, plastic, cohesive, weakly phosphatic, weakly calcareous, abundant very fine to fine grained quartz sand
370 – 380	10	CLAY – 100% Dark greenish gray (5G 4/1), soft, plastic, cohesive, weakly phosphatic, weakly calcareous
380 – 400	20	SANDY CLAY – 100% Dark greenish gray (5G 4/1), soft, plastic, cohesive, weakly phosphatic, weakly calcareous, abundant very fine to fine grained quartz sand
400 – 440	40	SANDY CLAY – 100% Grayish olive (10Y 4/2), very soft to soft, plastic, cohesive, weakly phosphatic, weakly calcareous, abundant very fine grained quartz sand, few forams
440 – 450	10	SANDY CLAY – 100% Greenish gray (5GY 5/1), medium, non-plastic, non-cohesive, weakly phosphatic, abundant fine grained quartz sand
450 – 500	50	SANDY CLAY – 100% Grayish olive (10Y 4/3), soft, plastic, cohesive, weakly phosphatic, weakly calcareous, abundant very fine grained quartz sand
500 – 510	10	LIMESTONE AND CHERT – 80% Limestone (mudstone to wackestone) very pale orange (10YR 8/2) to moderate yellowish brown (10YR 5/4), cryptocrystalline to microcrystalline, soft, poorly indurated with few casts. 20% Chert olive black (5Y 2/1), cryptocrystalline, very hard.

Depth (feet bls)	Thickness (feet)	Description Dual-Zone Monitor Well MW-1
Miocene-Oligocene Series Hawthorn Group – Arcadia Formation		
510 – 520	10	SANDY LIMEY CLAY – 100% Pale olive (10Y 6.5/2), medium, plastic, cohesive, weakly phosphatic, calcareous, abundant very fine grained quartz sand.
520 – 540	20	LIMESTONE, SANDY LIMEY CLAY AND CHERT – 50% Limestone (mudstone to wackestone), very pale orange (10YR 8/2) to moderate yellowish brown (10YR 5/4), cryptocrystalline to microcrystalline, soft, poorly indurated with few casts. 30% Pale olive (10Y 6.5/2), medium, plastic, cohesive, weakly phosphatic, calcareous, abundant very fine grained quartz sand. 20% Chert olive black (5Y 2/1), cryptocrystalline, very hard.
540 – 550	10	SANDY LIMEY CLAY – 100% Pale olive (10Y 6.5/2), very soft, plastic, cohesive, weakly phosphatic, calcareous, abundant very fine grained quartz sand
550 – 560	10	CLAY – 100% Yellowish gray (5Y 7/2), stiff, plastic, cohesive, weakly phosphatic, calcareous
560 – 570	10	CLAY – 100% Greenish gray (5GY 5.5/1), soft, plastic, cohesive, weakly phosphatic, weakly calcareous
570 – 590	20	CLAY – 100% Pale olive (10Y 6/2), very soft, non-plastic, cohesive, weakly calcareous
590 – 620	30	CLAY – 100% Yellowish gray (5Y 7/2), soft to medium, plastic, cohesive, highly calcareous
620 – 640	20	CLAY – 100% Pale olive (10Y 6/2) to grayish olive (10Y 5/2), soft to medium, plastic, cohesive, weakly calcareous
640 – 650	10	SANDY CLAY – 100% Grayish olive (10Y 5/2), medium, plastic, cohesive, weakly phosphatic, calcareous, abundant very fine grained carbonate sand
650 – 670	20	CLAY – 100% Yellowish gray (5Y 7/2), soft, plastic, cohesive, calcareous
680 – 700	20	CLAY – 100% Yellowish gray (5Y 7/2), very soft, non-plastic, non-cohesive, calcareous, abundant detrital carbonate
700 – 710	10	LIMESTONE AND CLAY – 50% Limestone (grainstone) very pale orange (10YR 8/2) to yellowish gray (5Y 8/1), medium to coarse grained, hard, well indurated. 50% Clay yellowish gray (5Y 7/2), very soft, non-plastic, non-cohesive, calcareous, abundant detrital carbonate
710 – 720	10	LIMESTONE AND CLAY – 50% Limestone (packstone) very pale orange (10YR 8/2), very fine to fine grained, soft, poorly indurated, weakly phosphatic. 50% Clay Yellowish gray (5Y 7/2), very soft, non-plastic, non-cohesive, calcareous, abundant detrital carbonate
720 – 730	10	CLAY – 100% Yellowish gray (5Y 7/2), medium, plastic, cohesive, weakly phosphatic, calcareous
730 – 740	10	LIMESTONE AND CLAY – 50% Limestone (packstone) very pale orange (10YR 8/2), very fine to fine grained, soft, poorly indurated, weakly phosphatic. 50% Clay Yellowish gray (5Y 7/2), very soft, non-plastic, non-cohesive, calcareous, abundant detrital carbonate
740 – 810	70	CLAY – 100% Light olive gray (5Y 6/2), medium, plastic, cohesive, weakly phosphatic, phosphate content decreasing with depth, calcareous

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Depth (feet bls)	Thickness (feet)	Description Dual-Zone Monitor Well MW-1
810 – 840	30	CLAY AND LIMESTONE – 70% Clay yellowish gray (5Y 7/2), medium, plastic, cohesive, calcareous. 30% Limestone (packstone) yellowish gray (5Y 8/2), very fine to fine grained, soft, poorly indurated
840 – 850	10	CLAY – 100% Yellowish gray (5Y 7/2), medium, plastic, cohesive, calcareous
850 – 860	10	CLAY AND LIMESTONE – 60% Clay yellowish gray (5Y 7/2), medium, plastic, cohesive, calcareous. 40% Limestone (packstone) yellowish gray (5Y 8/2), fine grained, soft, poorly indurated
860 - 900	40	CLAY – 100% Yellowish gray (5Y 7/2), plastic, cohesive, slightly calcareous
900 – 930	30	CLAY – 100% Light olive gray (5Y 5/2) to greenish gray (5GY 6/1), medium, plastic, very cohesive, slightly calcareous
930 – 940	10	CLAY – 100% Grayish olive (10Y 5/2), soft, plastic, cohesive, weakly calcareous
940 – 950	10	LIMESTONE – 100% (packstone) Yellowish gray (5Y 7/2) to olive gray (5Y 5/1), fine grained, moderately hard to hard, moderately indurated, weakly phosphatic, locally weakly dolomitic
950 – 960	10	SANDY SILTY LIMESTONE – 100% (packstone) Light olive gray (5Y 6/1), fine to coarse grained, moderately hard, moderately indurated, weakly phosphatic, abundant detrital carbonate and very fine grained quartz sand
960 – 970	10	NO SAMPLE
970 – 980	10	SANDY LIMESTONE – 100% (packstone) Very pale orange (10YR 7.5/2) to olive gray (5Y 4/1), fine grained, hard, well indurated, weakly phosphatic, abundant very fine grained quartz sand. Trace yellowish gray (5Y 8/1) carbonate marl.
980 – 990	10	SANDY LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to light olive gray (5Y 5/2), fine to medium grained, hard, very well indurated, phosphatic, abundant very fine grained quartz sand, few shell fragments
990 – 1,000	10	LIMESTONE – 100% (wackestone to packstone) Very pale orange (10YR 8/2) to light bluish gray (5B 6.5/1), fine to medium grained, hard, very well indurated, weakly phosphatic, casts and molds common
1,000 – 1,020	20	LIMESTONE – 100%; 65% (packstone) Yellowish gray (5Y 7/2) to light gray (N7), very fine to coarse grained, hard, well indurated; 35% (mudstone) light olive gray (5Y 6/1), very fine to fine grained, moderately hard, well indurated
1,020 – 1,040	20	LIMESTONE – 100%; 60% (packstone) light olive gray (5Y 6/1), fine to medium grained, hard, well indurated; 40% (grainstone) Very pale orange (10YR 8/2, medium to coarse grained, hard, moderately to well indurated
Middle Eocene Avon Park Formation		
1,040 – 1,050	10	LIMESTONE – 100%; 80% (grainstone) Very pale orange (10YR 8/2), fine grained, hard, well indurated; 20% (packstone) light olive gray (5Y 7/1), microcrystalline to medium grained, hard, moderately indurated.
1,050 – 1,070	20	LIMESTONE – 100% (grainstone) Very pale orange (10YR 8/2), fine to medium grained, hard, poorly indurated; Large echinoids and forams abundant

Depth (feet bls)	Thickness (feet)	Description Dual-Zone Monitor Well MW-1
1,070 – 1,100	30	LIMESTONE – 100% (packstone to grainstone) Very pale orange (10YR 8/2) to Pale yellowish brown (10YR 6/2), fine to medium grained, hard, poorly indurated, fossiliferous. Forams abundant
1,100 – 1,140	40	LIMESTONE – 100%; 80% (packstone) Grayish orange (10YR 7/4) to Pale yellowish brown (10YR 6/2), fine grained, moderately soft to moderately hard, well indurated. 20% (mudstone) Very pale orange (10YR 8/2) microcrystalline, hard, well indurated, weakly vuggy
1,140 – 1,160	20	LIMESTONE – 100%; 80% (wackestone) White (N9) to Very light gray (N8), fine to very fine grained, moderately hard to hard, moderately indurated, weakly vuggy. 20% (grainstone) Very pale orange (10YR 8/2), medium grained, moderately hard, moderately well indurated
1,160 – 1,190	30	LIMESTONE – 100%; 60% (grainstone) Very pale orange (10YR 8/2), medium grained, moderately hard, moderately well indurated; 40% (wackestone) White (N9) to Very light gray (N8), fine to very fine grained, moderately hard to hard, moderately indurated, weakly vuggy
1,190 – 1,260	70	LIMESTONE – 100% (wackestone to packstone) Grayish orange (10YR 7/4) to very pale orange (10YR 8/2), microcrystalline to fine grained, moderately hard to hard, well indurated, weakly vuggy
1,260 – 1,290	30	LIMESTONE – 100% (wackestone to packstone) Grayish orange (10YR 7/4) to very pale orange (10YR 8/2), microcrystalline to coarse grained grained, soft to hard, well indurated, weakly vuggy, Echinoids abundant
1,290 – 1,340	50	LIMESTONE – 100%; 65% (wackestone to packstone) Yellowish gray (5Y 8/1) to light olive gray (5Y 6/1) to Very pale orange (10YR 8/2), medium to fine grained, hard to very hard, well indurated, 35% (packstone) Grayish orange (10YR 7/4), medium to coarse grained, moderately hard to hard, moderately indurated.
1,340 – 1,350	10	LIMESTONE AND LIMEY DOLOSTONE – 50% Limestone (packstone to grainstone) grayish orange (10YR 7/4), fine to medium grained, moderately soft to moderately hard, fossiliferous. 35% (wackestone) Medium light gray (N6), medium grained, hard, weakly vuggy. 15% Limey Dolostone olive gray (5Y 4/1), medium grained, hard, very well indurated.
1,350 – 1,370	20	LIMESTONE – 50% (packstone to grainstone) Grayish orange (10YR 7/4), fine to coarse grained, moderately hard to hard. 50% (wackestone) White (N9) to very pale orange (10YR 8/2), very fine to microcrystalline, hard, weakly vuggy.
1,370 – 1,390	20	LIMESTONE – 100%; 70% (packstone) Pale yellowish brown (10YR 6/2), fine to medium grained, hard, well indurated. 30% (mudstone) Grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2) to yellowish gray (5Y 8/1), very fine grained to cryptocrystalline, hard, well indurated, weakly vuggy.
1,390 – 1,410	20	LIMESTONE AND LIMEY DOLOSTONE – 40% Limestone (packstone), grayish orange (10YR 7/4), fine to medium grained, moderately soft to moderately hard. 30% (wackestone) Light olive gray (5Y 6/1), very fine to fine grained, hard, weakly vuggy. Limey Dolostone 30% Medium gray (N5) to Yellowish gray (5Y 8/1) very fine grained to cryptocrystalline, hard, vuggy.
1,410 – 1,420	10	LIMESTONE – 100%; Limestone 90% (packstone) Grayish orange (10YR 7/2) to light olive gray (5Y 5/1), very fine to coarse grained, moderately soft to moderately hard; 10% (mudstone) Very pale orange (10YR 8/2), very fine grained to cryptocrystalline, hard.

Depth (feet bls)	Thickness (feet)	Description Dual-Zone Monitor Well MW-1
1,420 – 1,490	70	LIMESTONE – 100%; 80% (wackestone to packstone) Yellowish gray (5Y 8/1), very fine to medium grained, moderately soft to moderately hard, moderately indurated; 20% (mudstone to wackestone) light gray (N6), fine grained to microcrystalline, hard.
1,490 – 1,500	10	LIMESTONE – 100% Limestone (grainstone) grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), fine to medium grained, very hard, well indurated, pelloidal, few forams and echinoids.
1,500 – 1,550	50	LIMESTONE – 100%; 70% (wackestone to mudstone) Very pale orange (10YR 8/2) to Light gray (N7) fine grained to microcrystalline, hard, well indurated, weakly vuggy; 30% (mudstone to wackestone) Very pale orange (10YR 8/2) to fine to medium grained, soft to moderately soft.
1,550 – 1,590	40	LIMESTONE – 100%; 90% (wackestone to packstone) Very light gray (N9) to very pale orange (10YR 8/2), very fine to fine grained, moderately hard, locally vuggy, pelloidal. 10% (mudstone to wackestone) Medium light gray (N6), cryptocrystalline to fine grained, weakly vuggy.
1,590 – 1,640	60	LIMESTONE – 100%; 80% (mudstone to wackestone) Medium light gray (N6), cryptocrystalline to fine grained, weakly vuggy. 20% (wackestone to packstone) Very light gray (N9) to white (N9), very fine to fine grained, hard, vuggy, pelloidal
1,640 – 1,680	40	LIMESTONE – 100%; 80% (packstone) Very pale orange (10YR 8/2), fine to medium grained, moderately hard to moderately soft, pelloidal. 20% (mudstone to wackestone) Light olive gray (5Y 5/2), very fine to fine grained, hard, weakly vuggy. Trace Limestone (mudstone) medium dark gray (N4) fine to very fine grained, hard, vuggy.
1,680 – 1,690	10	LIMESTONE – 100%; 70% (mudstone to wackestone) Medium light gray (N6), cryptocrystalline to fine grained, weakly vuggy carbonate. 30% (wackestone to packstone) Very light gray (N9) to medium dark gray (N4) to white (N9), very fine to fine grained, hard, vuggy, pelloidal
1,690 – 1,720	30	LIMESTONE – 100%; 80% (packstone) Very pale orange (10YR 8/2), fine to medium grained, moderately soft to moderately hard, pelloidal with forams common. 20% (mudstone) Yellowish gray (5GY 8/1) cryptocrystalline, hard, weakly vuggy. Trace Limestone (wackestone) medium light gray (N6), fine grained, hard.
1,720 – 1,740	20	LIMESTONE – 100%; 50% (packstone) Very pale orange (10YR 8/2) to dark yellowish orange (10YR 6/6), fine to medium grained, moderately hard to hard, pelloidal, fossiliferous. 40% (wackestone) Very pale orange (10YR 8/2), very fine grained, hard, moderately vuggy. 10% (wackestone) medium dark gray (N4) fine grained to cryptocrystalline, hard.
1,740 – 1,760	20	LIMESTONE – 100%; 80% (packstone) Very pale orange (10YR 8/2) fine grained, moderately hard to moderately soft, pelloidal, fossiliferous. 20% (mudstone) Pale yellowish brown (10YR 6/2) cryptocrystalline, very hard.
1,760 – 1,810	50	LIMESTONE – 100% (packstone) Very pale orange (10YR 8/2) to white (N8), fine to medium grained, moderately hard, pelloidal

APPENDIX F

GEOPHYSICAL LOGS

Hazen

Appendix F – Geophysical Log Index
Injection Well IW-1
Seminole Tribe of Florida – Hollywood Reservation

Run	Log	Date	Logged Interval (feet bls)	Borehole Diameter (inches)	Casing Diameter (inches)
1	XYC / GR / SP CTL – 54-inch casing	Jul 5, 2017 Jul 6, 2017	0 - 253 0 – 243	63-1/2	n/a
2	XYC / GR / SP	Jul 23,2017	0 – 1,006	52-1/2	n/a
3	CTL – 44-inch casing	Jul 26,2017	0 – 1,006	52-1/2	n/a
4	XYC / GR DIL w/ LL3 / SP BHCS w/ VDL LDWQ Fluid Conductivity / Temp Merged Flow Log BHTV	Aug 22, 2017	965 – 2,003	12-1/4	n/a
5	XYC / GR / SP / Temp	Oct 10, 2017	950 – 2,005	42-1/2	n/a
6	CTL – 34-inch casing	Oct 14-17, 2017	0 – 1,979	42-1/2	n/a
7	XYC / GR DIL w/ LL3 / SP BHCS w/ VDL LDWQ BHTV Fluid Conductivity / Temp Merged Flowmeter	Nov 6, 2017 Nov 6, 2017 Nov 7, 2017 Nov 7, 2017 Nov 7, 2017 Nov 8, 2017 Nov 8, 2017	1,950 – 3,005 1,990 – 3,005 2,000 – 3,005 2,000 – 3,005 2,000 – 3,005 1,970 – 2,995 1,970 – 2,995	12-1/4	n/a
8	XYC / GR / Temp / SP	Dec 15, 2017	2,000 – 2,928	32-1/2	n/a
9	CTL – 24-inch casing	Dec 23-29, 2017	0 – 2,905	32-1/2	24
10	CBL- 24-inch casing	Dec 30, 2017	50 – 2,904	32-1/2	24
11	XYC / GR DIL w/ LL3 / SP BHCS w/ VDL Fluid Conductivity / Temp	Jan 29, 2018	2,870 – 3,501 2,910 – 3,501 2,900 – 3,501 2,920 – 3,501	22-1/4	n/a
12	Precementing CBL – 16-inch casing	Feb 3, 2018	0 – 2,910	22-1/4	16
13	CTL – 16-inch casing	Feb 6-10, 2018	0 – 2,910	22-1/4	16
14	Post cementing CBL – 16-inch casing	Feb 11, 2018	10 – 2,910	22-1/4	16
15	High Resolution Temp RTS	Apr 20, 2018	0 – 3,501	22-1/4	16

Hazen

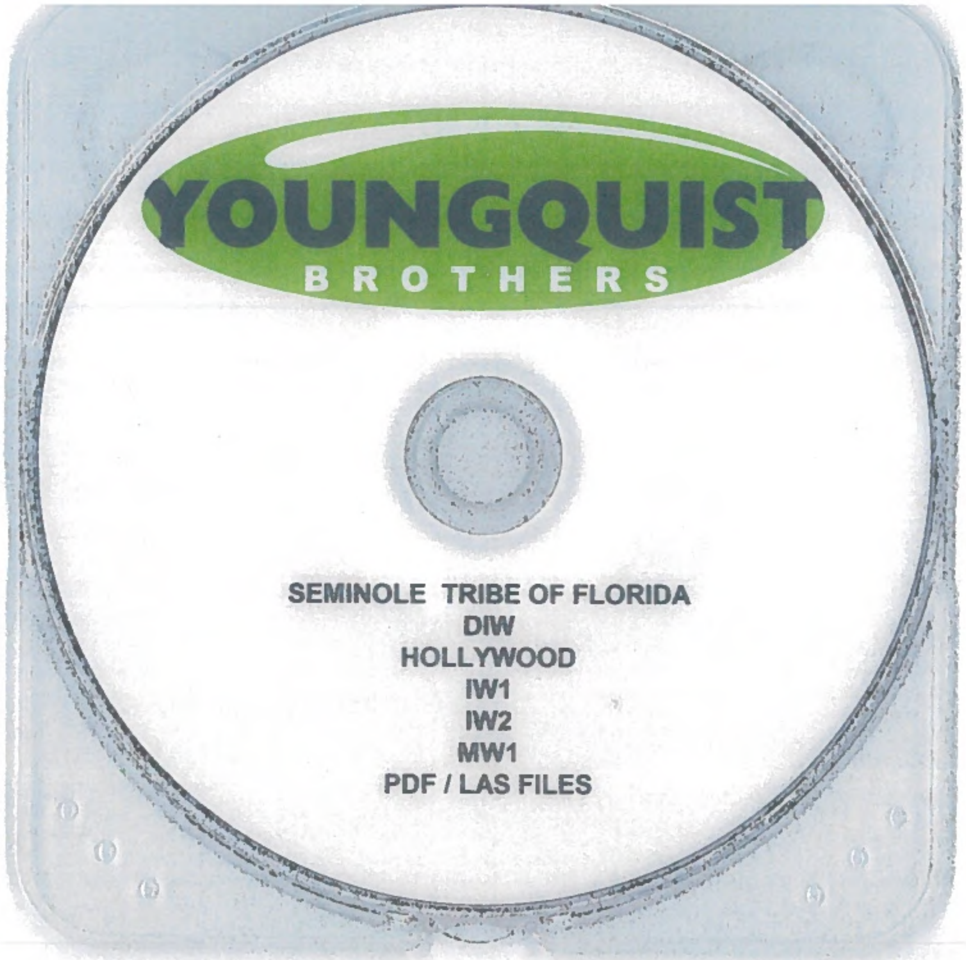
Appendix F – Geophysical Log Index
Injection Well IW-2
Seminole Tribe of Florida – Hollywood Reservation

Run	Log	Date	Logged Interval (feet bls)	Borehole Diameter (inches)	Casing Diameter (inches)
1	XYC / GR / SP	May 23, 2017	0 - 254	64-1/2	n/a
2	XYC / GR / SP	Jun 16, 2017	0 – 1,012	52-1/2	n/a
3	CTL – 44-inch casing	Jun 18-19, 2017	0 – 1,000	52-1/2	44
4 4 4 4 4 4 4	XYC / GR DIL w/ LL3 / SP BHCS w/ VDL LDWQ Fluid Conductivity / Temp BHTV Merged Flowmeter	Jul 11, 2017 Jul 11, 2017 Jul 11, 2017 Jul 11, 2017 Jul 11, 2017 Jul 11, 2017 Jul 11, 2017	950 – 2,003 950 – 2,003 950 – 2,003 950 – 2,003 950 – 2,003 1,004 – 1,996 950 – 2,003	12-1/4	n/a
5 5	XYC / GR / SP Temp	Aug 15, 2017 Aug 15, 2017	800 – 2,008 0 – 2,008	42-1/2	n/a
6	CTL – 34-inch casing	Aug 18-22, 2017	0 – 2,004	42-1/2	34
7	XYC / GR DIL w/ LL3 / SP BHCS w/ VDL LDWQ Fluid Conductivity / Temp BHTV Merged Flowmeter	Sep 26, 2017 Sep 26, 2017 Sep 26, 2017 Sep 26, 2017 Sep 26, 2017 Sep 26, 2017 Sep 26-27, 2017	1,950 – 3,002 1,950 – 3,002 1,950 – 3,002 1,950 – 3,002 1,950 – 3,002 2,000 – 2,998 1,950 – 3,002	12-1/4	n/a
8	XYC / GR / Temp / SP	Oct 30, 2017	1,950 – 3,002	32-1/2	n/a
9	CTL – 24-inch casing	Nov 3-8, 2017	0 – 3,000	32-1/2	n/a
10	CBL – 24-inch casing	Nov 8, 2017	0 – 2,999	32-1/2	n/a
11	XYC / GR DIL w/ LL3 / SP BHCS w/ VDL Fluid Conductivity / Temp	Nov 25, 2017	2,950 – 3,506 3,000 – 3,506 2,980 – 3,506 2,980 – 3,506	22-1/4	n/a
12	Precementing CBL – 16-inch casing	Dec 1, 2017	0 – 3,020	22-1/4	196
13	CTL – 16-inch casing	Dec 3-6, 2017	0 – 3,506	22-1/4	16
14	Post cementing CBL – 16-inch casing	Dec 7, 2017	0 – 3,020	22-1/4	16
15	Temp – High Resolution	Apr 18, 2018	0 – 3,503	22-1/4	n/a
15	RTS	Apr 18, 2018	0 – 3,503	22-1/4	16

Hazen

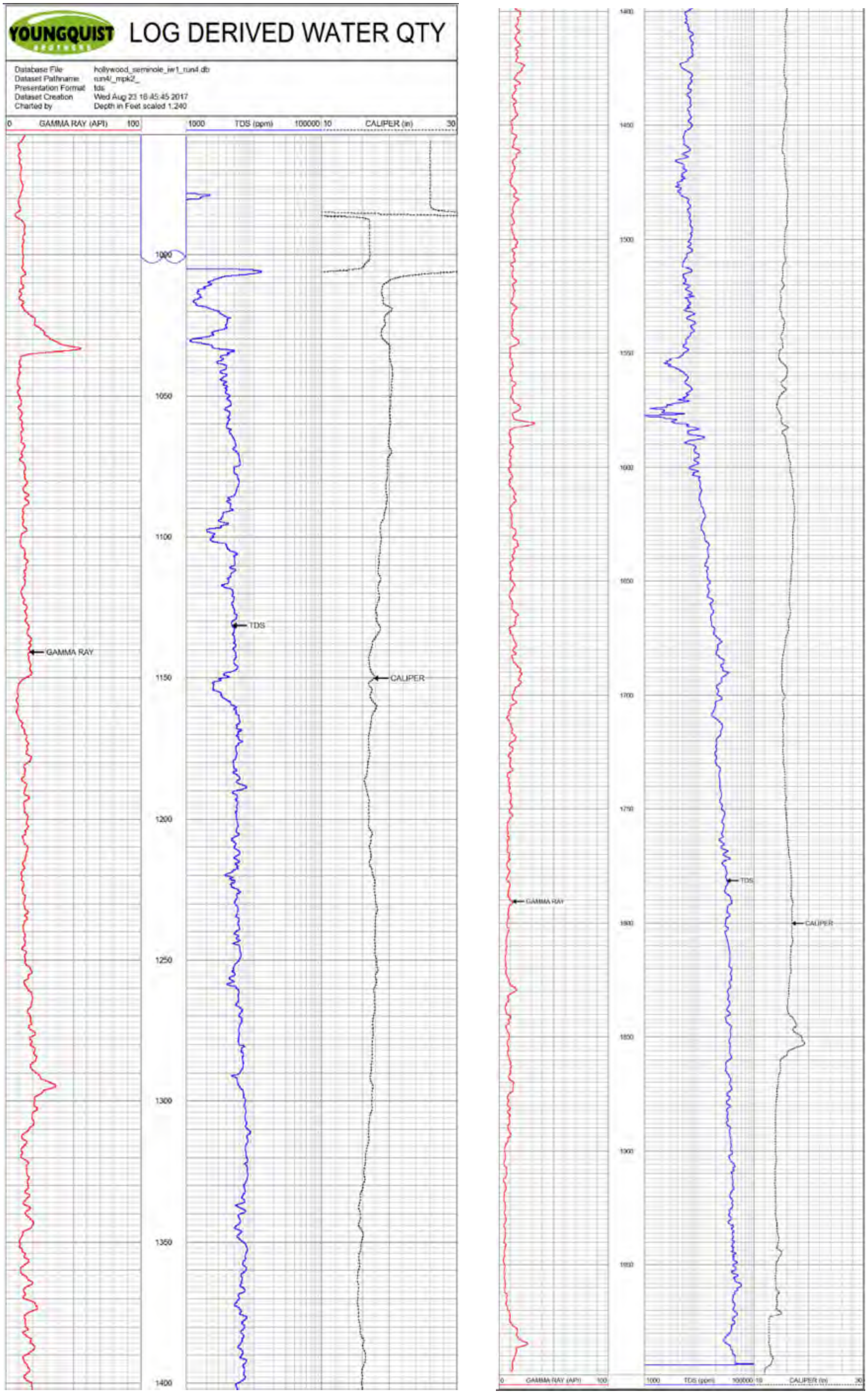
Appendix F – Geophysical Log Index
Dual Zone Monitor Well MW-1
Seminole Tribe of Florida – Hollywood Reservation

Run	Log	Date	Logged Interval (feet bls)	Borehole Diameter (inches)	Casing Diameter (inches)
1	XYC / GR / Temp / SP	Dec 21, 2017	0 - 254	46-1/2	n/a
2	CTL – 36-inch casing	Dec 22, 2017	0 – 243	46-1/2	36
3	XYC / GR / Temp / SP	Jan 10, 2018	200 – 1,008	34-1/2	n/a
4	CTL – 24-inch casing	Jan 11-12, 2018	0 – 998	34-1/2	24
5	XYC / GR DIL w/ LL3 / SP BHCS w/ VDL LDWQ Fluid Conductivity / Temp Merged Flowmeter	Jan 24, 2018 Jan 25, 2018 Jan 25, 2018 Jan 25, 2018 Jan 25, 2018 Jan 23-25, 2018	950 – 1,812 995 – 1,812 990 – 1,812 1,000 – 1,812 950 – 1,812 950 – 1,812	12-1/4	n/a
6	XYC / GR / Temp / SP	Feb 17, 2018	950 – 1,503	22-1/4	n/a
7	CTL – 16-inch casing	Feb 19-21, 2018	0 – 1,470	n/a	16
8	CBL – 16-inch casing	Feb 23, 2018	20 – 1,495	n/a	16
9	XYC / GR	Feb 28, 2016	1,450 – 1,810	12-1/4	n/a
10	Precementing CBL – FRP casing	Mar 3, 2018	990 – 1,780	n/a	6-5/8
11	CTL – 6.625-inch casing	Mar 6-7, 2018	0 – 1,770	n/a	6-5/8
12	Post cementing CBL – FRP casing XYC / GR	Mar 8, 2018	990 – 1,770 1,700 – 1,804	n/a	6-5/8


YOUNGQUIST
BROTHERS
SEMINOLE TRIBE OF FLORIDA
DIW
HOLLYWOOD
IW1
IW2
MW1
PDF / LAS FILES

APPENDIX G

LOG DERIVED WATER QUALITY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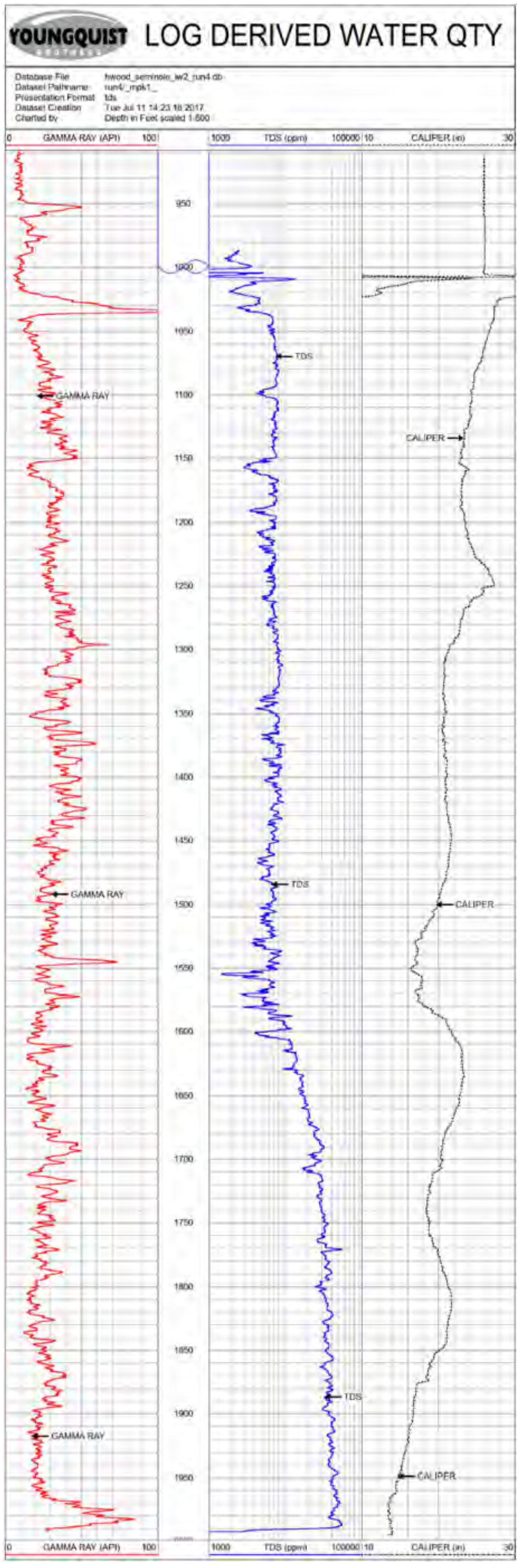
LOG DERIVED WATER QTY
Database File hollywood_seminole_iw1_run4.db
Dataset Pathname run4/_mpk2_
Presentation Format tds
Dataset Creation Wed Aug 23 16:45:45 2017
Charted by Depth in Feet scaled 1:240
0 GAMMA RAY (API) 100
1000 TDS (ppm) 100000
10 CALIPER (in) 30
1000
1050
1100
1150
1200
1250
1300
1350
1400
GAMMA RAY
TDS
CALIPER
1400
1450
1500
1550
1600
1650
1700
1750
1800
1850
1900
1950
GAMMA RAY
TDS
CALIPER
0 GAMMA RAY (API) 100
1000 TDS (ppm) 100000
10 CALIPER (in) 30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Database File hwood_seminole_iw2_run4.db
Dataset Pathname run4/_mpk1_
Presentation Format tds
Dataset Creation Tue Jul 11 14:23:18 2017
Charted by Depth in Feet scaled 1:600
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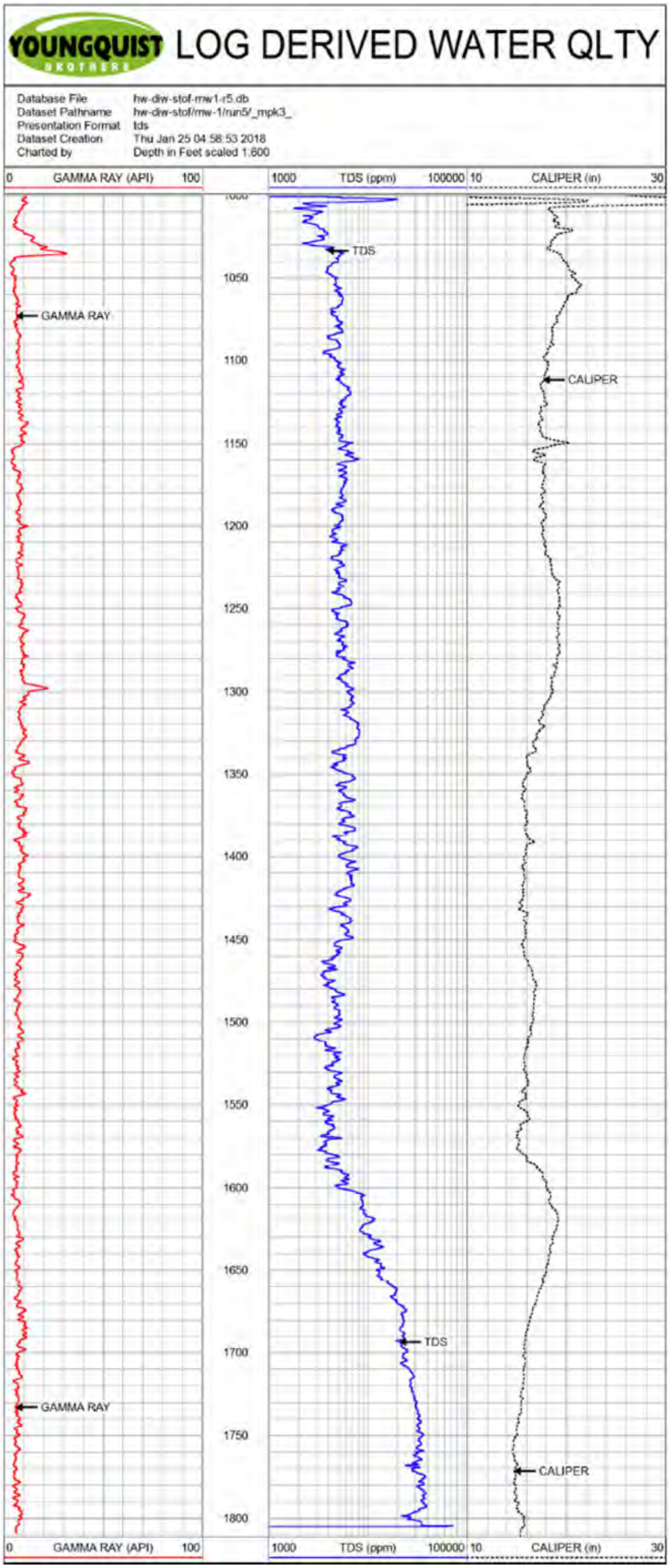
1000 TDS (ppm) 100000
10 CALIPER (in) 30
950
1000
1050
1100
1150
1200
1250
1300
1350
1400
1450
1500
1550
1600
1650
1700
1750
1800
1850
1900
1950
GAMMA RAY
TDS
CALIPER
0 GAMMA RAY (API) 100
1000 TDS (ppm) 100000
10 CALIPER (in) 30


YOUNGQUIST BROTHERS
LOG DERIVED WATER QLTY
Database File hw-diw-stof-mw1-r5.db
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Presentation Format tds
Dataset Creation Thu Jan 25 04:58:53 2018
Charted by Depth in Feet scaled 1:600
0 GAMMA RAY (API) 100
1000 TDS (ppm) 100000
10 CALIPER (in) 30
GAMMA RAY
TDS
CALIPER
1050
1100
1150
1200
1250
1300
1350
1400
1450
1500
1550
1600
1650
1700
1750
1800

APPENDIX H

GEOPHYSICAL LOGGING QUALITY CONTROL

CALIBRATION

Few logging tools give a response immediately useful in formation evaluation. Logging tools generally exert some disturbance on the formation (pass electric current through it, bombard it with sub-atomic particles, etc.). The tools' detectors measure this disturbance after it has passed through the formation. This measurement may be made in counts per second, it is referred to as the raw measurement. Such responses are of limited interest to a geoscientist.

Calibration links this raw measurement to a useful formation property. All calibrations work on the same principle. A tool is placed in environments (usually two) of known physical property and the tool's responses in these environments are measured. An arithmetic relation (usually a straight line) between these points is constructed and used to convert actual measurements to calibrated values. For example, by recording the X-Y Caliper Tool's response (pulses per second, ***raw measurement***) to rings of known size (inches, ***calibrated measurement***); we can derive an equation that will allow measurement of an unknown hole diameter.

The Primary Standard for all logging tools is dependent on the physical property it has been designed to measure. This Primary Standard may be one of the following:

- API standard test pits, such as those found at the University of Houston.
- A test fixture from the tool manufacturer.
- Part of the tool's electronic circuitry.

Each Tool Section in this manual describes the primary standard adopted by Youngquist Brothers, Inc. Geophysical Logging division.

Manufacturing plants and operations bases use Secondary Standards when needed as it is impractical to calibrate, and re-calibrate, each tool in some primary standards such as the Houston API pits. These secondary calibrators are carefully referenced directly to the primary standard.

Some examples of these secondary Standards are :

- The Natural Gamma Ray jig
- The Compensated Neutron water tank
- The Aluminum and Magnesium blocks for density calibrations

CALIBRATION TECHNIQUE

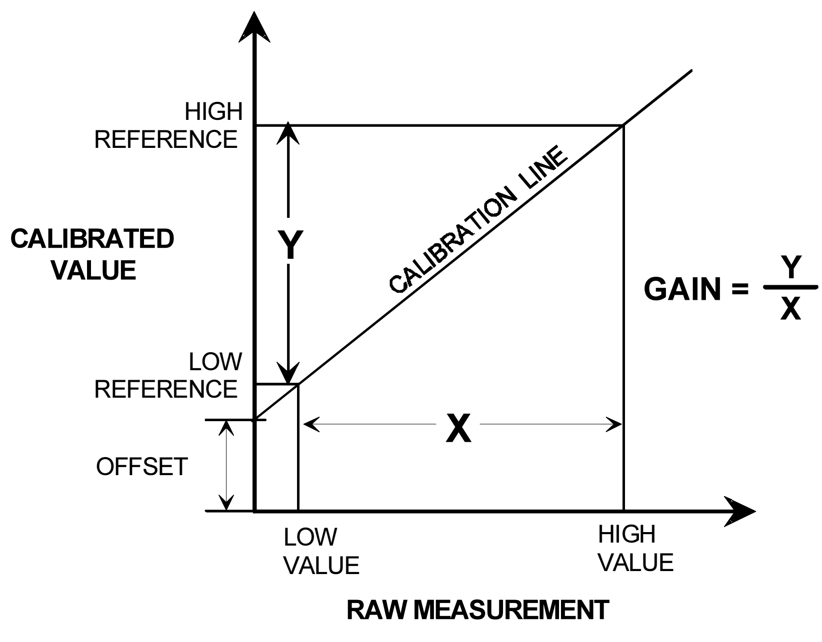
Some tools such as the X-Y Caliper Tool and the Fluid Resistivity Tool use multiple straight line segments to compute calibrated values. These tools use a modified version of the technique described below where a 2 point calibration scheme is described. The Flowmeter Tool is calibrated over 3 points and the data is fit to a quadratic equation.

We express a tool's linear response by:

$$y = mx + b$$

where y = calibrated response of the tool
m = slope or gain of the tool
x = raw value from tool
b = intercept or offset

This linear relationship between raw or measured values and calibrated values is shown
below :



$$Gain = \frac{High\,Cal - Low\,Cal}{High\,Meas - Low\,Meas} \qquad (A)$$

$$Offset\ or\ Intercept = Low\,Cal - (Gain \times Low\,Meas) \qquad (B)$$

VERIFICATION

A verification is exactly what it says it is,: it confirms that the tool response and calibration are still valid. It does not modify the relation between tool response and physical property measurement (i.e., the calibration).

Any verification method has to be fast, accurate, precise and rugged. They are normally done on the catwalk or drill floor, and take rig time.

DUAL INDUCTION TOOL (DIT)

The shop calibration of the Dual Induction Tool (DIT) involves placing the tool in a zero conductivity medium. This is accomplished by elevating the tool on tall wooden stands away from any metal or electrical fields (overhead or underground power lines). The height of the stands depends on ground conductivity which in turn is related to ground moisture content. A distance of 3 meters above the ground will normally remove any ground effect from the measurement. The tool zero conductivity signal is recorded for both deep and medium. Next a calibration loop of known conductivity is placed over the deep and medium sensor. The value of the loop is designed to represent a 500 mmho formation. This provides the “High Cal” value. Field verification is done to verify tool response in between master calibrations.

BOREHOLE COMPENSATED SONIC LOG (BHC)

The primary calibration for the BHC involves centralizing the tool in a section of water-filled steel casing and mechanically adjusting the spacers within the tool until the 4 individual transmitter to receiver pairs read the correct transit time for the 5 foot and 3 foot spacings. This procedure is done when the tool is built or whenever major repairs are performed on the transmitter/receiver section. Normal quality control procedures for all Compensated Sonic Logs requires logging the value of Delta T in the casing either on the way in the hole, or immediately after the logging run. This is an excellent verification that the entire system is functioning properly. Sometimes, this casing check is difficult in pipe that is well bonded. If possible the logging engineer should find a section of "free pipe" to record the casing check.

X-Y CALIPER TOOL (XYT)

The calibration of this is done by opening the caliper arms into two or more rings of known inside diameter, the smaller ring serves as the low calibrate value, the large ring is the high calibrate value. The gain and offset are calculated using the technique presented in the introduction. The size of the caliper rings used in the calibration and verification are selected based on the hole size that is being logged. Several size rings are available.

High Resolution Temperature Tool (HRT)

The shop calibration of the HRT uses two water baths of different temperatures. The low temperature bath is chosen to be 32°F because logging a Deep Injection Well we often see borehole temperature in the 40° range. The high temperature bath is normally between 150°F and 212°F. The gain and offset are calculated using the technique presented in the introduction. All the tools Youngquist Brothers, Inc. Geophysical Logging Division uses have fast response RTD sensors. The HRT is an extremely stable tool and requires calibration only after major repairs or component replacement. Because of the linearity of the sensor a single point verification made in the field will instantly tell if the tool is still in calibration and capable of recording accurate temperature. This verification should be done in a fluid that has reached temperature equilibrium.

Fluid Conductivity Temperature Tool (FCT)

The shop calibration of the fluid conductivity measurement involves placing the tool in a series of different salt solutions. The solutions are allowed to reach temperature and salinity equilibrium and are then measured with a precision digital conductivity meter. The tool is placed in each of the solutions and a multi-point calibration is made between tool output in pulses and fluid conductivity. The FCT is an extremely stable tool and requires calibration only after major repairs or component replacement. A single point verification made in the field will instantly tell if the tool is in calibration and capable of recording accurate fluid conductivity. This verification can be done with a water sample obtained from the well.

For calibration of the temperature tool see HRT section.

Gamma Ray Tool (GRT)

The primary calibration standard for all gamma ray tools is the API Gamma Ray Test Pit at the University of Houston. The API standard defines the difference between two radioactive formations as 200 Gamma Ray API units. After primary calibration, the tool is removed and moved to a distance away from the pit. A background reading in air is recorded. Next, a small radioactive source is placed at a fixed distance from the detector of the tool. By subtracting the background reading from the response to the radioactive source, a value in API units is assigned to the calibrator or Jig. This Jig can be used to calibrate other tools of similar design without taking it to the API test well.

FLOWMETER TOOL (FMT)

Quantitative analysis of flowmeter measurements requires calibration of the probe. Since the probe is a mechanical system utilizing components that are subject to wear (e.g. bearings) it must be calibrated before every use. Calibration is done by moving the tool at a known velocity through a static fluid column and measuring the number of pulses or counts output from the tool. It is important to calibrate the tool in the same diameter hole that the measurements will be made[1]. Two different velocities are required to establish a calibration line. Youngquist Brothers, Inc. Geophysical Logging Division uses three principal velocities (50, 70 and 100 fpm) to establish a calibration line. A second order linear fit of the calibration data is performed. By mathematically fitting a curve through the calibration data points it is possible to "back calculate" an unknown velocity if the number of counts are known. The equation is of the form :

$$V_{fm} = b_0 + (b_1 \times counts) + (b_2 \times counts^2) \qquad (3)$$

where b_0 , b_1, and b_2 are the coeficients determined by the linear curve fit routine.
Counts represent the raw signal from the flowmeter tool

[1] *Application Of The Borehole Flowmeter Method To Measure Spatially Variable Hydraulic Conductivity At The MADE Site - Kenneth R. Rehfeldt, Illinois State Water Survey*

APPENDIX I

CORE LITHOLOGIC DESCRIPTIONS

Appendix I – Lithologic Description of Cores
IW-1 Core 1 – 1,856 to 1,871 Feet BLS – 69% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
1,865.0 – 1,865.4	0.4	LIMESTONE (packstone): Pale yellowish brown (10YR 6/2), massive, fine to medium grained, moderately hard. well indurated, distinct mottles, indistinct lower contact
1,865.4 – 1,856.9	0.5	LIMESTONE (packstone to wackestone): Very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2) grading with depth to pale yellowish brown (10YR 6/2), generally massive, fine to medium grained, hard, very well indurated, indistinct lower contact
1,856.9 – 1,857.9	1.0	LIMESTONE (wackestone to mudstone): Very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), weakly bedded, very fine grained to microcrystalline, moderately hard to hard, moderately indurated, moderately grading with depth to weakly vuggy, gradational lower contact
1,857.9 – 1,859.1	1.2	LIMESTONE (wackestone to packstone): Yellowish gray (5Y 8/1), massive, fine to medium grained, moderately hard, moderately indurated, gradational lower contact
1,859.1 – 1,860.3	1.2	LIMESTONE (packstone to mudstone): Very pale orange (10YR 8/2) packstone weakly interbedded with light gray (N6) mudstone, to very pale orange (10YR 8/2), fine to medium grained, hard, moderately to very well indurated, mudstone is weakly vuggy, sharp wavy lower contact
1,860.3 – 1,863.7	3.4	LIMESTONE (wackestone to packstone): Pale yellowish brown (10YR 6/2) to very pale orange (10YR 8/2) generally massive, fine grained, moderately hard grading with depth to hard, moderately to well indurated, with few olive gray (5Y 4/1) coarse grained mudstone inclusions, indistinct lower contact
1,863.7 – 1,864.2	0.5	LIMESTONE AND DOLOMITIC LIMESTONE (mudstone) Very pale orange (10YR 8/2) and pale yellowish brown (10YR 6/2), thickly laminated with wavy laminations, fine grained to microcrystalline, moderately hard, very well indurated sharp wavy lower contact
1,864.2 – 1,866.3	2.1	LIMESTONE (wackestone): Pale yellowish brown (10YR 6/2), massive, fine to medium grained, moderately hard grading with depth to moderately soft, well indurated, weakly to moderately vuggy

Hazen

Appendix I – Lithologic Description of Cores
IW-1 Core 2 – 1,975 to 1,990 Feet BLS – 78% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
1,975.0 – 1,976.2	1.2	LIMESTONE (packstone): Pale yellowish brown (10YR 6/2), massive, fine to medium grained, moderately hard grading with depth to moderately soft, well indurated, with medium light gray (N6) hard mudstone inclusions, sharp horizontal lower contact
1,976.2 – 1,977.0	0.8	DOLOMITIC LIMESTONE (mudstone): Very pale orange (10YR 8/2) to grayish orange (10YR 7/4), laminated to weakly bedded, microcrystalline, hard, very well indurated with dark yellowish brown (10YR 4/2) dolostone laminations common, sharp horizontal lower contact
1,977.0 – 1,980.1	3.1	LIMESTONE (wackestone): Pale yellowish brown (10YR 6/2), generally massive, fine grained, moderately soft, very well indurated, with few medium gray (N5) coarse grained inclusions, gradational lower contact
1,980.1 – 1,980.9	1.2	DOLOMITIC LIMESTONE (mudstone): Pale yellowish brown (10YR 6/2) to yellowish gray (5Y 8/1) with thin dark yellowish brown (10YR 4/2) dolostone laminations, microcrystalline to cryptocrystalline, moderately hard, very well indurated, sharp horizontal lower contact
1,980.9 – 1,981.6	0.7	LIMESTONE (wackestone): Grayish orange (10YR 7/4) massive, fine to medium grained, moderately soft, very well indurated, sharp low angle lower contact
1,981.6 – 1,982.7	1.1	LIMESTONE (wackestone): Light olive gray (5Y 6/1) generally massive, medium grained, moderately soft, well indurated, with very pale orange (10YR 8/2) lenses and mudstone inclusions in lower 0.5 feet of section, sharp horizontal lower contact
1,982.7 – 1,985.1	2.7	DOLOMITIC LIMESTONE (mudstone): Very pale orange (10YR 8/2) to grayish orange (10YR 7/4), laminated to weakly bedded, microcrystalline, moderately hard, very well indurated with dark yellowish brown (10YR 4/2) dolostone laminations common, gradational lower contact
1,985.1 – 1,986.0	0.9	LIMESTONE (boundstone): Pale yellowish brown (10YR 6/2) to yellowish gray (5Y 8/1), generally massive, microcrystalline, hard, well indurated, with very pale orange (10YR 8/2) and medium dark gray (N4) coarse to very coarse grained mudstone inclusions
1,986.0 – 1,986.7	0.7	LIMESTONE (packstone): Light olive gray (5Y 6/1) to yellowish gray (5Y 8/1) laminated to weakly bedded, fine grained, moderately hard to moderately soft, well indurated

Hazen

Appendix I – Lithologic Description of Cores
IW-1 Core 3 – 2,080 to 2,095 Feet BLS – 85% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
2,080.0 – 2,080.3	0.3	LIMESTONE (mudstone): Medium light gray (N6), massive, microcrystalline, hard, very well indurated, indistinct lower contact
2,080.3 – 2,081.0	0.7	LIMESTONE (packstone to mudstone): Very pale orange (10YR 8/2) massive, fine to medium grained, moderately hard to hard, well indurated, weakly vuggy, gradational lower contact
2,081.0 – 2,083.5	3.5	LIMESTONE (packstone): Very pale orange (10YR 8/2), massive, fine grained, moderately soft, well indurated, sharp horizontal lower contact
2,083.5 – 2,084.3	0.8	LIMESTONE (mudstone): Very pale orange (10YR 8/2), generally massive, very fine grained, moderately hard, well indurated, gradational lower contact
2,084.3 – 2,085.8	1.5	LIMESTONE (packstone): Very pale orange (10YR 8/2), massive, fine grained, moderately soft, well indurated, sharp horizontal lower contact
2,085.8 – 2,086.8	1.0	DOLOSTONE: Dark yellowish brown (10YR 4/2) to pale yellowish brown (10YR 6/2) generally massive, microcrystalline, very hard, very well indurated, locally weakly limey, lower 0.6 feet of section vuggy with vugs lined with fine grained euhedral dolomite crystals, sharp horizontal lower contact
2,086.8 – 2,087.4	0.6	LIMESTONE (mudstone): Very pale orange (10YR 8/2), generally massive, very fine grained, moderately hard, well indurated, sharp horizontal lower contact
2,087.4 – 2,087.6	0.2	DOLOSTONE: Olive gray (5Y 4/1), massive, microcrystalline to cryptocrystalline, very hard, very well indurated, weakly limey, sharp horizontal lower contact
2,087.6 – 2,088.2	0.6	LIMESTONE (packstone to wackestone): Yellowish gray (5Y 8/1) massive, fine to medium grained, moderately hard, well indurated with mudstone inclusions common, gradational lower contact
2,088.2 – 2,088.5	0.3	LIMESTONE (wackestone to mudstone): Yellowish gray (5Y 8/1) massive, very fine grained, hard, well indurated, locally weakly vuggy with mudstone inclusions common, sharp horizontal lower contact
2,088.5 – 2,090.7	2.2	LIMESTONE (packstone): Very pale orange (10YR 8/2), generally massive, fine to medium grained, hard, well indurated, sharp wavy lower contact
2,090.7 – 2,091.0	0.3	LIMESTONE (mudstone): Very pale orange (10YR 8/2), massive, fine grained, hard, very well indurated with burrows common, sharp horizontal lower contact
2,091.0 – 2,091.9	0.9	LIMESTONE (packstone): Very pale orange (10YR 8/2), generally massive, fine to medium grained, hard, well indurated, gradational lower contact
2,091.9 – 2,092.7	0.8	LIMESTONE (wackestone): Very pale orange (10YR 8/2), massive, fine to very fine grained, moderately hard to hard, very well indurated

Appendix I – Lithologic Description of Cores
IW-1 Core 4 – 2,235 to 2,250 Feet BLS – 100% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
2,235.0 – 2,239.1	4.1	LIMESTONE (packstone): Very pale orange (10YR 8/2), massive, fine to medium grained, hard, very well indurated, with few shell fragments, casts , molds and tests gradational lower contact
2,239.1 – 2,246.3	7.2	LIMESTONE (packstone to mudstone): Very pale orange (10YR 8/2) massive, fine grained, hard, very well indurated, with shell fragments and few very pale orange (10YR 8/2) medium grained, moderately soft grainstone lenses, gradational lower contact
2,243.6 – 2,247.4	3.8	LIMESTONE (packstone): Very pale orange (10YR 8/2), massive, fine to medium grained, hard, very well indurated, fossiliferous, with very pale orange (10YR 8/2) hard mudstone lenses and shell fragments, indistinct lower contact
2,247.4 – 2,250.0	2.6	LIMESTONE (packstone to mudstone): Very pale orange (10YR 8/2) massive, fine grained, hard, very well indurated, with shell fragments and few very pale orange (10YR 8/2) medium grained, moderately soft grainstone lenses

Hazen

Appendix I – Lithologic Description of Cores
IW-1 Core 5 – 2,290 to 2,305 Feet BLS – 83% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
2,290.0 – 2,290.2	0.2	LIMESTONE (packstone): Yellowish gray (5Y 8/1), massive, fine grained, moderately soft, moderately indurated, indistinct lower contact
2,290.2 – 2,290.4	0.2	LIMESTONE (mudstone): Medium dark gray (N4) to medium gray (N5) massive, cryptocrystalline, very hard, very well indurated, indistinct lower contact
2,290.4 – 2,292.1	1.7	LIMESTONE (packstone): Yellowish gray (5Y 8/1), massive, fine grained, moderately hard, well indurated, poor core quality in lower 1.0 feet of section, indistinct lower contact
2,292.1 – 2,293.9	1.8	LIMESTONE (packstone to grainstone): Very pale orange (10YR 8/2), massive, fine to medium grained, moderately hard to hard, well indurated, locally weakly vuggy, with medium to coarse grained very pale orange (10YR 8/2) mudstone inclusions and casts, molds and burrows, gradational lower contact
2,293.9 – 2,299.9	6.0	LIMESTONE (packstone): Very pale orange (10YR 8/2), massive, fine to medium grained, moderately hard, well to very well indurated, gradational lower contact
2,299.9 – 2,302.5	2.9	LIMESTONE (packstone to grainstone): Very pale orange (10YR 8/2), massive, fine to medium grained, moderately hard to hard with locally soft inclusions, well indurated, locally weakly vuggy, with medium to coarse grained very pale orange (10YR 8/2) mudstone inclusions and casts, and molds

Hazen

Appendix I – Lithologic Description of Cores
IW-1 Core 6 – 2,312 to 2,327 Feet BLS – 100% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
2,312.0 – 2,313.8	1.8	LIMESTONE (packstone to mudstone): Yellowish gray (5Y 8/1), massive, fine grained to microcrystalline, , moderately hard, well indurated, weakly fossiliferous with casts and molds wavy lower contact
2,313.8 – 2,314.9	1.1	LIMESTONE (mudstone): Very pale orange (10YR 8/2) massive, microcrystalline, hard, very well indurated, weakly vuggy, weakly fossiliferous with pale yellowish orange (10YR 8/4) medium grained, moderately soft grainstone lenses common, sharp horizontal lower contact
2,314.9 – 2,317.1	2.2	LIMESTONE (packstone): Yellowish gray (5Y 8/1), massive, fine to medium grained, moderately hard, very well indurated with shell fragments common, sharp horizontal lower contact
2,317.1 – 2,317.6	0.5	LIMESTONE (packstone): Light gray (N7) to yellowish gray (5Y 8/1), massive, very fine grained, hard, very well indurated, weakly vuggy, gradational lower contact
2,317.6 – 2,322.0	4.4	LIMESTONE (packstone to wackestone): Pale yellowish brown (10YR 6/2) to very pale orange (10YR 8/2), massive, fine to very fine grained, hard, very well indurated, weakly fossiliferous with casts and molds and with few pale yellowish orange (10YR 8/4), medium grained, hard, very well indurated packstone lenses, gradational lower contact
2,322.0 – 2,323.7	1.7	LIMESTONE (packstone): Yellowish gray (5Y 8/1), massive, fine to medium grained, moderately hard, very well indurated with shell fragments common, sharp horizontal lower contact
2,323.7 – 2,326.3	2.6	LIMESTONE (packstone): Pale yellowish gray (5Y 8/1), massive, fine to very fine grained, hard, very well indurated with shell fragments in lower 0.4 feet of section, indistinct lower contact
2,326.3 – 2,327.0	0.7	LIMESTONE (packstone): Very pale orange (10YR 8/2), massive, fine grained, moderately soft, well indurated, poor core quality

Appendix I – Lithologic Description of Cores
IW-1 Core 7 – 2,485 to 2,498 Feet BLS – 61% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
2,485.0 – 2,485.4	0.4	DOLOMITIC LIMESTONE (packstone): Very pale orange (10YR 8/2) to grayish orange (10YR 7/4), generally massive, fine to medium grained, hard, very well indurated, with medium dark gray (N4) mudstone inclusions common, gradational lower contact
2,485.4– 2,486.3	0.9	DOLOMITIC LIMESTONE (packstone): Very pale orange (10YR 8/2) to moderate yellowish brown (10YR 5/4), generally massive, fine to very fine grained, hard, very well indurated, gradational lower contact
2,486.3 – 2,487.3	3.5	DOLOSTONE: Moderate yellowish brown (10YR 5/4) to dark yellowish brown , massive, very fine to fine grained, very hard, very well indurated, locally sucrosic, vuggy with vugs commonly lined with medium to fine grained euhedral to subhedral Dolomite crystals, gradational lower contact
2,487.3 – 2,488.0	0.7	LIMEY DOLOSTONE: Moderate yellowish brown (10YR 5/4), generally massive, very fine grained to microcrystalline, very hard, very well indurated, with very pale orange (10YR 8/2) Limestone inclusions and lenses, sharp wavy lower contact
2,488.0 – 2,489.2	1.5	DOLOMITIC LIMESTONE (packstone): Very pale orange (10YR 8/2) massive, fine to very fine grained, moderately hard, very well indurated, with grayish orange (10YR 7/4) to moderate yellowish brown (10YR 5/4) very fine grained, very hard Dolostone lenses, trace shell fragments, gradational lower contact
2,489.2 – 2,492.3	3.1	LIMEY DOLOSTONE: Pale yellowish brown (10YR 6/2) to pale orange (10YR 7/2), weakly bedded, very fine grained, hard, well indurated, locally coralline with moderate yellowish brown (10YR 5/4) high angle Limey Dolostone vein with fine grained euhedral Dolomite crystals and pale yellowish brown (10YR 6/2) detrital mudstone inclusions, wavy gradational lower contact
2,492.3 – 2,492.9	0.6	LIMESTONE (packstone): Very pale orange (10YR 8/2), massive, very fine to medium grained, hard, very well indurated, weakly vuggy with few shell fragments

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Appendix I – Lithologic Description of Cores
IW-1 Core 8 – 2,588 to 2,603 Feet BLS – 57% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
2,588.0 – 2,589.6	1.6	LIMESTONE (packstone): Very pale orange (10YR 8/2), massive, fine to medium grained, hard, moderately to well indurated with few forams, poor core quality indistinct lower contact
2,589.6 – 2,592.1	2.5	LIMESTONE (wackestone to mudstone): Very pale orange (10YR 8/2), massive, fine to very fine grained, hard, well indurated, weakly vuggy with casts and molds common, indistinct lower contact
2,591.2 – 2593.7	2.5	DOLOMITIC LIMESTONE (packstone): Very pale orange (10YR 8/2), massive, fine to medium grained, moderately hard, very well indurated, with pale yellowish brown (10YR 6/2) fine grained Dolostone inclusions, gradational lower contact
2,593.7 – 2,596.6	1.8	DOLOMITIC LIMESTONE (packstone to wackestone): Very pale orange (10YR 8/2), to pale yellowish brown (10YR 6/2), massive, fine to medium grained, moderately hard, well indurated, poor core quality

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Appendix I – Lithologic Description of Cores
IW-2 Core 1 – 1,730 to 1,745 Feet BLS – 97% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
1,730.0 – 1,735.1	5.1	LIMESTONE (packstone to wackestone): Yellowish gray (5Y 8/1), massive, medium grained, moderately soft. well indurated, few benthic foraminifera, sharp horizontal lower contact
1,735.1 – 1,735.6	0.5	LIMESTONE (wackestone to mudstone): Medium light gray (N6), generally massive, with few thin yellowish gray (5Y 8/1) beds and lenses, very fine to fine grained, hard, moderately to well indurated, weakly vuggy, sharp horizontal lower contact
1,735.6 – 1,737.0	1.4	LIMESTONE (wackestone): Yellowish gray (5Y 8/1) to very pale orange (10YR 8/2), massive, medium grained, moderately soft to moderately hard, well indurated, gradational lower contact weakly bedded with light gray (N7) very fine grained wackestone wavy lower contact
1,737.0 – 1,737.3	0.3	LIMESTONE (wackestone to packstone): Yellowish gray (5Y 8/1) grading with depth to medium light gray (N6), weakly bedded, medium grained, moderately hard to hard, moderately to poorly indurated, indistinct lower contact
1,737.3 – 1,740.7	3.4	LIMESTONE (wackestone): Yellowish gray (5Y 8/1) to very pale orange (10YR 8/2), massive, fine to medium grained, moderately soft to moderately hard, well indurated, fossiliferous with few benthic foraminifera, sharp horizontal lower contact
1,740.7– 1,741.7	1.0	LIMESTONE (dominantly packstone and mudstone): very pale orange (10YR 8/2), laminated to thinly bedded, moderately hard to hard; packstone medium to fine grained, moderately indurated; mudstone microcrystalline to cryptocrystalline well indurated, transitional lower contact.
1,741.7 – 1,743.7	2.0	LIMESTONE (packstone to wackestone) Very pale orange (10YR 8/2) to yellowish gray (5Y 8/1), massive, very fine to medium grained, moderately hard, well to very well indurated with few benthic foraminifera, gradational lower contact
1,743.7 – 1,744.5	0.8	LIMESTONE (packstone): Very pale orange (10YR 7/4) to yellowish gray (5Y 8/1), massive, medium grained, moderately hard to moderately soft, well indurated, fossiliferous with benthic foraminifera and tests common, indistinct lower contact
1,744.5 – 1,744.6	0.1	LIMESTONE (packstone): Very pale orange (10YR 7/4) to very pale orange (10YR 8/2), weakly laminated, microcrystalline, hard, very well indurated

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Appendix I – Lithologic Description of Cores
IW-2 Core 2 – 1,884.5 to 1,899.5 Feet BLS – 97% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
1,884.5 – 1,884.8	0.3	LIMESTONE (packstone grading with depth to mudstone): Yellowish gray (5Y 8/1), medium dark gray (N4) and very pale orange (10YR 8/2), thinly bedded, medium grained, hard. moderately indurated, fossiliferous, sharp horizontal lower contact
1,884.8 – 1,888.0	3.2	LIMESTONE (packstone to wackestone): Pale yellowish brown (10YR 8/2), massive, medium grained, hard, very well indurated, fossiliferous, sharp horizontal lower contact
1,888.0 – 1,889.9	1.9	LIMESTONE (wackestone): Very pale orange (10YR 8/2), massive, medium grading with depth to fine grained, moderately hard, very well indurated, burrows common, indistinct lower contact
1,889.9 – 1,890.4	0.5	LIMESTONE (mudstone): Yellowish gray (5Y 7/2) massive, microcrystalline, moderately hard, very well indurated, gradational lower contact
1,890.4 – 1,891.3	0.9	LIMESTONE (packstone): Yellowish gray (5Y 7/2), laminated, medium grained, moderately hard, moderately indurated, fossiliferous, gradational lower contact
1,891.3– 1,894.1	2.8	LIMESTONE (packstone to wackestone): Yellowish gray (5Y 7/2), massive, fine grained hard; well indurated; fossiliferous with few mudstone inclusions, sharp horizontal lower contact
1,894.1 – 1,895.6	1.5	LIMESTONE (packstone) Yellowish gray (5Y 7/2), massive, medium to coarse grained, hard, well to very well indurated, sharp horizontal lower contact
1,895.6 – 1,895.7	0.1	LIMESTONE (wackestone): Medium gray (N5) and yellowish gray (5Y 8/1), laminated, medium grained, hard, moderately indurated, sharp horizontal lower contact
1,895.7 – 1,896.4	0.7	LIMESTONE (mudstone): Pale yellowish brown (10YR 6/2) massive, very fine grained, hard, very well indurated, gradational lower contact
1,896.4 – 1,897.1	0.7	LIMESTONE (packstone) Yellowish gray (5Y 7/2), massive, medium to fine grained, hard, moderately well indurated, sharp horizontal lower contact
1,897.1 – 1,899.0	1.9	LIMESTONE (packstone to wackestone) Yellowish gray (5Y 7/2) grading with depth to pale yellowish brown (10YR 6/2), generally massive, fine grained, hard, very well indurated with benthic foraminifera common

Appendix I – Lithologic Description of Cores
IW-2 Core 3 – 2,056 to 2,071 Feet BLS – 65% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
2,056.0 – 2,058.2	2.2	LIMESTONE (packstone): Very pale orange (10YR 8/2), massive, fine to medium grained, moderately soft. well indurated, with few yellowish gray (5Y 8/1) mudstone inclusions in lower 0.3 feet of section, sharp horizontal lower contact
2,058.2 – 2,058.8	3.2	LIMESTONE (packstone and wackestone): Very pale orange (10YR 8/2), thinly weakly bedded, fine grained, moderately soft, moderately to well indurated, sharp horizontal lower contact
2,058.8 – 2,061.1	2.3	LIMESTONE (packstone): Yellowish gray (5Y 7/2) massive, fine to medium grained, moderately hard to hard. well indurated, forams common, gradational lower contact
2,061.1 – 2,062.0	0.9	LIMESTONE (packstone): Very pale orange (10YR 8/2), massive, medium to coarse grained, moderately hard to hard, well indurated, with few mudstone inclusions, gradational lower contact
2,062.0 – 2,062.6	0.6	LIMESTONE (packstone): Yellowish gray (5Y 7/2), massive, fine grained, moderately hard, well indurated, sharp horizontal lower contact
2,062.6 – 2,062.7	0.1	LIMESTONE (mudstone): Medium light gray (N6), massive, microcrystalline, very hard; moderately well indurated; vuggy, wavy lower contact
2,062.7 – 2,063.9	2.2	LIMESTONE (mudstone) Yellowish gray (5Y 7/2), generally massive, cryptocrystalline, hard, very well indurated, with few horizontal burrows and few medium grained packstone lenses and thin beds, gradational lower contact
2,063.9 – 2,065.0	1.1	LIMESTONE (packstone): Yellowish gray (5Y 7/2), massive, fine to medium grained, hard, well indurated, sharp horizontal lower contact
2,065.0 – 2,065.5	0.5	LIMESTONE (wackestone to mudstone): Light gray (N7), massive, fine grained, hard, well indurated, sharp horizontal lower contact
2,065.5– 2,065.8	0.3	LIMESTONE (packstone) Yellowish gray (5Y 7/1), generally massive, fine to medium grained, moderately soft, well indurated, with few very pale orange (10YR 8/2), microcrystalline, hard, very well indurated thin mudstone beds

Appendix I – Lithologic Description of Cores
IW-2 Core 4 – 2,160 to 2,175 Feet BLS – 61% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
2,160.0 – 2,160.3	0.3	LIMESTONE (mudstone): Olive gray (5Y 4/1), massive, cryptocrystalline, very hard, very well indurated, indistinct lower contact
2,160.3– 2,161.4	1.1	LIMESTONE (wackestone): Very pale orange (10YR 8/2), massive, fine grained, moderately hard, very well indurated, fossiliferous, indistinct lower contact
2,161.4 – 2,164.3	2.9	LIMESTONE (wackestone): Yellowish gray (5Y 7/1)massive, fine grained, moderately hard grading with depth to moderately hard, well indurated, with few olive gray (5Y 4/1), cryptocrystalline, very hard, very well indurated thin lenses in upper 0.4 feet of section, sharp horizontal lower contact
2,164.3– 2,165.5	1.2	LIMESTONE (mudstone): Medium light gray (N6), generally massive, upper gradational contact, microcrystalline to cryptocrystalline, very hard, very well indurated, locally weakly to moderately vuggy, sharp horizontal lower contact
2,165.5 – 2,167.7	2.2	LIMESTONE (mudstone to wackestone): Yellowish gray (5Y 7/1), massive, cryptocrystalline to medium grained, hard, very well indurated, locally weakly vuggy, upper 0.2 feet of section exhibits fractures fully healed with mudstone from overlying unit, moderate angle wavy lower contact
2,167.7 – 2,169.2	1.5	LIMESTONE (wackestone): Very pale orange (10YR 8/2), massive, very fine to medium grained, moderately soft, well indurated

Appendix I – Lithologic Description of Cores
IW-2 Core 5 – 2,290 to 2,305 Feet BLS – 97% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
2,290.0 – 2,292.0	2.0	LIMESTONE (packstone): Grayish orange (10YR 7/4), massive, medium grained, moderately soft grading with depth to moderately hard, moderately indurated, moderately vuggy, casts and molds common, gradational lower contact
2,292.0 – 2,293.2	1.2	LIMESTONE (packstone to mudstone): Yellowish gray (5Y 8/1), massive, fine grained, hard, very well indurated, with mudstone lenses, gradational lower contact
2,293.2 – 2,296.0	2.8	LIMESTONE (wackestone): Yellowish gray (5Y 8/1) to grayish orange (10YR 7/4), massive, fine grained, moderately hard to hard, very well indurated with few shell fragments, gradational lower contact
2,296.0 – 2,299.6	3.6	LIMESTONE (packstone to wackestone): Very pale orange (10YR 8/2) to grayish orange (10YR 7/4), massive, fine grained, hard, very well indurated, locally weakly vuggy with casts and molds common, and with mudstone matrix and lenses, gradational lower contact
2,299.6 – 2,302.3	2.7	LIMESTONE (packstone to wackestone): Very pale orange (10YR 8/2) to grayish orange (10YR 7/4), massive, fine to medium grained, hard to moderately hard, well to very well indurated with casts and molds common, and with mudstone matrix and lenses, indistinct lower contact
2,302.3 – 2,303.5	1.2	LIMESTONE (wackestone): Very pale orange (10YR 8/2), massive, fine grained, moderately hard; well indurated with few shell fragments, gradational lower contact
2,303.5 – 2,304.5	1.5	LIMESTONE AND DOLOMITIC LIMESTONE: (wackestone) As above weakly interbedded with Dolomitic Limestone (packstone), moderate yellowish brown (10YR 5/4), fine to medium grained, with very fine grained euhedral Dolomite rhombs, moderately hard, very well indurated

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Appendix I – Lithologic Description of Cores
IW-2 Core 6 – 2,420 to 2,435Feet BLS – 100% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
2,420.0 – 2,420.2	0.2	LIMESTONE (mudstone): Olive gray (5Y 4/1), massive, cryptocrystalline, very hard, very well indurated, indistinct lower contact
2,420.2 – 2,423.5	3.3	LIMESTONE (packstone to wackestone): Grayish orange (10YR 7/4), massive, medium grading with depth to fine grained, moderately hard grading with depth to hard, moderately well grading with depth to very well indurated, with few light gray (N7) thin, hard mudstone lenses and inclusions, gradational lower contact
2,423.5 – 2,424.6	1.1	LIMESTONE (wackestone): Grayish orange (10YR 7/4), massive, very fine to fine grained, hard, very well indurated, with few light gray (N7), hard mudstone lenses, gradational lower contact
2,424.6 – 2,425.5	0.9	LIMEY DOLOSTONE: Pale yellowish brown (10YR 6/2) massive, very fine to fine grained euhedral to subhedral crystals, hard, very well indurated, with grayish orange (10YR 7/4) Limestone (wackestone) inclusions and shell fragments, gradational lower contact
2,425.5 – 2,426.2	0.7	DOLOSTONE: Moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2), massive, very fine to fine grained euhedral crystals, hard, very well indurated, moderately vuggy, locally weakly limey with trace fossils, gradational lower contact
2,426.2 – 2,426.9	0.7	DOLOMITIC LIMESTONE (wackestone): Pale yellowish brown (10YR 6/2), massive, very fine grained, hard; very well indurated; low angle irregular lower contact
2,426.9 – 2,434.0	7.1	LIMEY DOLOSTONE AND DOLOMITIC LIMESTONE: Limey Dolostone; olive gray (5Y 4/1) to dark yellowish brown (10YR 5/4) generally massive, very fine grained, hard, very well indurated transitioning with depth to Dolomitic Limestone (packstone to wackestone) grayish orange (10YR 7/4), generally massive, fine grained, hard, well to very well indurated, locally weakly fossiliferous and locally weakly vuggy, gradational lower contact
2,434.0 – 2,435.0	1.0	LIMESTONE (wackestone to mudstone): Grayish orange (10YR 7/4), generally massive, fine grained, hard, well to very well indurated

Appendix I – Lithologic Description of Cores
IW-2 Core 7(I) – 2,860 to 2,867 Feet BLS – 60% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
2,860.0 – 2,860.6	0.6	LIMESTONE AND DOLOSTONE: Limestone (wackestone to mudstone); Yellowish gray (5Y 8/1), fine grained, moderately soft, well indurated interbedded with Dolostone; Olive black (5Y 2/1) cryptocrystalline, very hard, very well indurated, sharp horizontal lower contact
2,860.6 – 2,861.1	0.5	LIMESTONE (wackestone): Grayish orange (5Y 7/4), generally massive to very weakly laminated, fine grained, hard, very well indurated, sharp horizontal lower contact
2,861.1 – 2,861.6	0.5	LIMESTONE (packstone): Very pale orange (10YR 8/2) to yellowish gray (5Y 7/1), massive, fine grained, hard, moderately indurated, gradational lower contact
2,861.6 – 2,862.2	0.6	LIMESTONE (wackestone): Very pale orange (10YR 8/2), massive, fine to very fine grained, hard, very well indurated, gradational lower contact
2,862.2– 2,862.6	0.4	LIMESTONE (packstone): Very pale orange (10YR 8/2), massive, fine to medium grained, moderately soft to soft, moderately well indurated, sharp horizontal lower contact
2,862.6 – 2,863.0	0.4	LIMESTONE (packstone to mudstone): Yellowish gray (5Y 8/1), massive, fine grained, hard, very well indurated, moderately vuggy with casts, molds and moldic porosity sharp horizontal lower contact
2,863.0 – 2,863.4	0.4	LIMESTONE (packstone): Pale orange (10YR 7/2), massive, very fine to fine grained, moderately soft, well indurated, indistinct lower contact
2,863.4 – 2,864.2	0.8	LIMESTONE (packstone): Grayish orange (5Y 7/1), generally massive, fine to medium grained, hard, well indurated, with thin, washed out very pale orange (10YR 8/2) soft, poorly indurated interbed

Appendix I – Lithologic Description of Cores
IW-2 Core 7(R) – 2,868 to 2,882 Feet BLS – 69% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
2,868.0 – 2,869.6	1.6	LIMESTONE (packstone): Very pale orange (10YR 8/2), massive, fine grained, moderately hard, well indurated, gradational lower contact
2,869.6 – 2,874.2	6.6	LIMESTONE (wackestone): Very pale orange (10YR 8/2), massive, very fine grained, moderately hard, well to very well indurated

Appendix I – Lithologic Description of Cores
IW-2 Core 8 – 2,925 to 2,940 Feet BLS – 73% Recovery
Seminole Tribe of Florida – Hollywood Reservation

Depth (feet bls)	Thickness (feet)	Description
2,925.0 – 2,926.5	1.5	LIMESTONE (wackestone): Very pale orange (10YR 8/2), massive, fine grained, moderately hard, very well indurated, gradational lower contact
2,926.5 – 2,926.9	0.4	LIMESTONE (packstone): Yellowish gray (5Y 8/1), generally massive, fine grained, hard, very well indurated, locally vuggy with medium light gray (N6) to light gray (N7) cryptocrystalline, very hard mudstone inclusions, sharp horizontal lower contact
2,926.9 – 2,928.3	1.4	LIMEY DOLOSTONE: Grayish orange (10YR 7/4), to rarely dark yellowish brown (10YR 4/2) massive, fine grained, very hard, moderately indurated, fossiliferous, sharp horizontal lower contact
2,928.3 – 2,929.0	0.7	DOLOSTONE: Grayish orange (10YR 7/4) to yellowish gray (5Y 8/1), massive, very fine grained, hard, very well indurated, sharp horizontal lower contact
2,929.0 – 2,931.1	1.1	LIMESTONE (packstone to wackestone): Very pale orange (10YR 8/2), massive, very fine, moderately hard, very well indurated, gradational lower contact
2,931.1 – 2,931.4	0.3	LIMESTONE (packstone): Grayish orange (10YR 7/4), massive, fine to medium grained, moderately soft, moderately to well indurated, vuggy with very pale orange (10YR 8/2), hard mudstone lenses, sharp horizontal lower contact
2,931.4 – 2,931.7	0.3	DOLOMITIC LIMESTONE (mudstone): Light gray (N7), massive, microcrystalline, very hard, very well indurated, with few very thin olive gray (5Y 4/1) dolostone laminations, sharp horizontal lower contact
2,931.7 – 2,934.6	2.9	LIMESTONE (wackestone): Very pale orange (10YR 8/2), massive, very fine grained, hard grading with depth to moderately hard, very well to well indurated, sharp horizontal lower contact
2,934.6 – 2,936.0	1.4	LIMESTONE (mudstone): Light olive gray (5Y 6/1) to very light olive gray (5Y 7/2), bedded, microcrystalline to cryptocrystalline, very hard. very well indurated, fully healed wavy horizontal fracture at 2,934.9

APPENDIX J

CORE LABORATORY REPORTS

Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

May 1, 2018
File Number 17-13-0137

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Fort Myers, Florida 33908

Attention: Mr. Charles Reynolds

Subject: Rock Core Testing
Seminole Tribe of Florida Hollywood Reservation
WWTP Deep Injection Well IW-1

Gentlemen:

As requested, vertical and horizontal permeability, unconfined compression and specific gravity tests have been completed on 30 rock cores provided for testing by your office. The cores were received on November 2 and December 27, 2017 and were designated as follows:

Core	Depth (feet)	Core Interval Length (feet)	No. of Samples
1	1,857.7 – 1,869.6	11.9	5
2	1,979.1 – 1,984.6	5.5	5
3	2,083.7 – 2,092.7	9.0	5
4	2,237.9 – 2,248.3	10.4	5
5	2,290.5 – 2,294.1	3.6	2
6	2,316.0 – 2,326.3	10.3	3
7	2485.8 – 2,492.9	7.1	3
8	2,591.2 – 2,593.1	1.9	2

Photographs of the as-received core samples are attached.

Permeability Tests

Permeability tests were performed in general accordance with ASTM Standard D5084 "Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter" using either the constant head (Method A) or falling head-rising tailwater (Method C) test methods. The core samples were first tested for vertical hydraulic conductivity, and then cross-cored for measurement of horizontal hydraulic conductivity on the vertical permeability test specimens. The permeability test results are presented on the attached hydraulic conductivity test reports. Photographs of the vertical permeability test specimens are also attached. A total of 27 vertical and 28 horizontal permeability tests were performed.

8008 S. Orange Avenue 32809, Post Office Box 593003, Orlando, Florida 32859-3003 Phone (407) 855-3860 FAX (407) 859-8121
Louisiana: Alexandria, Baton Rouge, Monroe, New Orleans, Shreveport
Florida: Bartow, Cocoa, Fort Myers, Miami, Orlando, Port St. Lucie, Sarasota, Tallahassee, Tampa, West Palm Beach

Specific Gravity Tests

The measured mineral specific gravities are presented on the attached test reports. The specific gravity tests were performed in general accordance with ASTM Standard D854 "Specific Gravity of Soil Solids by Water Pycnometer" using 80 gram specimens ground to pass the U.S. Standard No. 40 sieve. One specific gravity test was performed on each core sample. The specific gravities measured on the samples are presented on the hydraulic conductivity and unconfined compression test reports.

Unconfined Compression Tests

Unconfined compression tests were performed in general accordance with ASTM Standard D7012 "Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures" using Method C Uniaxial Compressive Strength of Intact Rock Core Specimens. The results of the unconfined compression tests are presented on the attached unconfined compression test reports. At least one unconfined compression test was performed on each core. A total of 17 unconfined compression test were performed.

Total Porosity

The total porosity, n, of each permeability test specimen was back-calculated from dry density, γ_d, and measured mineral specific gravity, G_s, using the relationship: $n = (1 - [\gamma_d/(G_s\gamma_w)])$ where γ_w is the unit weight of water. The total porosities of the permeability test specimens are reported on the hydraulic conductivity test reports.

The test samples were reported to be from the client-specified designations herein. The test results are indicative of only the specimens that were actually tested. The test results presented are based upon accepted industry practice as well as test method(s) listed. Ardaman & Associates, Inc. neither accepts responsibility for, nor makes claims to the final use and purpose of the test results.

Please contact us if you have any questions about the test results or require additional information.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.
Certificate of Authorization No. 5950

Thomas S. Ingra, P.E.
Laboratory Director
Florida License No. 31987

S:\Projects\2017\17-13-0137\IW-1 TEST REPORT.docx

Table 1

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

SEMINOLE TRIBE OF FLORIDA HOLLYWOOD RESERVATION WWTP DEEP INJECTION WELL IW-1

Core	Sample	Visual Description	Depth (feet, BLS) From	Depth (feet, BLS) To	Interval Length (inches)	As-Received Core Length (inch) Total Length	As-Received Core Length (inch) Usable Length at Full Diameter	Length Trimmed for Testing	Core Diameter Nominal Diameter (inch)	Core Diameter Trimmed for Testing	Specific Gravity, Gs	Length (cm)	Diameter (cm)	Volume (cm^3)	Mass of Dry Solids (grams)	Initial Water Content (%)	Initial Dry Density (lb/ft^3)	Total Porosity	Final Total Unit Weight (lb/ft^3)	Final Water Content (%)	Final Saturation (%)	Isotropic Effective Confining Stress (lb/in^2)	Back-pressure (lb/in^2)	Average Hydraulic Gradient	Flow (cm^3)	Outflow/Inflow Ratio	Test Duration (days)	B-factor at End of Test (%)	B-factor Stress Increments (lb/in^2)	ASTM D5084 Test Method	Vertical Hydraulic Conductivity, k_{v20} (cm/sec)
1	1	Light brown limestone	1,857.7	1,858.3	7.2	7.2	**4.5**	Yes	4	No	2.71	11.014	10.043	872.49	1,321.84	27.8	94.6	0.441	120.9	27.8	96	30	70	1.6	6.78	1.02	1	**94 [S]**	10.8; 14.9; 20.1	C	**1.5 E-03**
	2	Light brown limestone	1,861.9	1,862.9	12.0	12.0	10.0	Yes	4	No	2.70	10.382	10.036	821.28	1,264.76	27.3	96.1	0.430	122.4	27.3	**98**	30	70	1.7	15.78	1.04	1	89 [S]	10.7; 14.9; 20.1	C	**5.5 E-04**
	3	Light brown limestone	1,864.5	1,865.6	13.2	13.0	10.0	Yes	4	No	2.69	10.606	10.066	844.02	1,273.69	27.7	94.2	0.439	120.5	27.9	96	30	70	**1.7**	15.18	1.02	2	82 [S]	5.5; 9.9; 14.1	C	**6.6 E-04**
	4	Light brown limestone	1,868.0	1,868.5	6.0	6.0	4.25	Yes	4	No	2.69	10.490	10.082	837.45	1,307.58	26.8	**97.5**	0.420	123.8	27.0	100	30	**70**	1.6	7.58	1.03	1	**95**	6.5	C	**3.7 E-04**
	5	Light brown limestone	1,868.5	1,869.6	13.2	13.2	10.0	Yes	4	No	2.68	10.423	10.073	830.62	1,328.08	24.9	99.8	0.403	124.8	25.0	**99**	**30**	70	1.7	7.62	1.01	1	100	**4.9**	C	**4.6 E-04**
2	1	Light grayish-brown limestone	1,979.1	1,980.1	12.0	12.0	10.5	Yes	4	No	2.70	11.034	10.057	876.52	1,569.69	17.8	111.8	0.337	131.7	17.8	95	**30**	170	59.0	5.26	0.96	1	100	**6.4**	A	**7.7 E-07**
	2	Light grayish-brown limestone	1,980.1	1,980.5	4.8	4.8	4.25	Yes	4	No	2.66	10.175	10.019	802.10	1,380.83	20.3	107.5	0.353	129.3	20.3	**99**	30	170	28.5	1.97	0.92	1	---	---	A	**3.6 E-07**
	3	Light brown limestone	1,981.0	1,981.6	7.2	7.2	5.5	Yes	4	No	2.69	10.278	9.973	802.88	1,447.50	16.8	112.6	0.330	132.5	17.7	97	30	170	58.2	1.63	1.00	1	87 [S]	3.7; 9.4; 13.1	A	**3.4 E-06**
	4	Light grayish-brown limestone	1,982.5	1,983.1	7.2	7.0	5.5	Yes	4	No	2.64	10.990	10.022	866.95	1,490.10	20.3	107.3	0.349	129.1	20.3	100	30	170	59.9	1.98	0.93	1	**95 [S]**	9.4; 13.7; 21.2	A	**9.8 E-08**
	5	Light grayish-brown limestone	1,983.6	1,984.6	12.0	12.0	11.0	Yes	4	No	2.62	10.816	10.086	864.16	1,496.41	17.1	108.1	0.339	128.8	19.1	98	30	170	51.6	1.90	0.96	1	89 [S]	9.4; 13.6; 21.2	A	**1.4 E-07**
3	1	Light gray limestone	2,083.7	2,084.5	9.6	9.0	8.5	Yes	4	No	2.71	9.938	10.019	783.50	1,263.91	24.6	100.7	0.405	125.6	24.7	98	30	170	64.5	2.82	1.03	1	100	6.2	A	**3.9 E-06**
	2	Light gray limestone	2,084.5	2,085.1	7.2	7.0	6.0	Yes	4	No	2.70	[Specimen split vertically during trimming for testing]																			
	3	Light gray and gray limestone	2,086.8	2,087.6	9.6	8.5	**7.5**	Yes	4	No	2.72	10.751	10.076	857.26	2,068.27	**4.4**	150.6	0.113	157.5	4.6	98	40	160	117.8	10.34	1.13	17	100	9.9	A	**6.2 E-09**
	4	Light gray limestone	2,088.5	2,089.0	6.0	6.0	**5.5**	Yes	4	No	2.70	10.550	10.056	837.90	1,374.03	23.7	102.4	0.393	126.6	23.7	**99**	30	70	1.8	14.45	1.04	1	100	5.7	C	**6.1 E-04**
	5	Light gray limestone	2,091.9	2,092.7	9.6	8.75	8.0	Yes	4	No	2.70	9.038	10.065	719.03	1,242.00	20.7	107.8	0.360	130.2	20.7	**99**	30	70	16.0	9.02	0.96	1	87 [S]	4.1; 6.7; 9.2	A	**6.9 E-06**
4	1	Light gray limestone	2,237.9	2,238.5	7.2	7.2	6.5	Yes	4	No	2.70	6.643	10.030	524.87	956.45	17.0	113.8	0.325	133.1	17.0	**95**	30	70	2.5	7.93	1.01	1	91 [S]	4.2; 6.7; 9.3	C	**2.5 E-04**
	2	Light gray limestone	2,239.1	2,239.6	6.0	7.0	**5.5**	Yes	4	No	2.69	10.219	10.043	809.43	1,519.35	**15.4**	117.2	0.302	135.2	15.4	96	**30**	70	2.1	12.98	0.81	1	95 [S]	8.4; 12.2; 15.6	C	**2.3 E-04**
	3	Light gray limestone	2,239.6	2,240.3	8.4	8.0	6.5	Yes	4	No	2.71	7.308	10.048	**579.49**	1,078.64	15.4	116.2	0.313	134.4	15.7	**93**	30	**70**	2.5	7.52	0.99	1	89 [S]	7.1; 12.0; 17.2	C	**3.4 E-04**
	4	Light gray limestone	2,240.3	2,241.0	8.4	6.0	4.5	Yes	4	No	2.71	12.274	10.028	969.40	1,915.00	12.7	123.3	0.271	139.0	12.7	93	30	70	1.3	14.90	1.01	1	72 [S]	6.8; 13.1; 19.4	C	**1.2 E-03**
	5	Light gray limestone	2,247.4	2,248.3	10.8	10.8	7.5	Yes	4	No	2.71	9.106	10.063	724.18	1,356.58	15.2	116.9	0.309	135.1	15.5	94	30	**70**	1.9	7.50	1.00	1	98	9.2	C	**3.9 E-04**
5	1	Light gray limestone	2,290.5	2,290.9	4.8	**5.5**	**4.25**	Yes	4	No	2.71	[Unconfined compression test only]																			
	2	Light gray limestone	2,293.6	2,294.1	6.0	5.5	3.0	Yes	4	No	2.71	7.037	10.089	562.53	1,047.83	14.8	116.3	0.313	133.6	14.9	89	30	70	**2.4**	7.85	1.03	1	---	---	C	**5.1 E-04**
6	1	Light gray limestone	2,316.0	2,316.9	10.8	9.5	8.0	Yes	4	No	2.72	10.218	10.052	810.85	1,631.44	12.8	125.6	0.260	141.7	12.8	**99**	30	70	1.7	6.72	1.01	1	87 [S]	7.8; 12.8; 16.0.	C	**7.6 E-05**
	2	Light gray dolomitic limestone	2,323.0	2,323.6	7.2	7.2	6.5	Yes	4	No	2.84	10.631	10.061	845.09	1,513.70	18.0	111.8	0.369	132.2	18.2	88	30	70	1.6	23.65	1.00	4	97	5.6	C	**1.0 E-03**
	3	Light gray limestone	2,325.4	2,326.3	10.8	10.0	**9.5**	Yes	4	No	2.70	11.524	10.080	919.63	1,720.75	15.5	116.8	0.307	135.2	15.7	96	30	70	1.5	14.60	1.02	1	100	7.1	C	**4.7 E-04**
7	1	Light gray limestone	2,485.8	2,486.1	3.6	3.6	3.3	Yes	4	No	2.72	7.665	**9.999**	601.89	1,265.82	10.5	131.3	0.227	145.1	10.5	**97**	30	170	70.6	1.79	1.02	1	98	10.9	A	**3.0 E-06**
	2	Light gray limestone	2,490.1	2,490.9	9.6	9.5	8.0	Yes	4	No	2.71	10.098	10.079	805.63	1,607.98	13.1	124.6	0.264	141.1	13.2	100	30	70	1.8	6.65	0.98	1	98	10.5	C	**6.8 E-05**
	3	Light gray limestone	2,492.1	2,492.9	9.6	9.6	5.5	Yes	4	No	2.71	7.222	10.045	572.33	1,168.30	10.7	127.4	0.247	141.9	11.4	**94**	30	70	69.3	5.36	0.99	1	**93 [S]**	8.1; 12.6; 17.1	A	**1.6 E-05**
8	1	Light gray limestone	2,591.2	2,591.6	4.8	4.25	2.75	Yes	4	No	2.72	7.488	9.864	572.22	1,162.02	11.9	126.8	0.253	142.0	12.0	96	30	170	74.7	9.66	0.99	1	98	7.0	A	**1.7 E-05**
	2	Light gray limestone	2,592.5	2,593.1	7.2	6.0	3.5	Yes	4	No	2.71	[Unconfined compression test only]																			

COMMENTS: (1) Core samples were cut to length, air-dried, deaired under vacuum for a minimum of 24 hours, and then saturated with deaired tap water from the bottom up while maintaining the vacuum. (2) Final water content for all samples from horizontal permeability test specimen. Mass of dry solids calculated from measured wet mass and final water content. (3) Deaired tap water permeant. (4) Mass of dry solids for samples Core 3 Sample 3, Core 4 Sample 5, Core 5 Sample 2 and Core 7 Sample 3 from initial air dry mass.

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

ASTM D5084 Test Methods: Method A - Constant Head; Method C - Falling Head; Rising Tailwater

Where: [S] Denotes relatively stable B-factor for consecutive increments of cell pressure.

Checked By: TM Date: 02/01/18

Table 2

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

SEMINOLE TRIBE OF FLORIDA HOLLYWOOD RESERVATION WWTP DEEP INJECTION WELL IW-1

Core	Sample	Visual Description	Depth (feet, BLS) From	Depth (feet, BLS) To	Interval Length (inches)	As-Received Core Length (inch) Total Length	As-Received Core Length (inch) Usable Length at Full Diameter	Core Diameter Nominal Diameter (inch)	Core Diameter Trimmed for Testing	Specific Gravity, Gs	Length (cm)	Diameter (cm)	Volume (cm^3)	Mass of Dry Solids (grams)	Initial Water Content (%)	Initial Dry Density (lb/ft^3)	Total Porosity	Final Total Unit Weight (lb/ft^3)	Final Water Content (%)	Final Saturation (%)	Isotropic Effective Confining Stress (lb/in^2)	Back-pressure (lb/in^2)	Average Hydraulic Gradient	Flow (cm^3)	Outflow/Inflow Ratio	Test Duration (days)	B-factor at End of Test (%)	B-factor Stress Increments (lb/in^2)	ASTM D5084 Test Method	Horizontal Hydraulic Conductivity, kh_{20} (cm/sec)
1	1	Light brown limestone	1,857.7	1,858.3	7.2	7.2	4.5	4	Yes	2.71	7.184	5.066	144.81	218.80	27.5	94.3	0.442	120.5	27.8	95	30	70	2.6	6.45	0.98	2	92 [S]	5.2; 10.3; 12.7	C	**1.4E-03**
	2	Light brown limestone	1,861.9	1,862.9	12.0	12.0	10.0	4	Yes	2.70	7.608	5.052	152.51	234.96	27.0	96.2	0.429	122.4	27.3	98	30	70	2.4	6.88	0.99	2	71 [S]	9.0; 12.8; 18.2	C	**1.3E-03**
	3	Light brown limestone	1,864.5	1,865.6	13.2	13.0	10.0	4	Yes	2.69	7.776	5.086	157.98	238.43	**27.7**	94.2	0.439	120.5	27.9	96	30	70	2.4	14.13	1.05	5	93 [S]	6.6; 9.9; 13.8	C	**1.1E-03**
	4	Light brown limestone	1,868.0	1,868.5	6.0	6.0	4.25	4	Yes	2.69	6.700	5.063	134.89	210.20	25.5	**97.3**	0.421	123.5	27.0	100	30	70	21.6	7.38	0.95	2	91 [S]	7.1; 11.1; 15.7	A	**6.7E-05**
	5	Light brown limestone	1,868.5	1,869.6	13.2	13.2	10.0	4	Yes	2.68	7.401	5.062	148.94	238.70	25.0	100.1	0.402	125.0	25.0	100	30	70	2.2	7.32	1.05	2	72 [S]	9.0; 12.8; 18.3	C	**2.0E-03**
2	1	Light grayish-brown limestone	1,979.1	1,980.1	12.0	12.0	10.5	4	Yes	2.70	6.707	5.058	134.76	243.75	17.8	112.9	0.330	133.1	17.8	98	30	160	97.4	1.35	0.94	4	90 [S]	10.0; 13.8; 17.8	A	**1.3E-06**
	2	Light grayish-brown limestone	1,980.1	1,980.5	4.8	4.8	4.25	4	Yes	2.66	6.883	5.064	138.63	239.47	20.3	107.8	0.351	129.7	20.3	100	30	160	44.3	1.43	0.95	5	92 [S]	5.5; 9.8; 13.3	A	**4.2E-06**
	3	Light brown limestone	1,981.0	1,981.6	7.2	7.2	**5.5**	4	Yes	2.69	6.495	5.066	130.92	237.90	16.9	113.4	0.324	133.6	17.7	**99**	30	160	94.0	1.39	1.00	**1**	90 [S]	6.9; 11.0; 16.3	A	**5.7E-06**
	4	Light grayish-brown limestone	1,982.5	1,983.1	7.2	**7.0**	**5.5**	4	Yes	2.64	6.973	5.072	140.89	242.24	20.3	107.3	0.349	129.1	20.3	100	30	160	85.1	1.41	0.93	**1**	89 [S]	7.0; 11.0; 16.3	A	**6.1E-07**
	5	Light grayish-brown limestone	1,983.6	1,984.6	12.0	12.0	11.0	4	Yes	2.62	6.974	5.085	141.63	247.33	19.1	109.0	0.333	129.9	19.1	100	30	160	82.4	12.08	1.01	2	86 [S]	6.5; 10.2; 15.6	A	**7.4E-06**
3	1	Light gray limestone	2,083.7	2,084.5	9.6	9.0	8.5	4	Yes	2.71	7.000	5.076	141.65	229.97	24.6	101.4	0.401	126.4	24.7	100	30	160	**88.8**	1.18	0.98	**1**	88 [S]	6.58; 10.2; 16.1	A	**6.0E-06**
	2	Light gray limestone	2,084.5	2,085.1	7.2	7.0	6.0	4	Yes	2.70	6.716	5.074	135.80	229.00	21.9	105.3	0.375	128.5	22.0	**99**	30	160	42.0	7.78	0.94	2	**77 [S]**	7.1; 10.7; 15.7	A	**1.6E-05**
	3	Light gray and gray limestone	2,086.8	2,087.6	9.6	**8.5**	7.5	4	Yes	2.72	7.568	5.080	153.39	395.15	3.3	160.8	0.053	166.2	3.3	**99**	30	160	82.8	19.66	1.07	7	97	6.5	A	**1.1E-07**
	4	Light gray limestone	2,088.5	2,089.0	6.0	6.0	5.5	4	Yes	2.70	7.804	5.078	158.05	257.42	23.1	101.7	0.397	125.8	23.7	**97**	30	70	2.4	22.02	1.03	2	80 [S]	5.9; 10.6; 14.0	C	**2.0E-04**
	5	Light gray limestone	2,091.9	2,092.7	9.6	8.75	8.0	4	Yes	2.70	6.950	5.078	140.75	243.47	20.5	108.0	0.359	130.3	20.7	100	30	70	40.6	8.48	0.97	3	58 [S]	6.9; 10.5; 13.3	A	**1.4E-05**
4	1	Light gray limestone	2,237.9	2,238.5	7.2	7.2	6.5	4	Yes	2.70	5.886	5.058	118.27	219.97	17.0	116.1	0.311	134.6	17.0	99	30	70	3.1	6.75	0.98	2	82 [S]	11.2; 14.9; 19.1	C	**2.5E-04**
	2	Light gray limestone	2,239.1	2,239.6	6.0	**7.0**	5.5	4	Yes	2.69	7.435	5.076	150.46	284.87	15.1	118.2	0.296	136.5	15.4	99	30	70	2.3	6.58	0.99	2	76 [S]	7.2; 13.1; 18.5	C	**2.1E-04**
	3	Light gray limestone	2,239.6	2,240.3	8.4	8.0	6.5	4	Yes	2.71	7.544	5.079	152.84	288.12	15.2	117.7	0.304	136.1	15.7	97	30	70	2.4	**6.92**	0.99	2	80 [S]	4.7; 7.7; 11.8	C	**3.3E-04**
	4	Light gray limestone	2,240.3	2,241.0	8.4	6.0	4.5	4	Yes	2.71	7.664	5.076	155.09	309.68	12.2	124.7	0.262	140.5	12.7	96	30	70	9.8	7.52	0.98	1	61 [S]	6.0; 9.8; 13.2	A	**9.7E-05**
	5	Light gray limestone	2,247.4	2,248.3	10.8	10.8	**7.5**	4	Yes	2.71	6.266	5.079	126.95	244.10	14.2	120.0	0.290	138.1	14.6	98	30	70	2.6	7.65	1.01	2	**73 [S]**	7.5; 11.8; 15.6	C	**2.6E-04**
5	1	Light gray limestone	2,290.5	2,290.9	4.8	5.5	4.25	4	Yes	2.71	[Unconfined compression test only]																			
	2	Light gray limestone	2,293.6	2,294.1	6.0	5.5	3.0	4	Yes	2.71	7.869	5.084	159.74	309.07	14.2	120.8	0.286	138.0	14.2	96	30	70	2.2	7.12	1.02	2	90 [S]	3.6; 7.9; 11.4	C	**4.9E-04**
6	1	Light gray limestone	2,316.0	2,316.9	10.8	**9.5**	8.0	4	Yes	2.72	6.892	5.078	139.58	281.54	12.7	125.9	0.258	142.1	12.8	100	30	170	39.6	3.92	0.98	3	91 [S]	11.4; 15.9; 20.0	A	**6.9E-05**
	2	Light gray dolomitic limestone	2,323.0	2,323.6	7.2	7.2	6.5	4	Yes	2.84	6.874	5.079	139.27	250.42	18.0	112.3	0.367	132.7	18.2	**89**	30	70	22.5	20.10	0.98	**1**	84 [S]	5.7; 10.5; 16.7	A	**5.8E-05**
	3	Light gray limestone	2,325.4	2,326.3	10.8	10.0	9.5	4	Yes	2.70	7.615	5.085	154.65	291.20	15.4	117.6	0.303	136.0	15.7	97	30	170	34.1	18.20	1.00	3	88 [S]	4.3; 9.5; 11.6	A	**4.6E-04**
7	1	Light gray limestone	2,485.8	2,486.1	3.6	3.6	**3.3**	4	Yes	2.72	6.844	5.086	139.04	294.49	10.4	132.2	0.221	146.0	10.5	100	30	70	41.8	8.12	0.97	3	56 [S]	5.1; 10.2; 16.5	A	**4.2E-06**
	2	Light gray limestone	2,490.1	2,490.9	9.6	9.5	8.0	4	Yes	2.71	6.721	5.077	136.06	270.89	13.1	124.3	0.265	140.8	13.2	**99**	30	70	10.6	9.30	1.00	**1**	71 [S]	6.1; 9.8; 13.3	A	**1.5E-04**
	3	Light gray limestone	2,492.1	2,492.9	9.6	9.6	**5.5**	4	Yes	2.71	7.072	5.080	143.34	297.98	10.9	129.8	0.233	144.3	11.2	100	30	70	40.6	8.88	0.98	2	84 [S]	6.3; 10.9; 16.4	A	**1.7E-05**
8	1	Light gray limestone	2,591.2	2,591.6	4.8	4.25	2.75	4	Yes	2.72	7.094	5.083	143.95	294.68	11.9	127.8	0.247	143.1	12.0	99	30	70	40.3	9.60	0.98	3	75 [S]	6.1; 11.6; 16.1	A	**1.6E-05**
	2	Light gray limestone	2,592.5	2,593.1	7.2	6.0	3.5	4	Yes	2.71	[Unconfined compression test only]																			

COMMENTS: (1) Horizontal permeability test specimens cross cored from the corresponding vertical permeability test specimens. (2) Deaired tap water permeant.

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

ASTM D5084 Test Methods: Method A - Constant Head; Method C - Falling Head; Rising Tailwater

Where: [S] Denotes relatively stable B-factor for consecutive increments of cell pressure.

Checked By: TM Date: 05/01/18

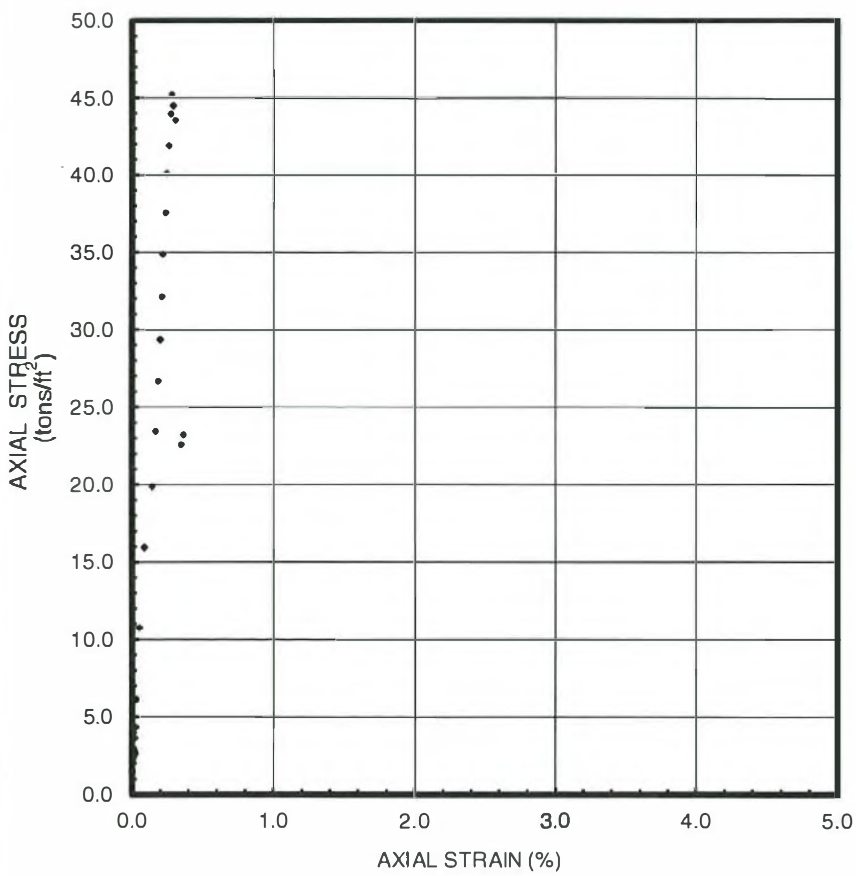
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Younggquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/17/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: IW-1 SAMPLE: Core 1/2
DEPTH: 1,861.9 - 1,862.9 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW1C12
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.367	5.126	2.0	17.5	99.2	68	0.0337	0.325	0.80	0.26	**628**	1.64E05	261



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments:

Loading Rate: 13.0 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0

Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.125"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.49%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.70 ☐ Assumed ☒ Measured

FAILURE SKETCH

Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

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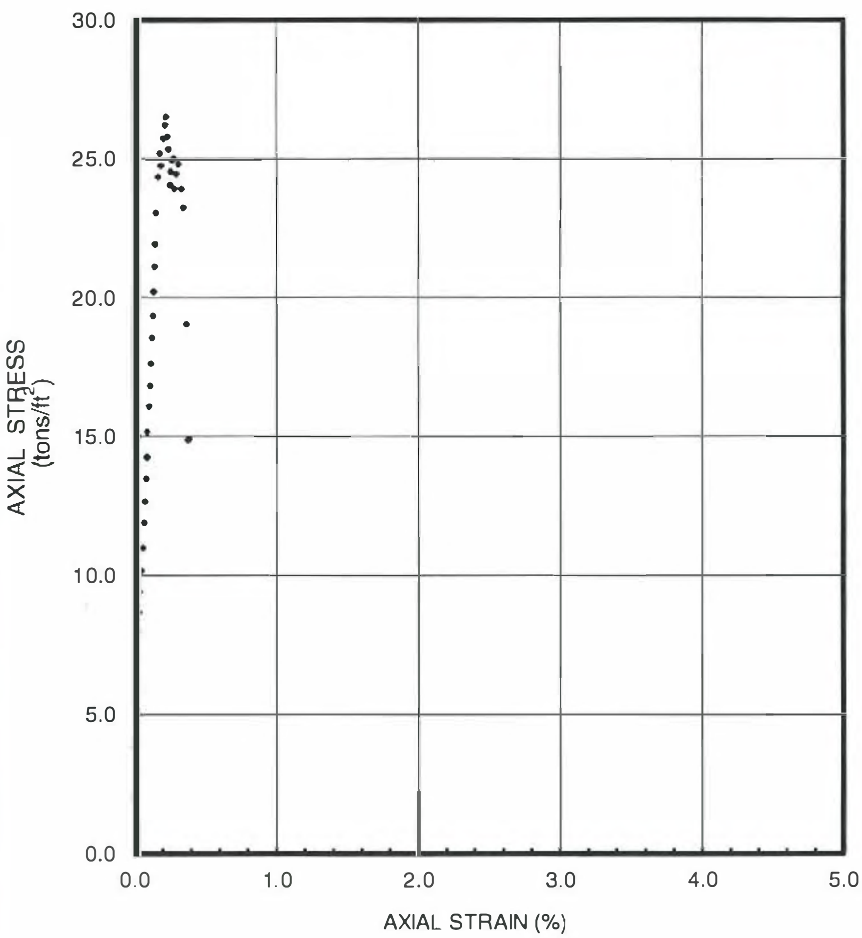
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Younqquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/18/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: **IW-1** SAMPLE: Core 1/3
DEPTH: 1,864.5 – 1,865.6 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW1C13
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.499	5.110	2.1	19.4	96.4	70	0.0123	0.117	1.88	0.22	**368**	1.60E05	**435**



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

Loading Rate: 3.3 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.114"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.87%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.69 ☐ Assumed ☒ Measured

FAILURE SKETCH

Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

Checked By: RM Date: 05/01/18
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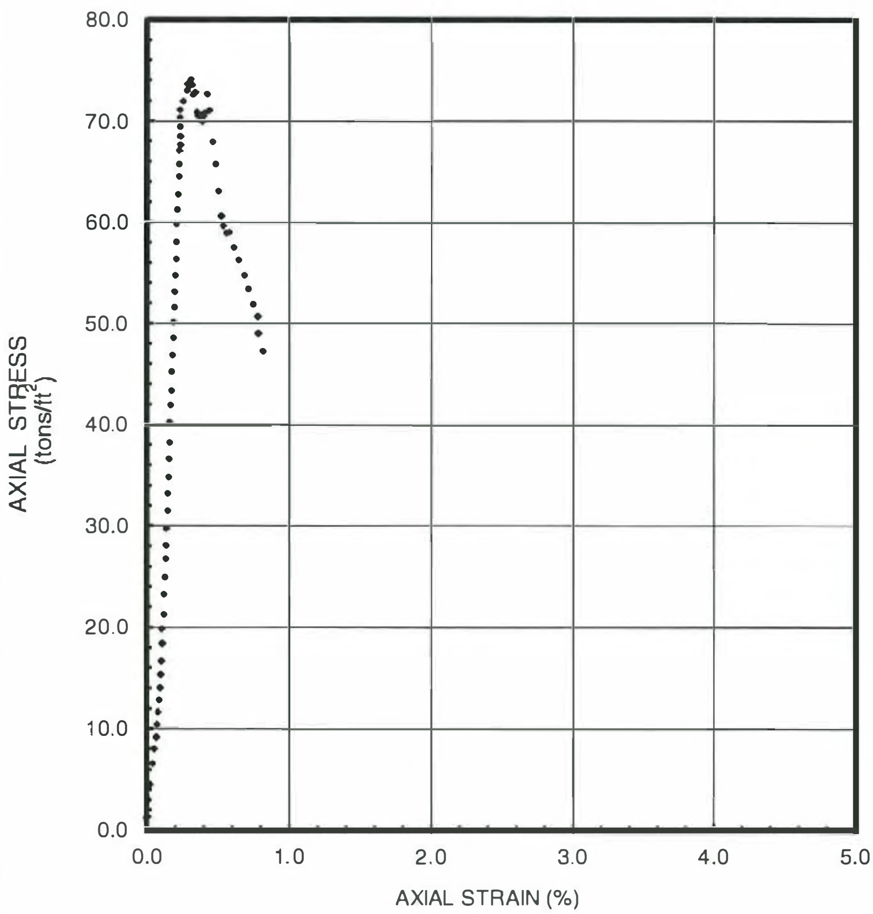
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Younggquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/18/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: IW-1 SAMPLE: Core 1/5
DEPTH: 1,868.5 – 1,869.6 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW1C15
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.915	5.104	2.1	11.3	108.9	56	0.0117	0.107	2.90	0.31	1,029	5.80E05	564



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

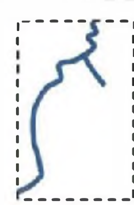
Loading Rate: 5.9 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.098"
Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.60%
Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.68 ☐ Assumed ☒ Measured

FAILURE SKETCH



Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 05/01/18
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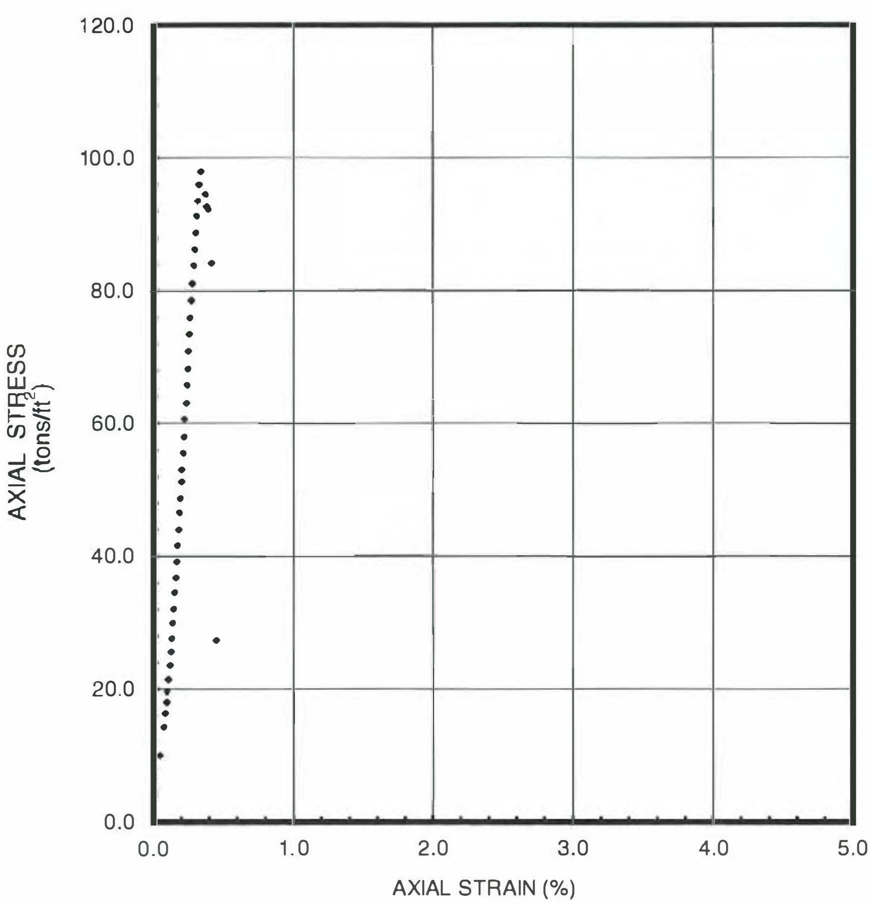
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/17/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: IW-1 SAMPLE: Core 2/1
DEPTH: 1,979.1 – 1,980.1 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW1C21
SAMPLE DESCRIPTION: Light grayish-brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.430	5.088	2.1	14.9	109.5	**75**	0.0164	0.157	2.15	0.34	**1,360**	5.03E05	370



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None
☒ Lab-Stone
Comments:

Loading Rate: 10.5 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.068"
Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.93%
Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.70 ☐ Assumed
☒ Measured

FAILURE SKETCH

The test data and all associated project information presented here on shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 05/01/18
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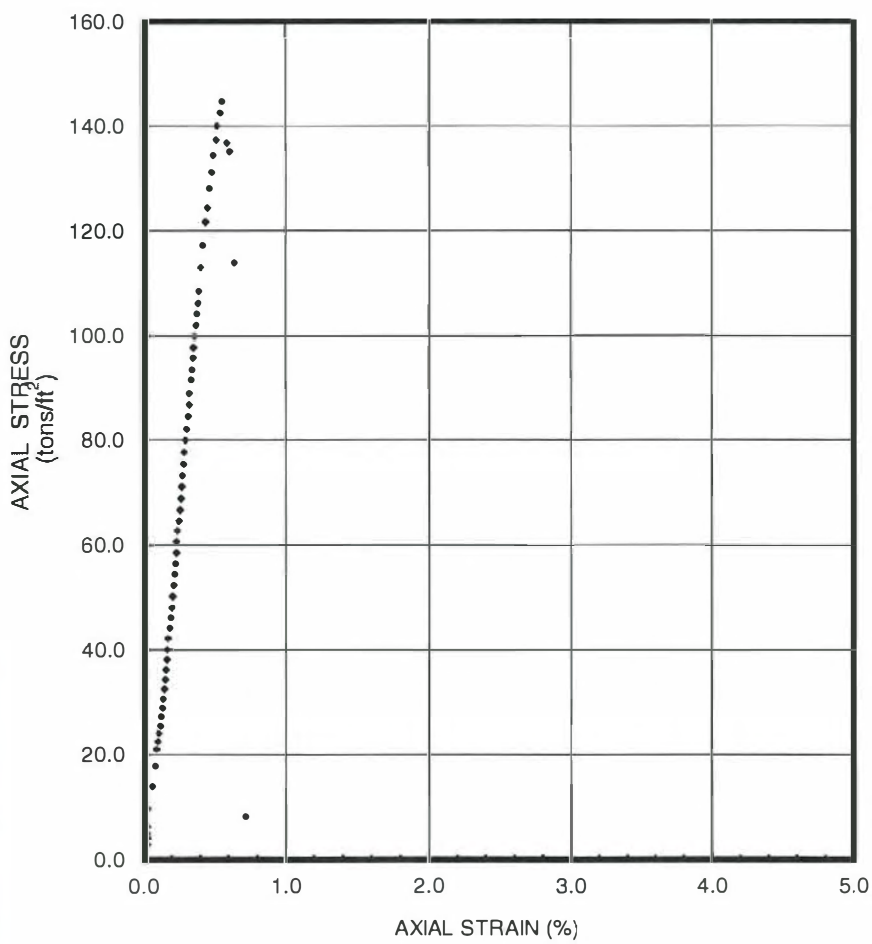
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/18/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: **IW-1** SAMPLE: Core 2/5
DEPTH: 1,983.6 - 1,984.6 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW1C25
SAMPLE DESCRIPTION: [redacted] grayish-brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.475	5.099	2.1	19.1	104.0	**87**	0.0188	0.180	3.17	0.56	**2,011**	4.39E05	218



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments:

Loading Rate: 10.8 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0

Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.201"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.66%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.62 ☐ Assumed ☒ Measured

FAILURE SKETCH

The test data and all associated project information presented here on shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 05/01/18
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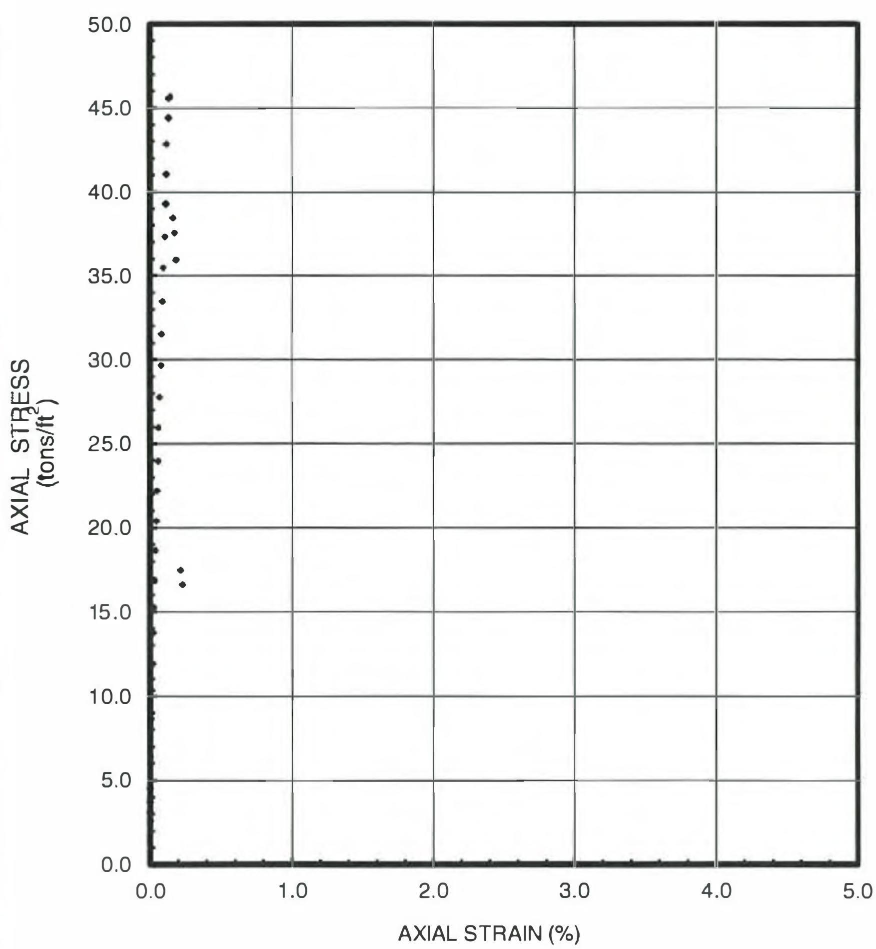
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Younggquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 12/27/17
DATE TEST SET-UP: 01/26/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: IW-1 SAMPLE: Core 3/1
DEPTH: 2,083.7 – 2,084.5 ☒ feet; ☐ meters.
LABORATORY IDENTIFICATION NO.: 170137/IW1C31
SAMPLE DESCRIPTION: Light gray limestone.

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.972	5.097	2.2	18.0	99.0	69	0.0112	0.102	1.40	0.14	**634**	4.36E05	688



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

Loading Rate: 7.5 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.093"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.76"

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.71 ☐ Assumed ☒ Measured

FAILURE SKETCH

Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 05/01/18
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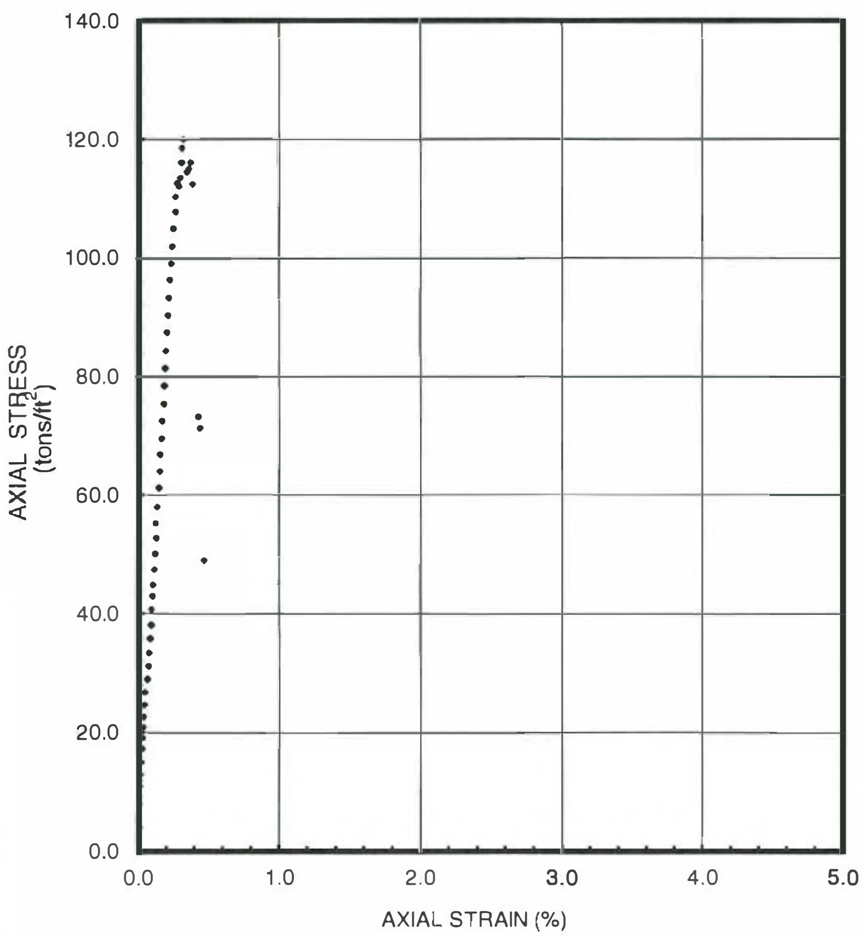
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Younggquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 12/27/17
DATE TEST SET-UP: 01/26/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: IW-1 SAMPLE: Core 3/3
DEPTH: 2,086.8 - 2,087.6 ☒ feet; ☐ meters.
LABORATORY IDENTIFICATION NO.: 170137/IW1C33
SAMPLE DESCRIPTION: Light gray and gray limestone.

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50}(lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.123	5.105	2.0	8.8	117.7	54	0.0113	0.112	2.95	0.33	**1,667**	5.97E05	358



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None
☒ Lab-Stone
Comments:

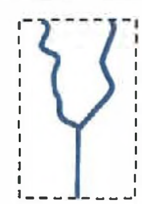
Loading Rate: 9.4 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.223"
Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.58%
Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.72 ☐ Assumed
☒ Measured

FAILURE SKETCH



Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 05/01/18
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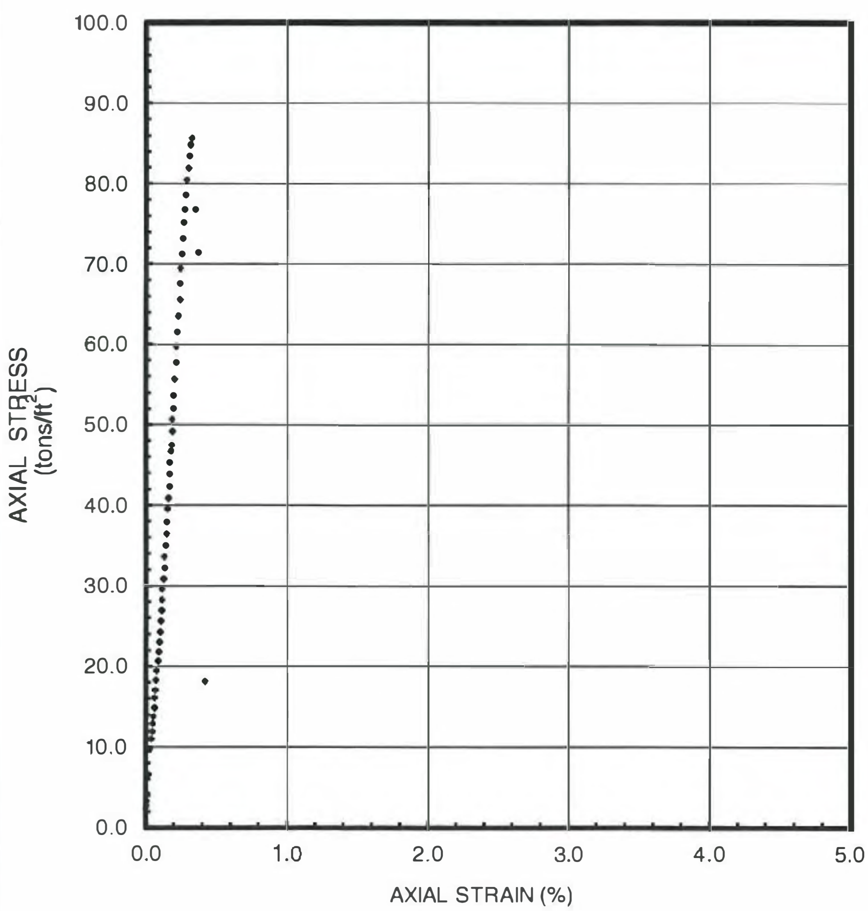
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Younggquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 12/27/17
DATE TEST SET-UP: 01/26/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: IW-1 SAMPLE: Core 3/5
DEPTH: 2,091.9 – 2,092.7 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW1.C35
SAMPLE DESCRIPTION: Light gray limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.709	5.086	2.1	14.9	105.8	68	0.0119	0.111	2.88	0.32	**1,191**	4.17E05	350



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments:

Loading Rate: 6.9 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0

Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.039"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.71%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.70 ☐ Assumed ☒ Measured

FAILURE SKETCH

Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 05/01/18

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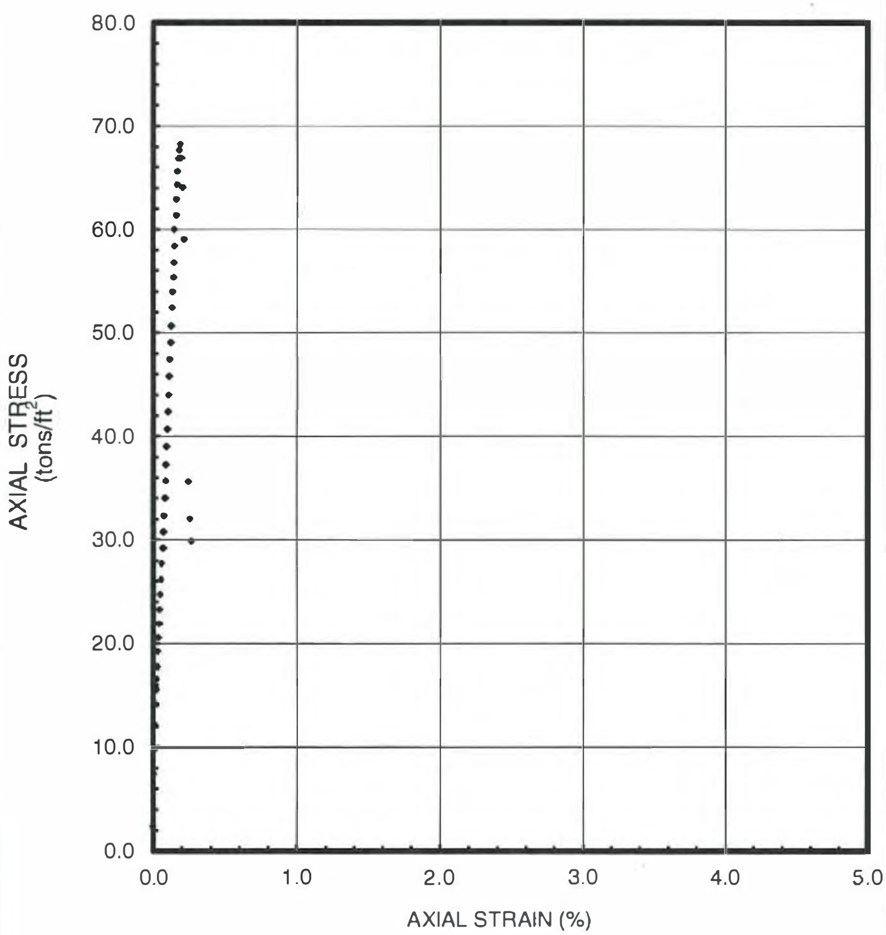
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Younqquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 12/27/17
DATE TEST SET-UP: 01/26/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: IW-1 SAMPLE: Core 4/1
DEPTH: 2,237.9 – 2,238.5 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW1C41
SAMPLE DESCRIPTION: [redacted] gray limestone.

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.833	5.125	2.1	8.0	111.8	43	0.0091	0.084	2.15	0.18	**948**	4.88E05	515



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None
☒ Lab-Stone
Comments:

Loading Rate: 7.3 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

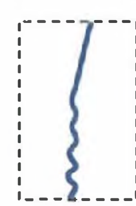
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.151"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.77%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.70 ☐ Assumed
☒ Measured

FAILURE SKETCH



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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 05/01/18
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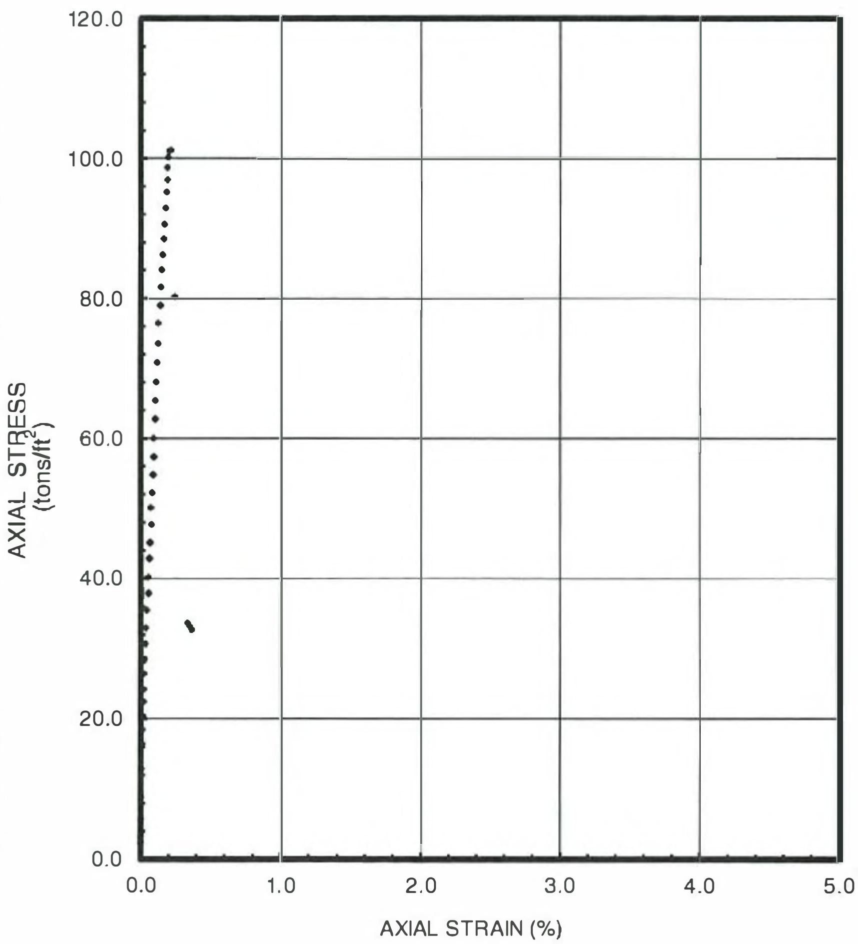
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Younqquist Brothers. Inc..
PROJECT: Seminole.Tribe.– Hollywood Reservation.
FILE.NO.: 17-13-0137.

DATE SAMPLE RECEIVED: 12/27/17
DATE TEST SET-UP: 01/26/18
DATE.REPORTED: 05/01/18.

INCOMING SAMPLE NO.: ---
BORING: IW-1 SAMPLE: Core.4/4.
DEPTH: 2,239.6 - 2,240.3 ☒ feet; ☐ meters.
LABORATORY.IDENTIFICATION.NO.: 170137/IW1C44.
SAMPLE.DESCRIPTION: Light gray limestone.

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in^2)	Young's Tangent Modulus, E_{50} (lb/in^2)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft^3)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.862	5.137	2.1	7.9	120.0	52	0.0105	0.096	2.23	0.22	**1,406**	7.24E05	515



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

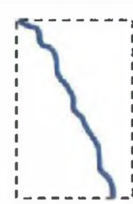
Loading Rate: 10.5 lb/in^2/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.200"
Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.49%
Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.71 ☐ Assumed ☒ Measured

FAILURE SKETCH



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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

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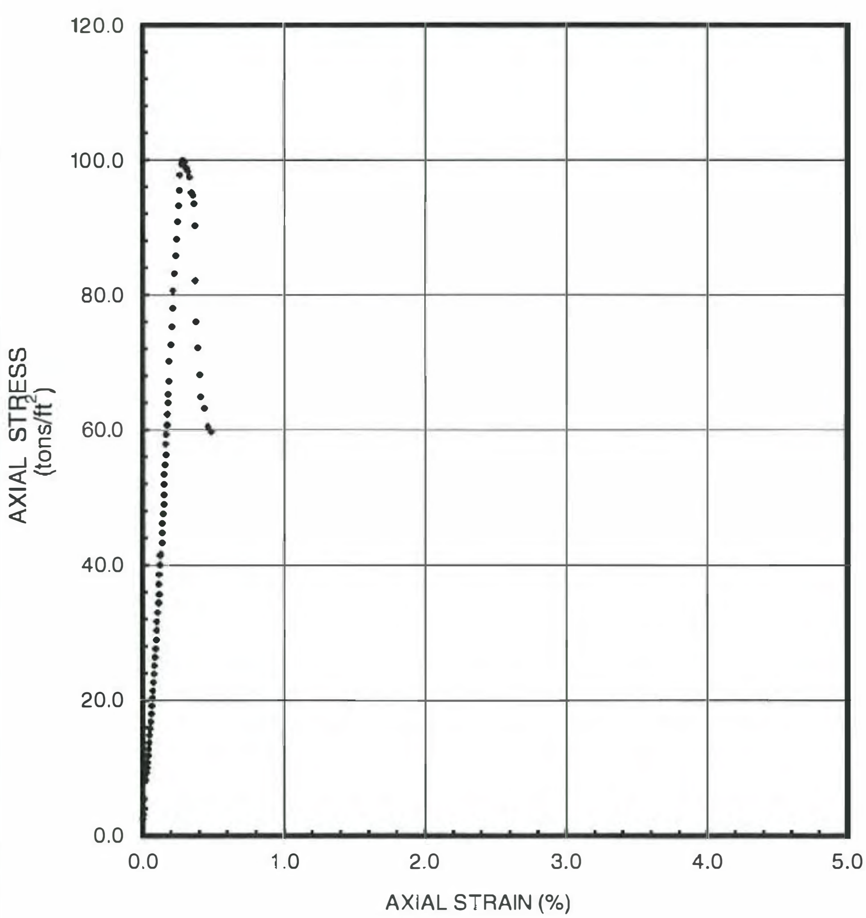
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Younqquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 12/27/17
DATE TEST SET-UP: 01/26/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: IW-1 SAMPLE: Core 4/5
DEPTH: 2,247.4 - 2,248.3 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW1C45
SAMPLE DESCRIPTION: Light gray limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.750	5.120	2.1	7.2	117.0	44	0.0095	0.088	3.23	0.28	**1,388**	5.88E05	424



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments:

Loading Rate: 7.2 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

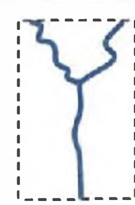
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.097"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.54%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.71 ☐ Assumed ☒ Measured

FAILURE SKETCH



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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

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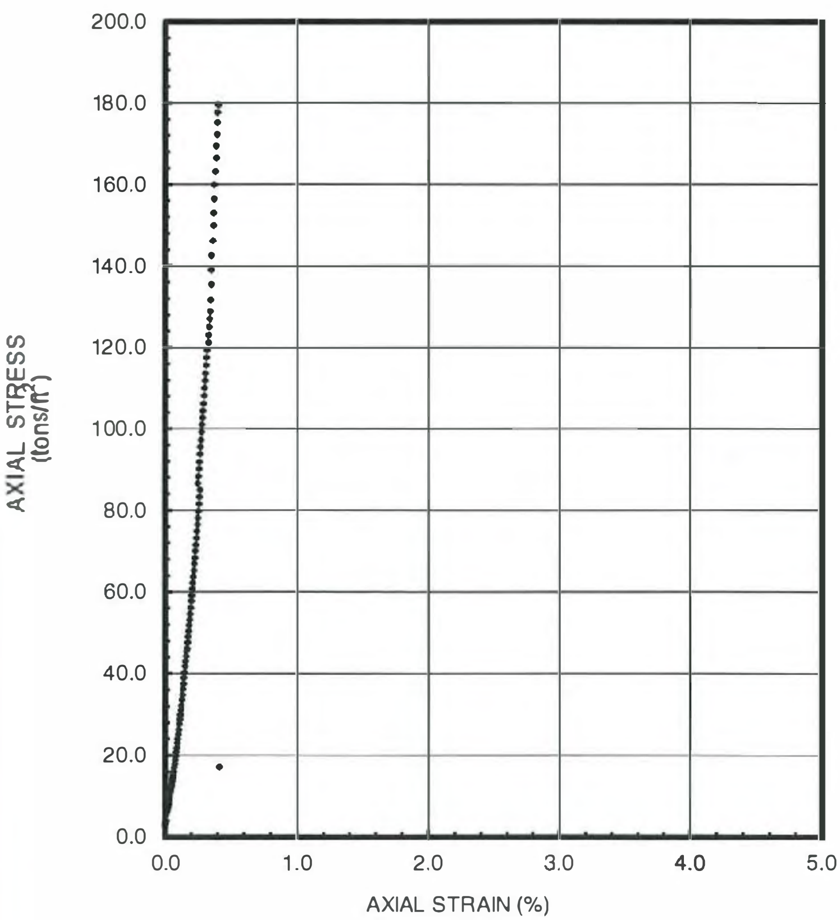
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 12/27/17
DATE TEST SET-UP: 01/26/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: IW-1 SAMPLE: Core 5/1
DEPTH: 2,290.5 - 2,290.9 ☒ feet; ☐ meters.
LABORATORY IDENTIFICATION NO.: 170137/IW1C51
SAMPLE DESCRIPTION: Light gray limestone.

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
9.272	5.116	1.8	8.5	118.1	53	0.0072	0.078	5.40	0.42	**2,496**	8.5E05	**341**



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments:

Loading Rate: 7.7 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0

Specimen Sub-Cored for Testing:
☒ Yes
☐ No

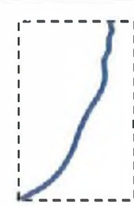
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.054"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.66%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.71 ☐ Assumed ☒ Measured

FAILURE SKETCH



Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

Checked By: JW Date: 05/01/18

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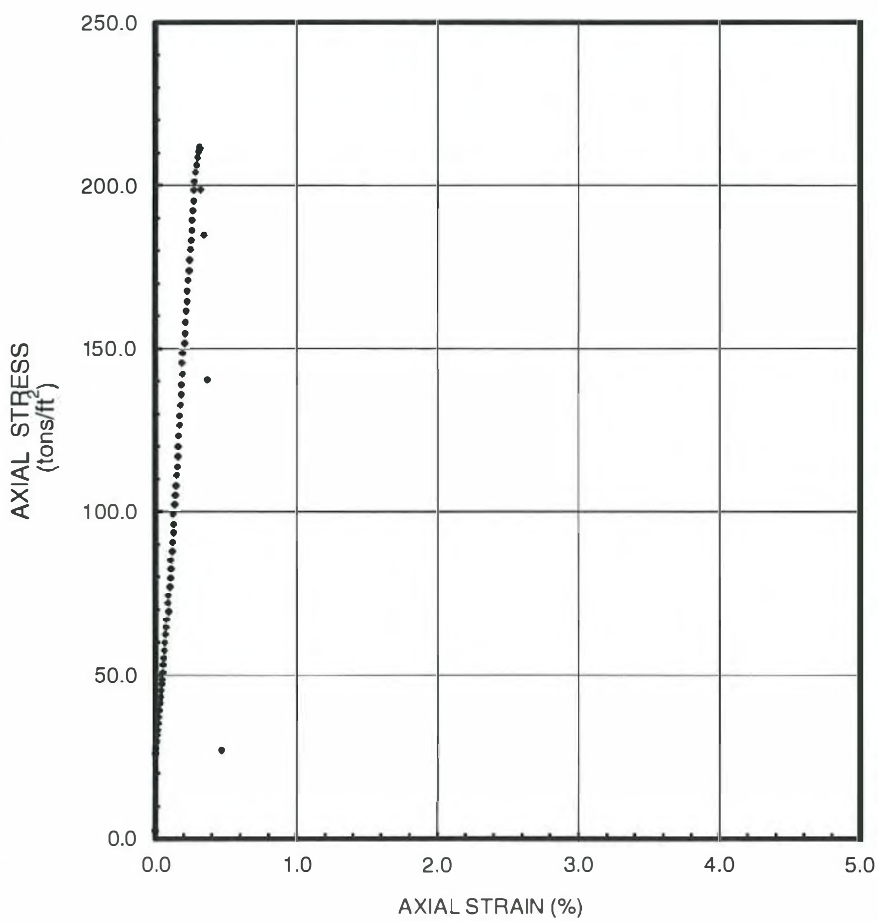
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 12/27/17
DATE TEST SET-UP: 01/26/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: **IW-1** SAMPLE: Core 6/1
DEPTH: 2,316.0 - 2,316.9 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW1C61
SAMPLE DESCRIPTION: Light gray limestone.

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.876	5.079	2.1	6.2	128.5	52	0.0092	0.084	**4.35**	0.37	**2,945**	9.89E05	336



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments:

Loading Rate: 11.3 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0

Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.061"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.58%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.72 ☐ Assumed ☒ Measured

FAILURE SKETCH

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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

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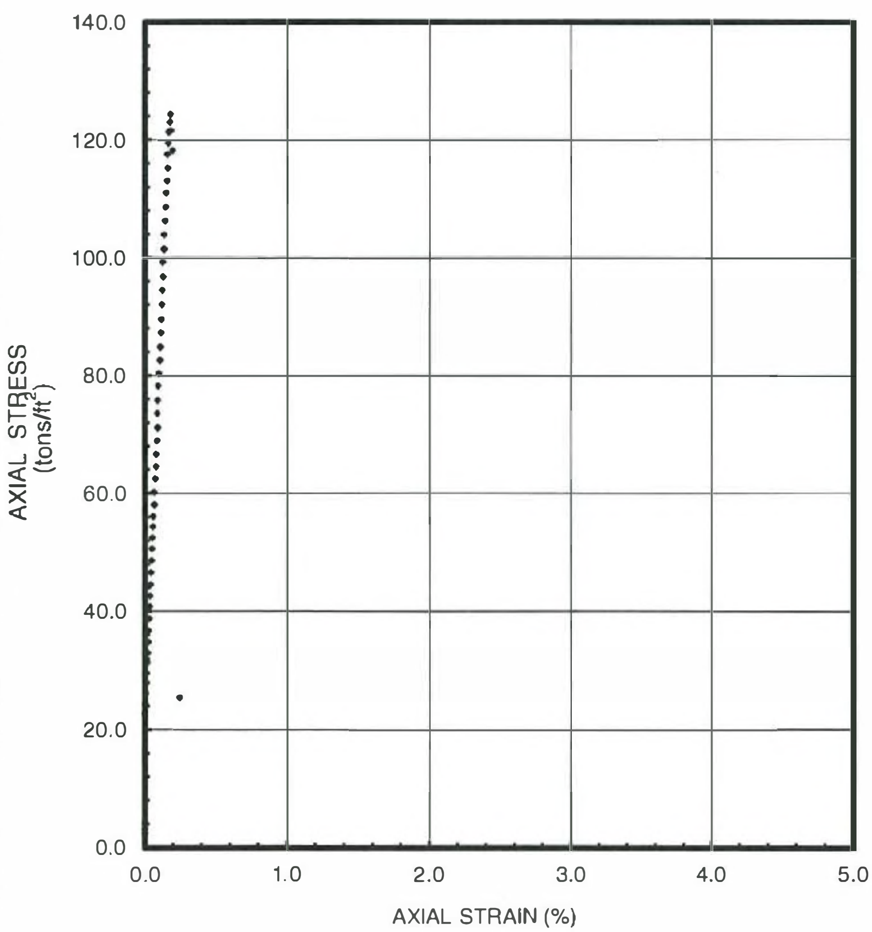
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Younqquist Brothers, Inc..
PROJECT: Seminole.Tribe.– Hollywood Reservation.
FILE.NO.: 17-13-0137.

DATE SAMPLE RECEIVED: 12/27/17
DATE.TEST.SET-UP: 01/26/18
DATE.REPORTED: 05/01/18.

INCOMING.SAMPLE.NO.: ---
BORING: IW-1 SAMPLE: Core.6/3.
DEPTH: 2,325.4 - 2,326.3 ☒ feet; ☐ meters.
LABORATORY.IDENTIFICATION.NO.: 170137/IW1C63.
SAMPLE.DESCRIPTION: Light gray limestone.

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
11.000	5.097	2.2	6.0	117.3	37	0.0076	0.069	3.20	0.22	**1,728**	8.7E05	504



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

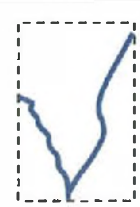
Loading Rate: 9.0 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.040"
Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.69%
Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.70 ☐ Assumed ☒ Measured

FAILURE SKETCH



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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 05/01/18
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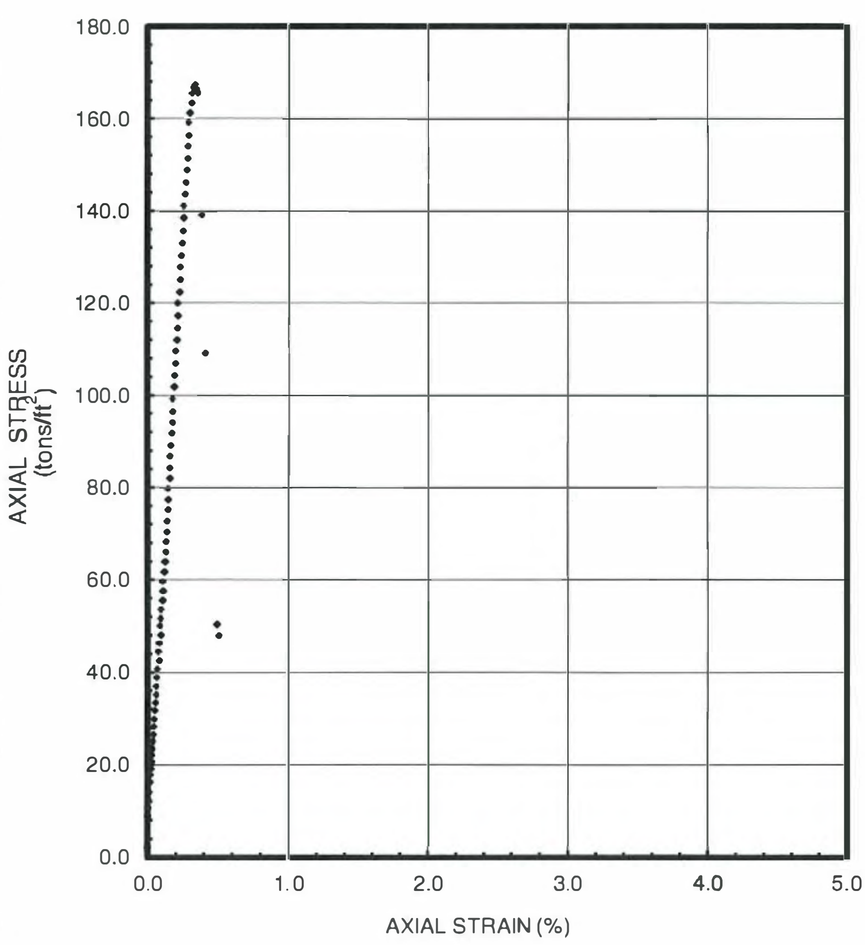
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Younquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 12/27/17
DATE TEST SET-UP: 01/26/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: **IW-1** SAMPLE: Core 7/2
DEPTH: 2,490.1 - 2,490.9 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW1C72
SAMPLE DESCRIPTION: [illegible] gray limestone.

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.657	5.138	2.1	**4.4**	125.3	34	0.0092	0.087	4.03	0.35	**2,328**	7.79E05	335



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

Loading Rate: 9.6 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.140"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.83%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.71 ☐ Assumed ☒ Measured

FAILURE SKETCH

Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 05/01/18
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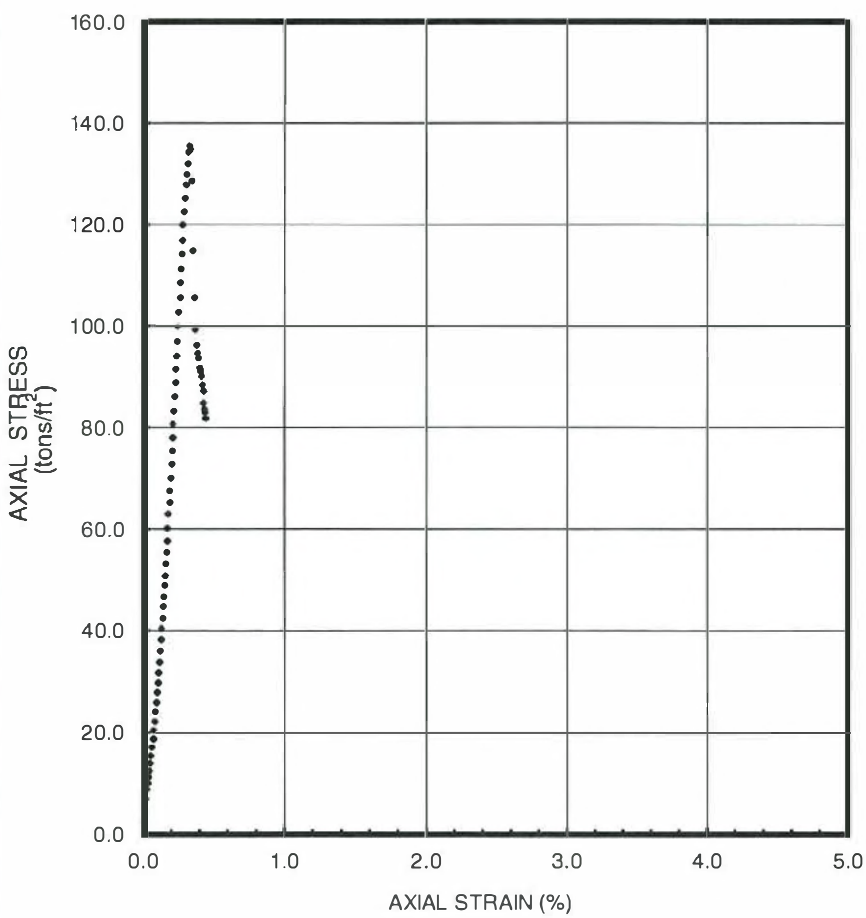
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Younquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 12/27/17
DATE TEST SET-UP: 01/26/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: IW-1 SAMPLE: Core 7/3
DEPTH: 2,492.1 - 2,492.9 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW1C73
SAMPLE DESCRIPTION: Light gray limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
11.108	5.105	2.2	**4.4**	124.3	**33**	0.0116	0.104	3.13	0.33	**1,884**	7.10E05	377



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments:

Loading Rate: 10.0 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0

Specimen Sub-Cored for Testing:
☒ Yes
☐ No

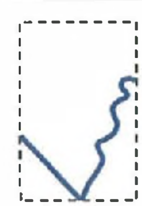
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.109"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.48%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.71 ☐ Assumed ☒ Measured

FAILURE SKETCH



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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: [illegible] Date: 05/01/18

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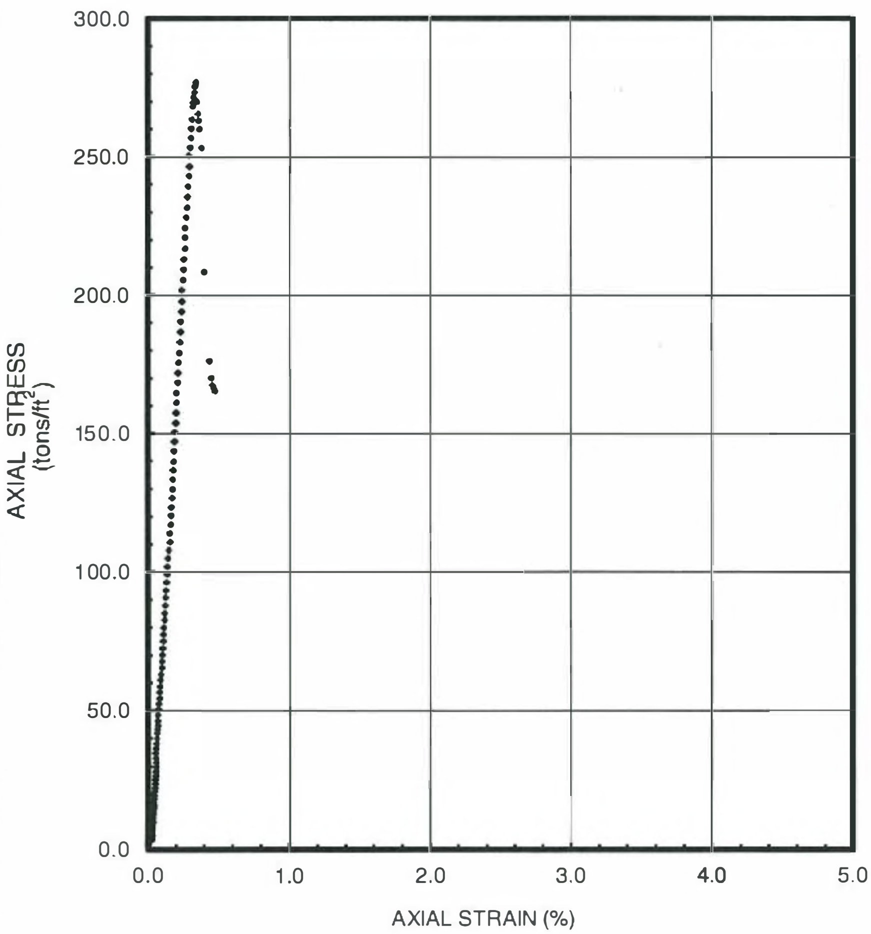
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/26/18
DATE REPORTED: 05/01/18

INCOMING SAMPLE NO.: ---
BORING: IW-1 SAMPLE: Core 8/2
DEPTH: 2,592.5 – 2,593.1 ☒ feet; ☐ meters.
LABORATORY IDENTIFICATION NO.: 170137/IW1C82
SAMPLE DESCRIPTION: Light gray limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
8.419	5.096	1.7	4.4	135.5	48	0.0050	0.059	5.68	0.34	**3,852**	1.42E06	**369**



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments: Specimen tested with H/D<2.0

Loading Rate: 11.3 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.035"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.72%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.71 ☐ Assumed ☒ Measured

FAILURE SKETCH

The test data and all associated project information presented here on shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 05/01/18
S:\Projects\2017\17-13-0137\17-13-0137 QU TESTS\IW-1\QU-STOF-25 2592.5.docx

AS-RECEIVED CORE 1 SAMPLE 1
1,857.7' - 1,858.3'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

AS-RECEIVED CORE 1 SAMPLE 2
1,861.9' - 1,862.9'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

AS-RECEIVED CORE 1 SAMPLE 3
1,864.5' - 1,865.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

AS-RECEIVED CORE 1 SAMPLE 4
1,868.0' - 1,868.5'

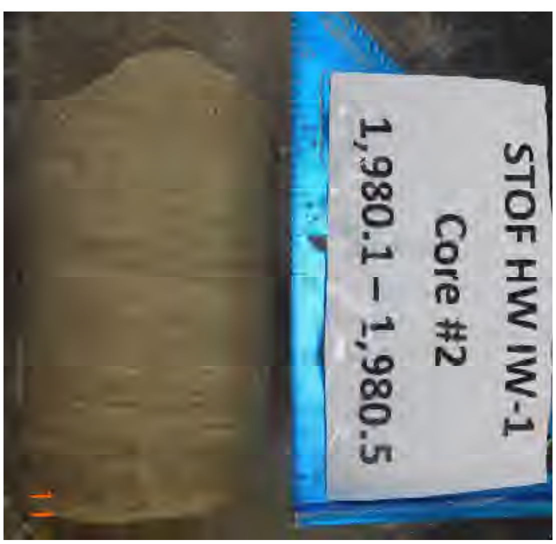
Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

AS-RECEIVED CORE 1 SAMPLE 5
1,868.5' - 1,869.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

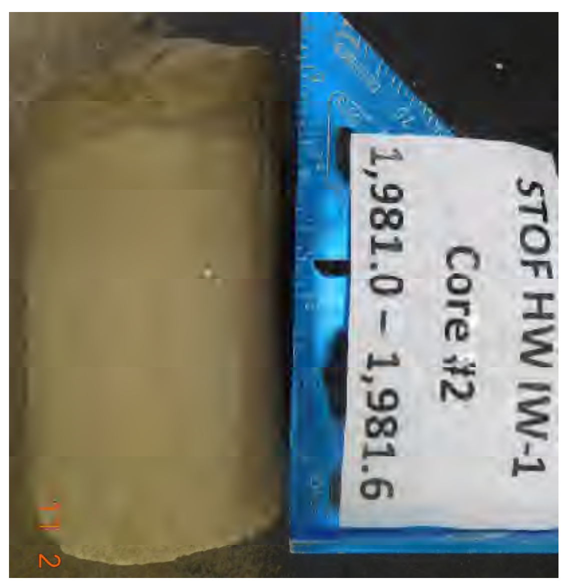
AS-RECEIVED CORE 2 SAMPLE 1
1,979.1' - 1,980.1'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137



AS-RECEIVED CORE 2 SAMPLE 2
1,980.1' - 1,980.5'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137



AS-RECEIVED CORE 2 SAMPLE 3
1,981.0' - 1,981.6'

AS-RECEIVED CORE 2 SAMPLE 4
1,982.5' - 1,983.1'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

AS-RECEIVED CORE 2 SAMPLE 5
1,983.6' - 1,984.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

AS-RECEIVED CORE 3 SAMPLE 1
2,083.7' – 2,084.5'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

AS-RECEIVED CORE 3 SAMPLE 2
2,084.5' – 2,085.1'

AS-RECEIVED CORE 3 SAMPLE 3
2,086.8' – 2,087.6'

AS-RECEIVED CORE 3 SAMPLE 4
2,088.5' – 2,089.0'

AS-RECEIVED CORE 3 SAMPLE 5
2,091.9' – 2,092.7'

AS-RECEIVED CORE 4 SAMPLE 1
2,237.9' – 2,238.5'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

AS-RECEIVED CORE 4 SAMPLE 2
2,239.1' – 2,239.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

AS-RECEIVED CORE 4 SAMPLE 3
2,239.6' – 2,240.3'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

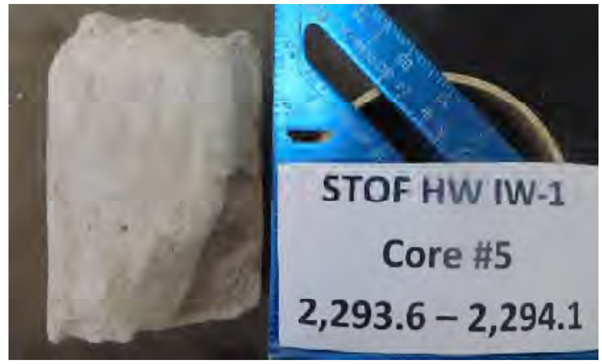
AS-RECEIVED CORE 4 SAMPLE 4
2,240.3' – 2,241.0'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

AS-RECEIVED CORE 4 SAMPLE 5
2,247.4' – 2,248.3'

AS-RECEIVED CORE 5 SAMPLE 1
2,290.5' – 2,290.9'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137



AS-RECEIVED CORE 5 SAMPLE 2
2,293.6' – 2,294.1'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

AS-RECEIVED CORE 6 SAMPLE 1
2,316.0' – 2,316.9'

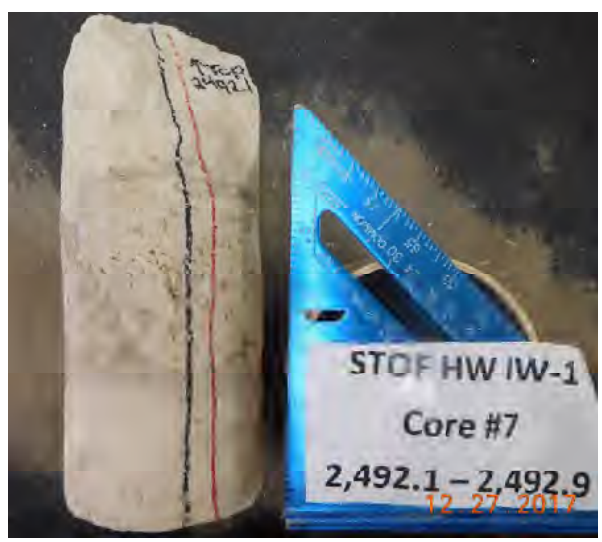
Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

AS-RECEIVED CORE 6 SAMPLE 2
2,323.0' – 2,323.6'

AS-RECEIVED CORE 6 SAMPLE 3
2,325.4' – 2,326.3'

AS-RECEIVED CORE 7 SAMPLE 1
2,485.8' – 2,486.1'

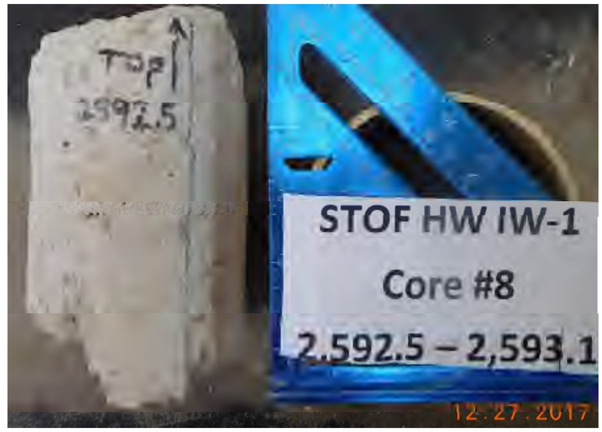
AS-RECEIVED CORE 7 SAMPLE 2
2,490.1' – 2,490.9'



AS-RECEIVED CORE 7 SAMPLE 3
2,492.1' – 2,492.9'

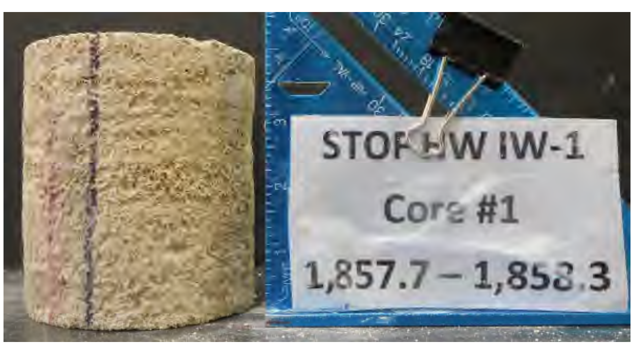
AS-RECEIVED CORE 8 SAMPLE 1
2,591.2' – 2,591.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137



AS-RECEIVED CORE 8 SAMPLE 2
2,592.5' – 2,593.1'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137



CORE 1 SAMPLE 1 PERMEABILITY TEST SPECIMEN
1,857.7' – 1,858.3'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 1 SAMPLE 1 PERMEABILITY TEST SPECIMEN
1,857.7' – 1,858.3'

CORE 1 SAMPLE 2 PERMEABILITY TEST SPECIMEN
1,861.9' - 1,862.9'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 1 SAMPLE 2 PERMEABILITY TEST SPECIMEN
1,861.9' – 1,862.9'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 1 SAMPLE 3 PERMEABILITY TEST SPECIMEN
1,864.5' - 1,865.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 1 SAMPLE 3 PERMEABILITY TEST SPECIMEN
1,864.5' - 1,865.6'

CORE 1 SAMPLE 4 PERMEABILITY TEST SPECIMEN
1,868.0' - 1,868.5'

CORE 1 SAMPLE 4 PERMEABILITY TEST SPECIMEN
1,868.0' - 1,868.5'

CORE 1 SAMPLE 5 PERMEABILITY TEST SPECIMEN
1,868.5' - 1,869.6'

CORE 1 SAMPLE 5 PERMEABILITY TEST SPECIMEN
1,868.5' - 1,869.6'

CORE 2 SAMPLE 1 PERMEABILITY TEST SPECIMEN
1,979.1' - 1,980.1'

CORE 2 SAMPLE 1 PERMEABILITY TEST SPECIMEN
1,979.1' - 1,980.1'

CORE 2 SAMPLE 2 PERMEABILITY TEST SPECIMEN
1,980.1' - 1,980.5'

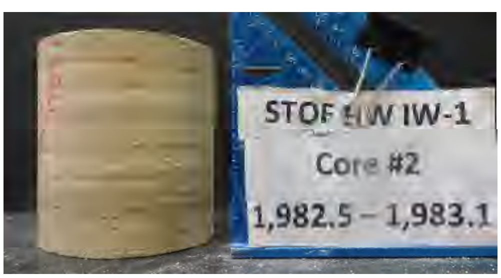
CORE 2 SAMPLE 2 PERMEABILITY TEST SPECIMEN
1,980.1' - 1,980.5'

CORE 2 SAMPLE 3 PERMEABILITY TEST SPECIMEN
1,981.0' - 1,981.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 2 SAMPLE 3 PERMEABILITY TEST SPECIMEN
1,981.0' - 1,981.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137



CORE 2 SAMPLE 4 PERMEABILITY TEST SPECIMEN
1,982.5' - 1,983.1'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 2 SAMPLE 4 PERMEABILITY TEST SPECIMEN
1,982.5' - 1,983.1'

CORE 2 SAMPLE 5 PERMEABILITY TEST SPECIMEN
1,983.6' - 1,984.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 2 SAMPLE 5 PERMEABILITY TEST SPECIMEN
1,983.6' - 1,984.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 3 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,083.7' – 2,084.5'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 3 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,083.7' – 2,084.5'

CORE 3 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,084.5' – 2,085.1'

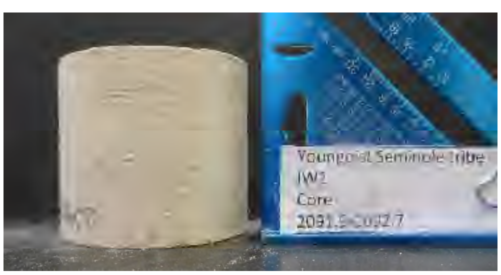
CORE 3 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,084.5' – 2,085.1'

CORE 3 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,086.8' – 2,087.6'

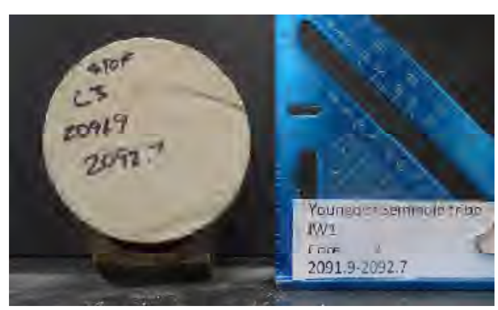
CORE 3 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,086.8' – 2,087.6'

CORE 3 SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,088.5' – 2,089.0'

CORE 3 SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,088.5' – 2,089.0'



CORE 3 SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,091.9' – 2,092.7'



CORE 3 SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,091.9' – 2,092.7'

CORE 4 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,237.9' – 2,238.5'

CORE 4 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,237.9' – 2,238.5'

CORE 4 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,239.1' – 2,239.6'

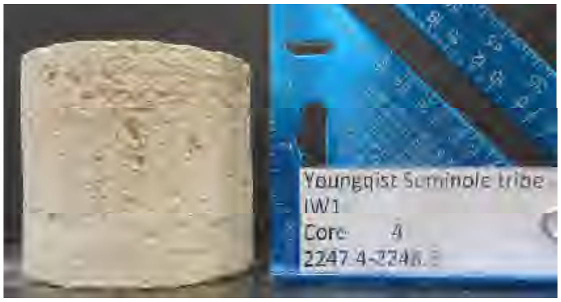
CORE 4 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,239.1' – 2,239.6'

CORE 4 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,239.6' – 2,240.3'

CORE 4 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,239.6' – 2,240.3'

CORE 4 SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,240.3' – 2,241.0'

CORE 4 SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,240.3' – 2,241.0'



CORE 4 SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,247.4' – 2,248.3'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 4 SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,247.4' – 2,248.3'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 5 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,293.6' – 2,294.1'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 5 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,293.6' – 2,294.1'

CORE 6 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,316.0' – 2,316.9'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 6 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,316.0' – 2,316.9'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 6 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,323.0' – 2,323.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 6 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,323.0' – 2,323.6'

CORE 6 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,325.4' – 2,326.3'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 6 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,325.4' – 2,326.3'

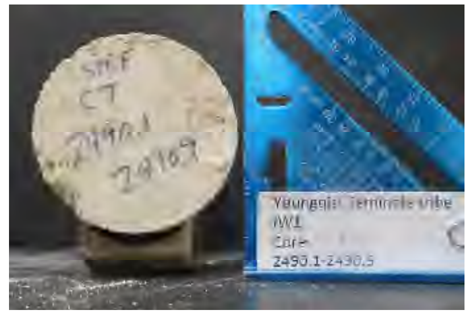
Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 7 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,485.8' – 2,486.1'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 7 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,485.8' – 2,486.1'

CORE 7 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,490.1' – 2,490.9'



CORE 7 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,490.1' – 2,490.9'

CORE 7 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,492.1' – 2,492.9'

CORE 7 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,492.1' – 2,492.9'

CORE 8 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,591.2' – 2,591.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-1
File No. 17-13-0137

CORE 8 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,591.2' – 2,591.6'

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March 9, 2018
File Number 17-13-0137

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Fort Myers, Florida 33908

Attention: Mr. Charles Reynolds

Subject: Rock Core Testing
Seminole Tribe of Florida Hollywood Reservation
WWTP Deep Injection Well IW-2

Gentlemen:

As requested, vertical and horizontal permeability, unconfined compression and specific gravity tests have been completed on 40 rock cores provided for testing by your office. The cores were received on November 2, 2017 and were designated as follows:

Core	Depth (feet)	Core Interval Length (feet)	No. of Samples
1	1,731.5 – 1,743.1	11.6	5
2	1,885.3 – 1,898.0	12.7	5
3	2,058.3 – 2,066.9	8.6	5
4	2,162.8 – 2,168.1	5.3	5
5	2,292.5 – 2,304.6	12.1	5
6	2,422.7 – 2,428.3	5.6	5
7	2,868.4 – 2,873.0	4.6	5
8	2,926.1 – 2,933.5	7.4	5

Photographs of the as-received core samples are attached.

Permeability Tests

Permeability tests were performed in general accordance with ASTM Standard D5084 "Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter" using either the constant head (Method A) or falling head-rising tailwater (Method C) test methods. The core samples were first tested for vertical hydraulic conductivity, and then cross-cored for measurement of horizontal hydraulic conductivity on the vertical permeability test specimens. The permeability test results are presented on the attached hydraulic conductivity test reports. Photographs of the vertical permeability test specimens are also attached. A total of 39 vertical and 38 horizontal permeability tests were performed.

Specific Gravity Tests

The measured mineral specific gravities are presented on the attached test reports. The specific gravity tests were performed in general accordance with ASTM Standard D854 "Specific Gravity of Soil Solids by Water Pycnometer" using 80 gram specimens ground to pass the U.S. Standard No. 40 sieve. One specific gravity test was performed on each core sample. The specific gravities measured on the samples are presented on the hydraulic conductivity test reports.

Unconfined Compression Tests

Unconfined compression tests were performed in general accordance with ASTM Standard D7012 "Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures" using Method C Uniaxial Compressive Strength of Intact Rock Core Specimens. The results of the unconfined compression tests are presented on the attached unconfined compression test reports. At least one unconfined compression test was performed on each core. A total of 20 unconfined compression test were performed.

Total Porosity

The total porosity, n, of each permeability test specimen was back-calculated from dry density, γ_d, and measured mineral specific gravity, G_s, using the relationship: $n= [\gamma_d/(G_s\gamma_w)]-1$ where γ_w is the unit weight of water. The total porosities of the permeability test specimens are reported on the hydraulic conductivity test reports.

The test samples were reported to be from the client-specified designations herein. The test results are indicative of only the specimens that were actually tested. The test results presented are based upon accepted industry practice as well as test method(s) listed. Ardaman & Associates, Inc. neither accepts responsibility for, nor makes claims to the final use and purpose of the test results.

Please contact us if you have any questions about the test results or require additional information.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.
Certificate of Authorization No. 5950

Thomas S. Ingra
Thomas S. Ingra, P.E.
Laboratory Director
Florida License No. 31987

S:\Projects\2017\17-13-0137\IW-2 TEST REPORT.docx

Table 1

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

SEMINOLE TRIBE OF FLORIDA HOLLYWOOD RESERVATION WWTP DEEP INJECTION WELL IW-2

Core	Sample	Visual Description	Depth (feet, BLS) From	Depth (feet, BLS) To	Interval Length (inches)	As-Received Core Length (inch) Total Length	As-Received Core Length (inch) Usable Length at Full Diameter	Length Trimmed for Testing	Core Diameter Nominal Diameter (inch)	Core Diameter Trimmed for Testing	Specific Gravity, Gs	Length (cm)	Diameter (cm)	Volume (cm^3)	Mass of Dry Solids (grams)	Initial Water Content (%)	Initial Dry Density (lb/ft^3)	Total Porosity	Final Total Unit Weight (lb/ft^3)	Final Water Content (%)	Final Saturation (%)	Isotropic Effective Confining Stress (lb/in^2)	Back-pressure (lb/in^2)	Average Hydraulic Gradient	Flow (cm^3)	Outflow/Inflow Ratio	Test Duration (days)	B-factor at End of Test (%)	B-factor Stress Increments (lb/in^2)	ASTM D5084 Test Method	Vertical Hydraulic Conductivity, kv_{20} (cm/sec)
1	1	Light brown limestone	1,731.5	1,732.4	10.8	9.5	8.0	Yes	4	No	2.71	10.454	10.051	829.45	1,201.17	31.3	90.4	0.466	118.7	31.3	97	30	70	1.6	7.58	1.05	1	99	4.7	C	**7.7 E-04**
	2	Light brown limestone	1,734.5	1,735.3	9.6	9.5	8.5	Yes	4	No	2.69	11.075	9.541	791.81	1,129.17	31.8	89.0	0.470	117.6	32.1	97	30	70	1.8	18.85	0.99	2	97	5.4	C	**9.7 E-04**
	3	Light brown limestone	1,738.5	1,738.8	3.6	3.6	2.75	Yes	4	No	2.67	8.035	9.954	625.27	1,144.40	15.3	115.3	0.314	132.9	16.3	95	30	70	2.2	6.98	1.01	1	99	6.3	C	**3.6 E-04**
	4	Light brown limestone	1,739.0	1,740.0	12.0	12.0	10.0	Yes	4	No	2.70	10.848	10.020	855.36	1,195.42	33.8	87.2	0.482	116.7	33.8	98	30	70	1.4	17.10	1.02	2	100	5.1	C	**2.2 E-03**
	5	Light brown limestone	1,742.2	1,743.1	10.8	10.8	9.5	Yes	4	No	2.70	11.102	10.012	874.04	1,271.42	31.1	90.8	0.461	119.1	31.2	98	30	70	1.5	7.48	1.01	7	100	6.3	C	**1.3 E-03**
2	1	Light brown limestone	1,885.3	1,886.2	10.8	10.8	9.5	Yes	4	No	2.69	10.916	10.070	869.38	1,283.72	29.5	92.2	0.451	119.4	29.5	97	30	70	1.5	8.10	1.01	1	85 [S]	4.4; 8.2; 11.6	C	**2.2 E-03**
	2	Light brown limestone	1,886.2	1,887.1	10.8	10.5	9.0	Yes	4	No	2.69	10.830	10.099	867.51	1,277.95	29.1	92.0	0.452	118.9	29.3	95	30	70	1.5	15.98	1.05	1	90 [S]	10.4; 13.5; 17.6	C	**2.2 E-03**
	3	Light brown limestone	1,889.8	1,890.5	8.4	8.4	6.5	Yes	4	No	2.70	7.225	10.032	571.07	1,098.87	14.4	120.1	0.287	137.5	14.5	97	30	160	94.4	1.42	0.96	1	100	14.0	A	**1.1 E-06**
	4	Light brown limestone	1,891.8	1,892.6	9.6	9.3	8.5	Yes	4	No	2.69	10.707	10.078	854.10	1,245.94	30.5	91.1	0.458	117.2	30.6	98	30	70	1.8	5.92	1.01	1	---	---	C	**1.1 E-03**
	5	Light brown limestone	1,897.2	1,898.0	9.6	9.6	9.0	Yes	4	No	2.69	11.686	10.064	929.52	1,336.69	32.2	89.8	0.465	118.9	32.4	100	30	70	1.4	7.18	1.01	1	99	6.1	C	**1.5 E-04**
3	1	Light brown limestone	2,058.3	2,059.0	8.4	7.5	6.0	Yes	4	No	2.71	10.526	9.948	818.09	1,246.70	28.4	95.1	0.438	122.5	28.7	100	30	70	1.7	7.25	1.03	2	89 [S]	6.3; 9.3; 12.6	C	**8.4 E-05**
	2	Light brown limestone	2,059.5	2,060.2	8.4	7.0	6.0	Yes	4	No	2.71	10.605	9.984	830.25	1,261.48	28.2	94.9	0.439	121.8	28.4	98	30	70	3.0	9.42	0.99	1	89 [S]	10.7; 14.6; 20.0	A	**1.4 E-04**
	3	Light brown limestone	2,060.2	2,061.3	13.2	13.0	10.0	Yes	4	No	2.70	7.158	9.987	560.69	870.61	26.5	96.9	0.425	122.8	26.7	98	30	70	2.6	6.52	0.99	1	94 [S]	10.5; 13.5; 17.6	C	**1.0 E-04**
	4	Light brown limestone	2,061.3	2,062.0	8.4	5.7	4.0	Yes	4	No	2.71	10.874	9.996	853.44	1,358.32	24.1	99.4	0.413	123.3	24.1	93	30	70	1.6	13.82	1.06	1	100	4.3	C	**1.3 E-03**
	5	Light brown limestone	2,066.1	2,066.9	9.6	9.00	6.0	Yes	4	No	2.70	8.584	10.008	675.16	1,021.89	27.7	94.5	0.439	120.8	27.8	96	30	70	2.1	7.15	1.06	1	94 [S]	5.8; 10.6; 15.0	C	**1.6 E-04**
4	1	Light brown limestone	2,162.8	2,163.2	4.8	5.0	4.25	Yes	4	No	2.71	12.162	10.016	958.26	1,588.55	23.0	103.5	0.388	127.4	23.1	99	30	70	1.6	5.85	1.02	1	97 [S]	13.5; 17.6; 21.4	C	**8.1 E-05**
	2	Light brown limestone	2,163.2	2,163.9	8.4	7.0	6.0	Yes	4	No	2.71	10.928	10.036	864.43	1,402.90	23.9	101.3	0.401	125.6	24.0	97	30	70	1.9	11.20	1.00	1	98 [S]	10.7; 14.6; 20.0	C	**1.1 E-04**
	3	Light brown limestone	2,164.3	2,164.9	7.2	7.0	5.5	Yes	4	No	2.70	11.007	10.073	882.75	1,677.05	15.5	118.6	0.296	137.1	15.6	100	30	160	30.8	1.50	0.97	1	97	4.7	A	**4.4 E-06**
	4	Light brown limestone	2,165.6	2,166.1	6.0	5.8	4.0	Yes	4	No	2.68	9.546	10.082	762.09	1,626.46	9.1	133.2	0.204	145.7	9.4	98	30	70	1.9	6.62	0.99	5	96	4.4	C	**1.0 E-04**
	5	Light brown limestone	2,167.0	2,168.1	13.2	13.0	6.0	Yes	4	No	2.71	10.270	10.071	818.15	1,518.16	14.6	115.8	0.315	133.2	15.0	88	30	70	1.8	6.25	1.02	1	80 [S]	4.5; 8.2; 11.9	C	**8.9 E-05**
5	1	Light brown limestone	2,292.5	2,293.2	8.4	7.0	6.0	Yes	4	No	2.73	11.240	10.085	897.82	1,795.38	12.4	124.8	0.268	140.5	12.5	94	30	70	1.5	7.58	0.99	2	86 [S]	6.3; 9.3; 12.7	C	**9.1 E-05**
	2	Light brown limestone	2,295.3	2,296.0	8.4	7.5	6.0	Yes	4	No	2.71	10.514	10.044	833.09	1,542.24	16.5	115.6	0.317	134.9	16.7	97	30	70	1.7	7.15	1.01	1	99	6.0	C	**2.0 E-04**
	3	Light brown limestone	2,299.7	2,301.0	15.6	13.6	12.0	Yes	4	No	2.72	10.600	10.094	848.29	1,664.54	12.8	122.5	0.279	138.4	13.0	91	30	70	1.6	7.50	1.01	2	95	6.2	C	**4.1 E-04**
	4	Light brown limestone	2,301.4	2,301.9	6.0	6.0	5.75	Yes	4	No	2.73	10.724	10.098	858.76	1,631.20	15.4	118.6	0.304	137.0	15.5	97	30	70	1.6	7.25	1.01	1	96	6.2	C	**4.6 E-04**
	5	Light brown dolomitic limestone	2,304.1	2,304.6	6.0	4.0	3.0	Yes	4	No	2.77	8.768	10.055	696.24	1,503.02	9.7	134.8	0.221	147.9	9.7	95	30	160	82.4	2.41	0.99	9	95	8.4	A	**2.3 E-06**
6	1	Light brown limestone	2,422.7	2,423.7	12.0	11.25	10.0	Yes	4	No	2.71	10.723	10.055	851.43	1,682.43	13.6	123.4	0.271	140.2	13.6	99	30	160	31.4	33.79	0.99	1	---	---	A	**8.8 E-05**
	2	Light brown limestone	2,423.7	2,424.5	9.6	9.9	9.0	Yes	4	No	2.74	10.881	10.059	864.72	1,811.69	10.6	130.8	0.235	144.8	10.7	95	30	160	53.6	4.03	0.96	1	95 [S]	8.3; 14.8; 19.4	A	**8.3 E-06**
	3	Light brown dolomitic limestone	2,424.5	2,425.2	8.4	6.25	4.5	Yes	4	No	2.76	10.253	10.068	816.32	1,777.24	8.6	135.9	0.211	147.6	8.6	89	30	160	57.2	1.38	0.98	1	97	9.4	A	**2.8 E-06**
	4	Light brown limestone	2,426.2	2,427.0	9.6	8.5	7.0	Yes	4	No	2.74	8.012	10.045	634.98	1,319.72	11.0	129.8	0.241	144.3	11.2	96	30	160	74.7	3.78	1.00	1	95	9.5	A	**9.3 E-06**
	5	Light brown limestone	2,427.2	2,428.3	13.2	13.0	11.0	Yes	4	No	2.70	10.614	10.060	843.67	1,547.86	15.6	114.5	0.321	133.9	16.9	97	30	160	41.7	8.19	0.99	1	74 [S]	3.8; 9.4; 13.2	A	**5.1 E-05**
7R	1	Light brown limestone	2,868.4	2,868.8	4.8	4.0	2.0	Yes	4	No	2.71	6.612	9.815	500.23	919.39	17.0	114.7	0.322	134.3	17.0	97	30	70	2.9	6.25	0.98	1	91 [S]	10.7; 14.9; 20.1	C	**1.2 E-04**
	2	Light brown limestone	2,868.8	2,869.3	6.0	6.0	4.0	Yes	4	No	2.70	10.432	9.890	801.36	1,376.41	19.6	107.2	0.364	128.3	19.6	93	30	70	1.6	7.40	0.97	1	100	6.3	C	**4.6 E-04**
	3	Light brown limestone	2,871.4	2,871.9	6.0	5.0	2.0	Yes	4	No	2.72	6.541	9.971	510.69	904.47	18.8	110.5	0.349	131.3	18.8	96	30	160	24.8	4.51	1.00	1	96	6.3	A	**2.4 E-05**
	4	Light brown limestone	2,871.9	2,872.3	4.8	4.75	4.0	Yes	4	No	2.72	10.817	9.972	844.81	1,480.81	19.6	109.4	0.356	131.0	19.7	97	30	70	3.2	7.90	1.00	1	95 [S]	10.7; 14.6; 20.0	A	**3.3 E-05**
	5	Light brown limestone	2,872.3	2,873.0	8.4	6.75	4.0	Yes	4	No	2.71	[Tested only for unconfined compressive strength]																			
8	1	Light brown limestone	2,926.1	2,926.5	4.8	4.5	3.0	Yes	4	No	2.72	10.847	10.002	852.18	1,519.14	17.6	111.3	0.347	130.9	17.6	91	30	160	22.2	14.03	1.00	1	99	4.5	A	**1.3 E-04**
	2	Light brown limestone	2,928.2	2,928.7	6.0	4.75	4.0	Yes	4	No	2.71	10.628	9.986	832.39	1,525.32	16.2	114.4	0.324	134.0	17.1	97	30	70	1.5	8.20	1.02	4	65 [S]	6.3; 10.2; 13.4	C	**4.8 E-04**
	3	Light brown limestone	2,930.6	2,931.2	7.2	7.5	4.0	Yes	4	No	2.71	7.402	9.979	578.95	1,040.75	18.1	112.2	0.337	132.8	18.4	98	30	70	2.4	6.55	1.02	2	94 [S]	6.3; 9.3; 12.6	C	**1.1 E-04**
	4	Light brown limestone	2,931.8	2,932.2	4.8	4.0	3.0	Yes	4	No	2.71	10.462	9.990	819.92	1,490.30	17.3	113.5	0.329	133.4	17.5	97	30	70	1.8	14.02	0.99	1	88 [S]	6.0; 10.8; 15.3	C	**2.6 E-04**
	5	Light brown limestone	2,932.8	2,933.5	8.4	6.75	6.25	Yes	4	No	2.71	10.826	10.030	855.51	1,569.27	17.0	114.5	0.323	133.9	17.0	96	30	70	1.6	7.05	1.01	1	92 [S]	5.6; 10.6; 17.3	C	**4.0 E-04**

COMMENTS: (1) Core samples were cut to length, air-dried, deaired under vacuum for a minimum of 24 hours, and then saturated with deaired tap water from the bottom up while maintaining the vacuum. (2) Final water content from horizontal permeability test specimen for all specimens except Core 1 Sample 3, Core 4 Sample 5, Core 5 Sample 1 and Core 5 Sample 3. Mass of dry solids calculated from measured wet mass and final water content. (3) Deaired tap water permeant. (4) Mass of dry solids for specimens Core 1 Sample 3, Core 4 Sample 5, Core 5 Sample 1 and Core 5 Sample 3 from initial air dried mass.

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

ASTM D5084 Test Methods: Method A - Constant Head; Method C - Falling Head; Rising Tailwater

Where: [S] Denotes relatively stable B-factor for consecutive increments of cell pressure.

Checked By: TM Date: 03/09/18

Table 2

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

SEMINOLE TRIBE OF FLORIDA HOLLYWOOD RESERVATION WWTP DEEP INJECTION WELL IW-2

Core	Sample	Visual Description	Depth (feet, BLS)		Interval Length (inches)	As-Received Core Length (inch)		Core Diameter		Specific Gravity, Gs	Horizontal Hydraulic Conductivity Test																			
			From	To		Total Length	Usable Length at Full Diameter	Nominal Diameter (inch)	Trimmed for Testing		Length (cm)	Diameter (cm)	Volume (cm^3)	Mass of Dry Solids (grams)	Initial Water Content (%)	Initial Dry Density (lb/ft^3)	Total Porosity	Final Total Unit Weight (lb/ft^3)	Final Water Content (%)	Final Saturation (%)	Isotropic Effective Confining Stress (lb/in^2)	Back-pressure (lb/in^2)	Average Hydraulic Gradient	Flow (cm^3)	Outflow/Inflow Ratio	Test Duration (days)	B-factor at End of Test (%)	B-factor Stress Increments (lb/in^2)	ASTM D5084 Test Method	Horizontal Hydraulic Conductivity, kh_{20} (cm/sec)
1	1	Light brown limestone	1,731.5	1,732.4	10.8	9.5	8.0	4	Yes	2.71	7.674	5.066	154.70	223.48	30.1	90.1	0.467	118.4	31.3	97	30	70	9.8	8.62	0.94	1	85 [S]	6.7; 10.1; 14.0	A	**2.2E-04**
	2	Light brown limestone	1,734.5	1,735.3	9.6	9.5	8.5	4	Yes	2.69	7.135	5.054	143.11	203.12	31.3	88.6	0.472	117.1	32.1	96	30	70	2.4	7.42	1.05	3	84 [S]	6.8; 10.1; 14.0	C	**1.2E-03**
	3	Light brown limestone	1,738.5	1,738.8	3.6	3.6	2.75	4	Yes	2.67	7.300	5.084	148.23	273.92	14.7	115.4	0.308	133.0	15.3	92	30	70	2.3	7.72	1.01	2	100	6.7; 10.8; 14.8	C	**2.1E-03**
	4	Light brown limestone	1,739.0	1,740.0	12.0	12.0	10.0	4	Yes	2.70	7.620	5.058	153.14	211.21	32.7	86.1	0.489	115.2	33.8	95	30	70	2.2	7.38	0.99	5	91 [S]	6.7; 11.7; 16.2	C	**2.9E-03**
	5	Light brown limestone	1,742.2	1,743.1	10.8	10.8	9.5	4	Yes	2.70	7.556	5.060	151.96	218.52	31.0	89.8	0.467	117.8	31.2	96	30	70	2.4	6.80	1.03	5	98	5.9; 10.4; 14.9	C	**9.5E-04**
2	1	Light brown limestone	1,885.3	1,886.2	10.8	10.8	9.5	4	Yes	2.69	7.577	5.062	152.44	226.69	28.6	92.8	0.447	120.3	29.5	98	30	70	2.3	7.12	1.02	5	91 [S]	5.9; 10.3; 14.8	C	**1.8E-03**
	2	Light brown limestone	1,886.2	1,887.1	10.8	10.5	9.0	4	Yes	2.69	7.644	5.063	153.88	226.96	28.8	92.1	0.437	119.1	29.3	96	30	70	2.4	13.85	1.02	5	83 [S]	4.1; 9.1; 13.0	C	**1.1E-03**
	3	Light brown limestone	1,889.8	1,890.5	8.4	8.4	6.5	4	Yes	2.70	7.323	5.060	147.27	284.72	14.5	120.6	0.284	138.2	14.5	99	30	160	73.4	10.67	0.95	1	93 [S]	6.4; 10.1	A	**1.5E-06**
	4	Light brown limestone	1,891.8	1,892.6	9.6	9.3	8.5	4	Yes	2.69	7.322	5.058	147.47	216.23	30.6	91.5	0.455	119.6	30.7	99	30	70	2.4	7.18	1.05	5	88 [S]	6.7; 11.7; 16.3	C	**7.6E-04**
	5	Light brown limestone	1,897.2	1,898.0	9.6	9.6	9.0	4	Yes	2.69	7.548	5.072	152.50	216.68	32.4	88.7	0.472	117.5	32.4	98	30	70	2.2	7.65	1.01	2	72 [S]	5.5; 9.0; 12.9	C	**1.1E-03**
3	1	Light brown limestone	2,058.3	2,059.0	8.4	7.5	6.0	4	Yes	2.71	7.432	5.054	149.12	225.10	26.8	94.1	0.443	121.3	28.7	98	30	70	9.4	9.70	1.05	1	75 [S]	6.7; 9.9; 13.8	C	**2.0E-04**
	2	Light brown limestone	2,059.5	2,060.2	8.4	7.0	6.0	4	Yes	2.71	7.407	5.057	148.77	225.95	28.4	94.8	0.440	121.8	28.4	98	30	70	2.7	5.05	1.02	2	89 [S]	4.3; 8.4; 12.3	C	**1.5E-04**
	3	Light brown limestone	2,060.2	2,061.3	13.2	13.0	10.0	4	Yes	2.70	6.785	5.043	135.52	211.48	26.7	97.4	0.422	123.5	26.7	99	30	70	11.1	8.05	0.94	5	75 [S]	7.4; 10.9; 14.0	A	**1.2E-04**
	4	Light brown limestone	2,061.3	2,062.0	8.4	5.7	4.0	4	Yes	2.71	7.453	5.044	148.96	236.49	24.1	99.1	0.414	123.0	24.1	92	30	70	11.4	8.58	1.01	1	86 [S]	6.8; 10.1; 14.0	A	**1.3E-04**
	5	Light brown limestone	2,066.1	2,066.9	9.6	9.00	6.0	4	Yes	2.70	6.956	5.044	138.96	213.48	27.8	95.9	0.431	122.6	27.8	99	30	70	16.6	7.62	0.99	5	85 [S]	5.9; 10.3; 14.9	A	**7.0E-05**
4	1	Light brown limestone	2,162.8	2,163.2	4.8	5.0	4.25	4	Yes	2.71	7.792	5.062	156.80	258.61	23.0	102.9	0.391	126.8	23.1	98	30	70	10.6	8.18	0.99	5	77 [S]	10.9; 14.0; 17.4	A	**1.0E-04**
	2	Light brown limestone	2,163.2	2,163.9	8.4	7.0	6.0	4	Yes	2.71	7.285	5.064	146.70	239.88	24.0	102.0	0.397	126.6	24.0	99	30	70	2.6	5.58	1.05	2	92 [S]	8.9; 12.8; 18.2	C	**1.4E-04**
	3	Light brown limestone	2,164.3	2,164.9	7.2	7.0	5.5	4	Yes	2.70	6.860	5.066	138.30	262.46	15.6	118.5	0.297	136.9	15.6	99	30	70	62.2	6.75	1.08	2	72 [S]	5.3; 10.5; 13.0	A	**8.4E-05**
	4	Light brown limestone	2,165.6	2,166.1	6.0	5.8	4.0	4	Yes	2.68	6.917	5.062	139.16	294.28	9.2	132.0	0.211	144.4	9.4	94	30	70	38.8	10.22	1.06	2	78 [S]	5.1; 9.9; 13.6	A	**3.5E-04**
	5	Light brown limestone	2,167.0	2,168.1	13.2	13.0	6.0	4	Yes	2.71	[Specimen fractured during cross-coring]																			
5	1	Light brown limestone	2,292.5	2,293.2	8.4	7.0	6.0	4	Yes	2.73	7.193	5.060	144.64	302.44	11.2	130.5	0.234	145.3	11.3	100	30	70	19.8	7.70	1.00	2	94 [S]	7.1; 11.1; 15.8	A	**7.2E-05**
	2	Light brown limestone	2,295.3	2,296.0	8.4	7.5	6.0	4	Yes	2.71	7.199	5.060	144.80	268.54	16.7	115.8	0.316	135.1	16.7	98	30	70	2.4	6.60	1.02	5	95 [S]	4.1; 9.1; 13.0	C	**4.0E-04**
	3	Light brown limestone	2,299.7	2,301.0	15.6	13.6	12.0	4	Yes	2.72	7.316	5.062	147.24	300.49	11.8	127.4	0.250	142.5	11.8	96	30	70	9.8	10.35	1.09	5	---	---	A	**2.1E-04**
	4	Light brown limestone	2,301.4	2,301.9	6.0	6.0	5.75	4	Yes	2.73	7.416	5.064	149.39	283.70	15.5	118.6	0.302	136.9	15.5	98	30	70	2.6	12.75	0.99	6	76 [S]	5.9; 9.7; 14.0	C	**3.2E-04**
	5	Light brown dolomitic limestone	2,304.1	2,304.6	6.0	4.0	3.0	4	Yes	2.77	6.986	5.069	140.97	304.74	9.7	134.9	0.220	148.1	9.7	96	30	160	80.5	35.88	1.04	6	92 [S]	5.3; 8.7; 13.8	A	**2.3E-06**
6	1	Light brown limestone	2,422.7	2,423.7	12.0	11.25	10.0	4	Yes	2.71	6.096	5.065	122.82	243.80	13.6	123.9	0.268	140.7	13.6	100	30	70	23.4	10.32	0.95	5	85 [S]	5.9; 10.3; 14.8	A	**6.9E-05**
	2	Light brown limestone	2,423.7	2,424.5	9.6	9.9	9.0	4	Yes	2.74	7.135	5.063	143.64	304.14	10.7	132.1	0.227	146.3	10.7	100	30	160	59.6	5.28	0.92	1	89 [S]	4.6; 9.5; 13.2	A	**7.4E-06**
	3	Light brown dolomitic limestone	2,424.5	2,425.2	8.4	6.25	4.5	4	Yes	2.76	7.312	5.061	147.09	326.59	8.6	138.6	0.196	150.6	8.6	98	30	160	42.3	4.68	0.97	3	95	7	A	**3.0E-06**
	4	Light brown limestone	2,426.2	2,427.0	9.6	8.5	7.0	4	Yes	2.74	7.657	5.066	154.33	323.59	11.2	130.8	0.235	145.5	11.2	100	30	160	68.7	1.61	0.93	5	91 [S]	10.0; 13.8; 17.5	A	**9.8E-06**
	5	Light brown limestone	2,427.2	2,428.3	13.2	13.0	11.0	4	Yes	2.70	6.866	5.062	138.15	255.67	15.7	115.5	0.315	135.0	16.9	99	30	70	21.6	21.75	1.05	6	----	----	A	**6.8E-05**
7	1	Light brown limestone	2,868.4	2,868.8	4.8	4.0	2.0	4	Yes	2.71	7.360	5.069	148.52	273.22	17.0	114.8	0.321	134.4	17.0	98	30	70	2.8	4.90	1.02	2	85 [S]	5.1; 10.5; 15.8	C	**7.7E-05**
	2	Light brown limestone	2,868.8	2,869.3	6.0	6.0	4.0	4	Yes	2.70	7.331	5.064	147.66	258.24	19.6	109.2	0.352	130.6	19.6	97	30	70	2.6	12.58	1.05	5	87 [S]	6.8; 11.7; 16.3	C	**3.9E-04**
	3	Light brown limestone	2,871.4	2,871.9	6.0	5.0	2.0	4	Yes	2.72	6.706	5.605	135.11	241.57	18.8	111.6	0.343	132.6	18.8	98	30	160	27.8	2.62	1.07	3	73 [S]	5.5; 9.5; 13.8	A	**5.1E-05**
	4	Light brown limestone	2,871.9	2,872.3	4.8	4.75	4.0	4	Yes	2.72	7.522	5.072	152.02	267.39	19.7	109.8	0.353	131.4	19.7	98	30	70	19.4	9.90	1.06	2	90 [S]	7.1; 11.1; 15.8	A	**4.1E-05**
	5	Light brown limestone	2,872.3	2,873.0	8.4	6.75	4.0	4	Yes	2.71	[Tested only for unconfined compressive strength]																			
8	1	Light brown limestone	2,926.1	2,926.5	4.8	4.5	3.0	4	Yes	2.72	6.870	5.068	138.60	252.31	17.5	113.6	0.331	133.7	17.6	97	30	70	10.6	10.18	1.08	6	85 [S]	11.2; 17.8; 22.9	A	**9.5E-05**
	2	Light brown limestone	2,928.2	2,928.7	6.0	4.75	4.0	4	Yes	2.71	7.486	5.084	151.95	275.88	15.7	113.3	0.330	132.7	17.1	94	30	70	2.3	6.90	0.99	1	---	---	C	**7.0E-04**
	3	Light brown limestone	2,930.6	2,931.2	7.2	7.5	4.0	4	Yes	2.71	7.412	5.066	149.36	268.73	18.4	112.1	0.337	132.9	18.4	98	30	70	10.5	7.82	1.07	5	93 [S]	6.5; 9.9; 13.8	A	**1.2E-04**
	4	Light brown limestone	2,931.8	2,932.2	4.8	4.0	3.0	4	Yes	2.71	7.401	5.069	149.36	272.47	17.5	113.9	0.327	133.9	17.5	98	30	70	2.4	6.88	0.99	5	83 [S]	6.8; 11.7; 16.3	C	**4.0E-04**
	5	Light brown limestone	2,932.8	2,933.5	8.4	6.75	6.25	4	Yes	2.71	7.694	5.085	156.25	284.80	15.9	113.8	0.327	133.1	17.0	94	30	70	2.4	6.78	1.03	1	86 [S]	6.8; 10.1; 14.0	C	**3.8E-04**

COMMENTS: (1) Horizontal permeability test specimens cross cored from the corresponding vertical permeability test specimens. (2) Deaired tap water permeant.

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

ASTM D5084 Test Methods: Method A - Constant Head; Method C - Falling Head; Rising Tailwater

Where: [S] Denotes relatively stable B-factor for consecutive increments of cell pressure.

Checked By: TM Date: 03/09/18

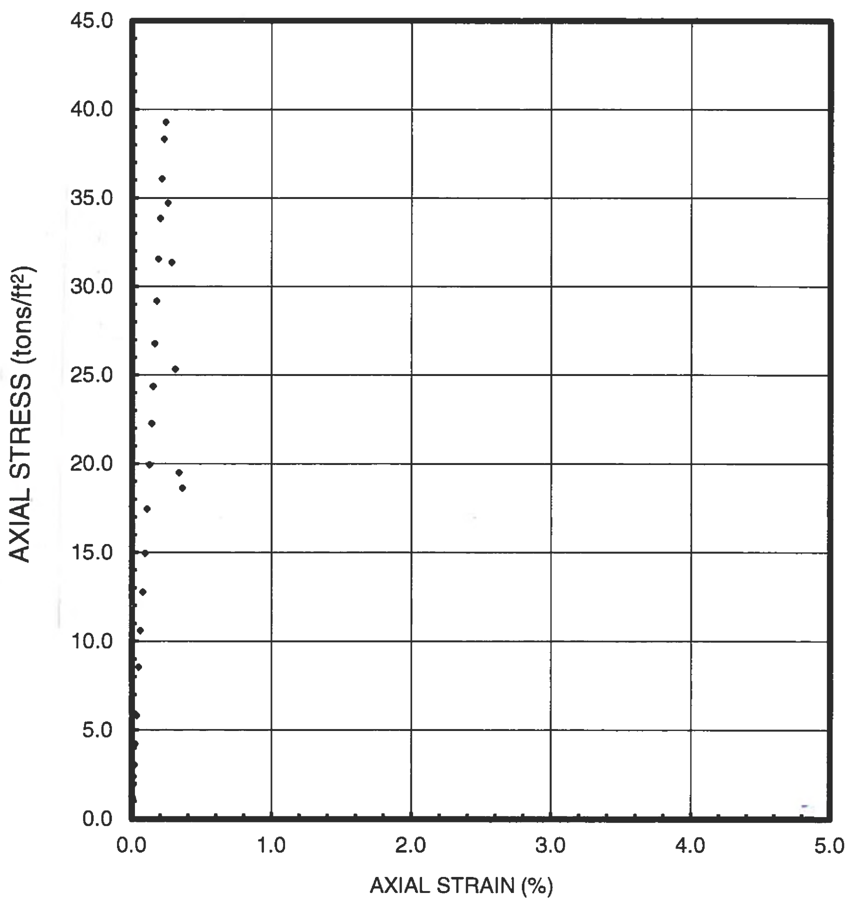
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/17/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: **IW-2** SAMPLE: Core 1/1
DEPTH: 1,731.5 – 1,732.4 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C11
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50} / σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.441	5.106	2.0	16.6	92.2	54	0.0251	0.240	1.00	0.24	**545**	2.45E05	449



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

Loading Rate: 9.1 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

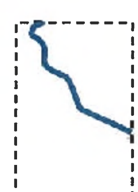
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.069"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.56%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.71 ☐ Assumed ☒ Measured

FAILURE SKETCH



Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18
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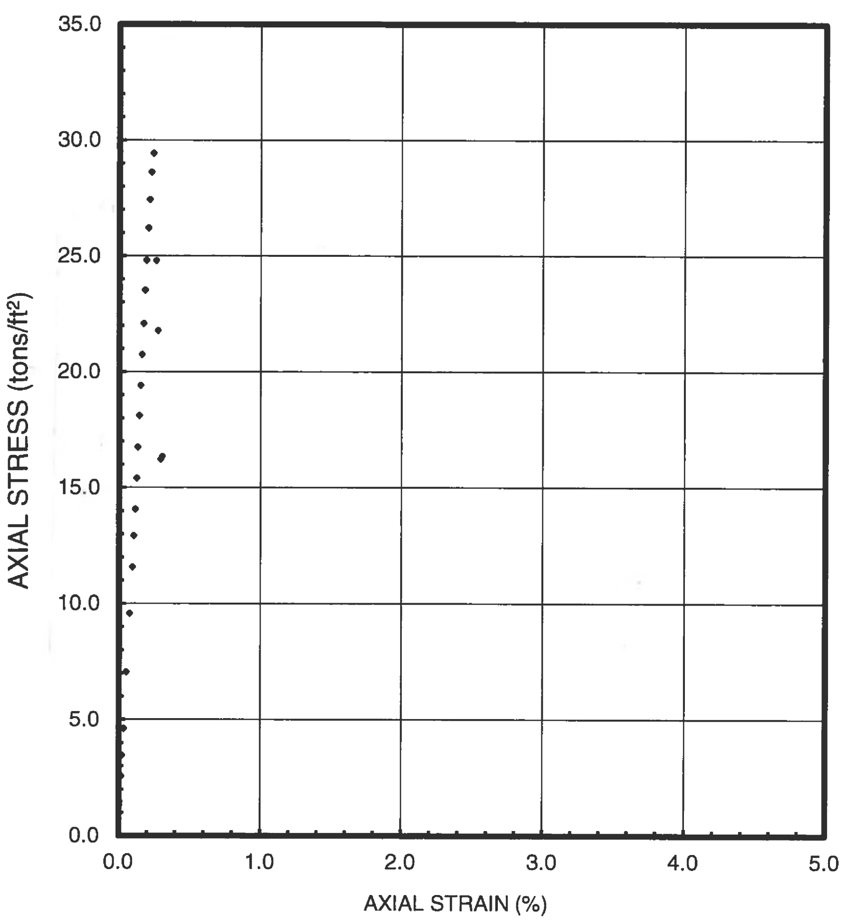
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/17/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: IW-2 SAMPLE: Core 1/2
DEPTH: 1,734.5 – 1,735.3 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C12
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50} / σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.599	5.116	2.1	17.2	85.2	48	0.0247	0.233	1.03	0.24	**409**	1.87E05	457



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments:

Loading Rate: 6.6 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0

Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.103"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.55%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.69 ☐ Assumed ☒ Measured

FAILURE SKETCH

Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TW Date: 03/09/18

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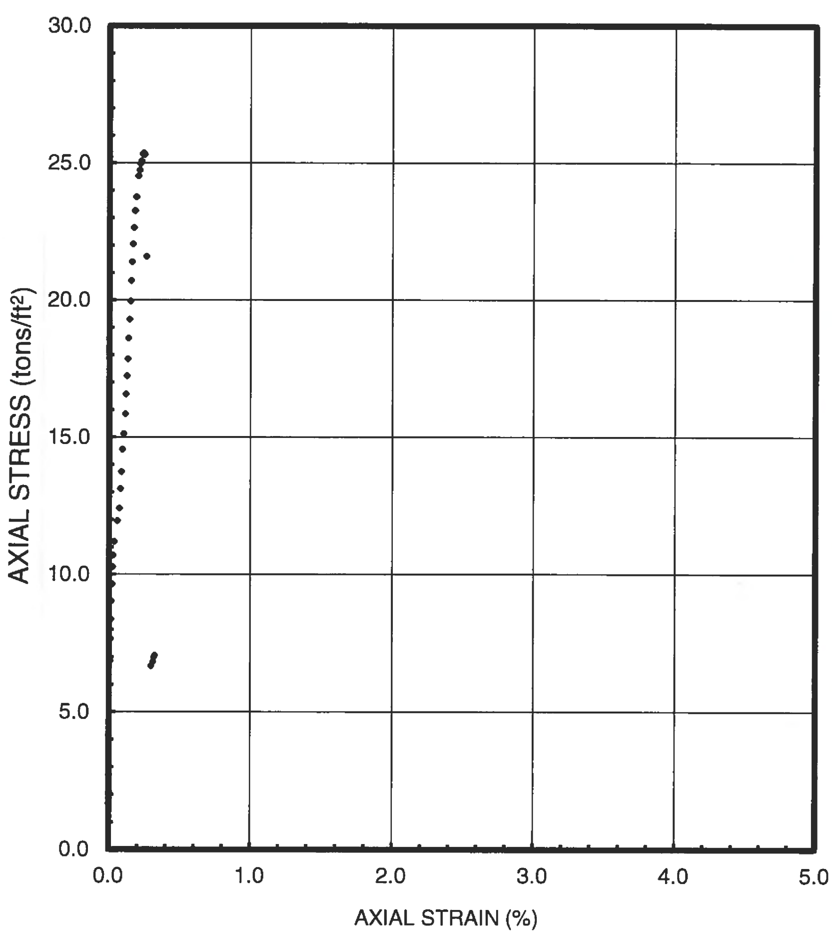
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/19/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: **IW-2** SAMPLE: Core 1/4
DEPTH: 1,739.0 - 1,740.0 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C14
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in^2)	Young's Tangent Modulus, E_{50} (lb/in^2)	Modulus Ratio [E_{50} / σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft^3)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.511	5.083	2.1	19.0	89.0	57	0.0145	0.138	1.75	0.24	**352**	9.40E04	266



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments:

Loading Rate: 3.4 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0

Specimen Sub-Cored for Testing:
☒ Yes
☐ No

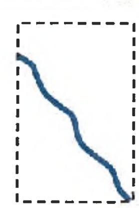
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.079"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.48%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.70 ☐ Assumed ☒ Measured

FAILURE SKETCH



Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18

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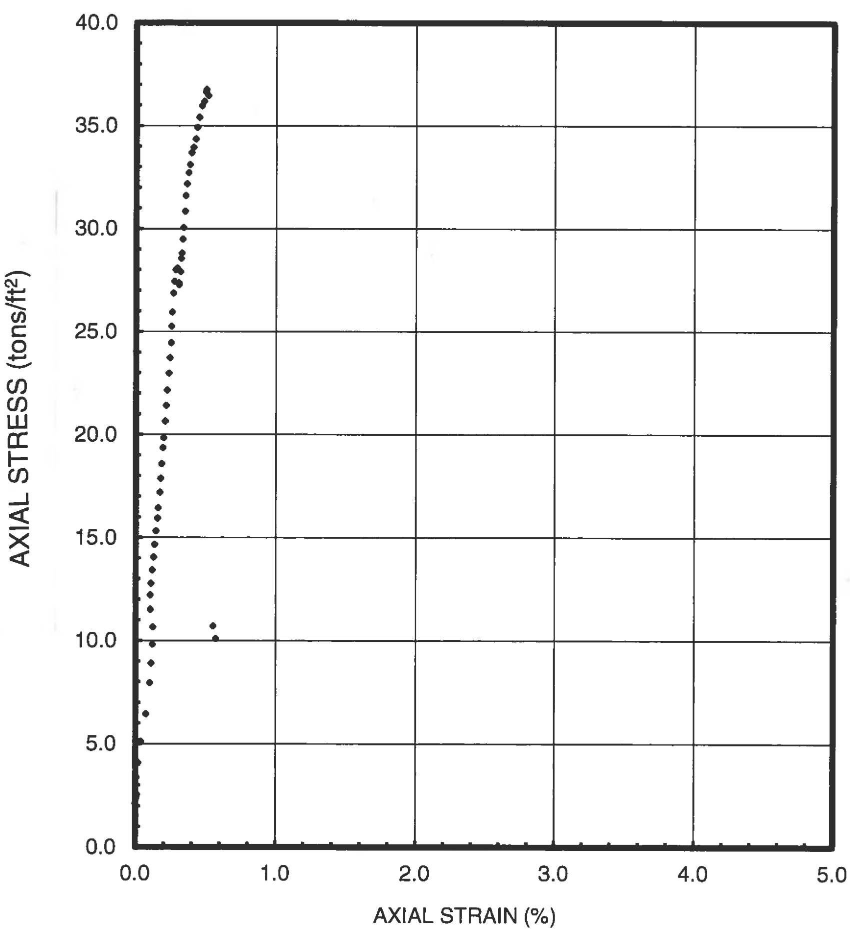
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/18/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: IW-2 SAMPLE: Core 1/5
DEPTH: 1,742.2 - 1,743.1 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C15
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in^2)	Young's Tangent Modulus, E_{50} (lb/in^2)	Modulus Ratio [E_{50} / σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft^3)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.627	5.127	2.1	16.2	92.6	53	0.0193	0.181	2.75	0.50	**511**	1.22E05	239



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

Loading Rate: 3.1 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

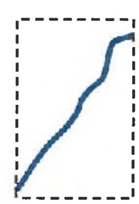
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.101"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.60%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.70 ☐ Assumed ☒ Measured

FAILURE SKETCH



Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18
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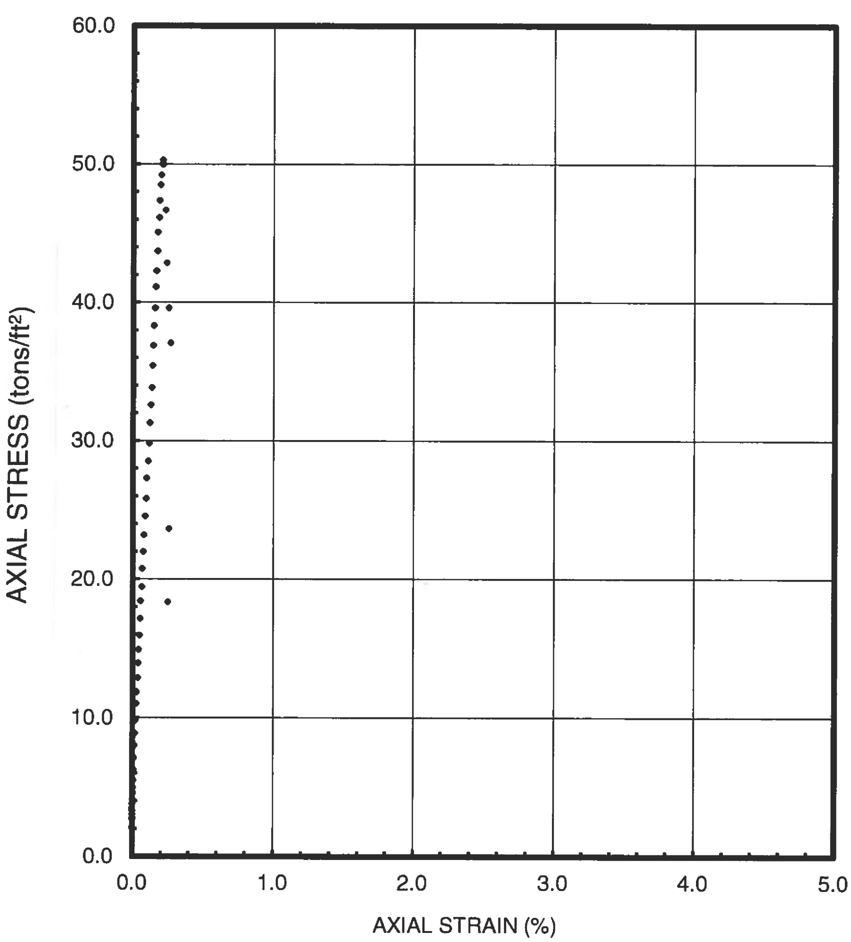
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/19/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: IW-2 SAMPLE: Core 2/1
DEPTH: 1,885.3 - 1,886.2 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C21
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50} / σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.769	5.115	2.1	14.2	95.8	51	0.0108	0.100	2.10	0.21	**699**	2.94E05	421



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None
☒ Lab-Stone

Comments:

Loading Rate: 5.5 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0

Specimen Sub-Cored for Testing:
☒ Yes
☐ No

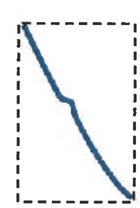
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.058"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.59%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.69 ☐ Assumed
☒ Measured

FAILURE SKETCH



The test data and all associated project information presented here on shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18

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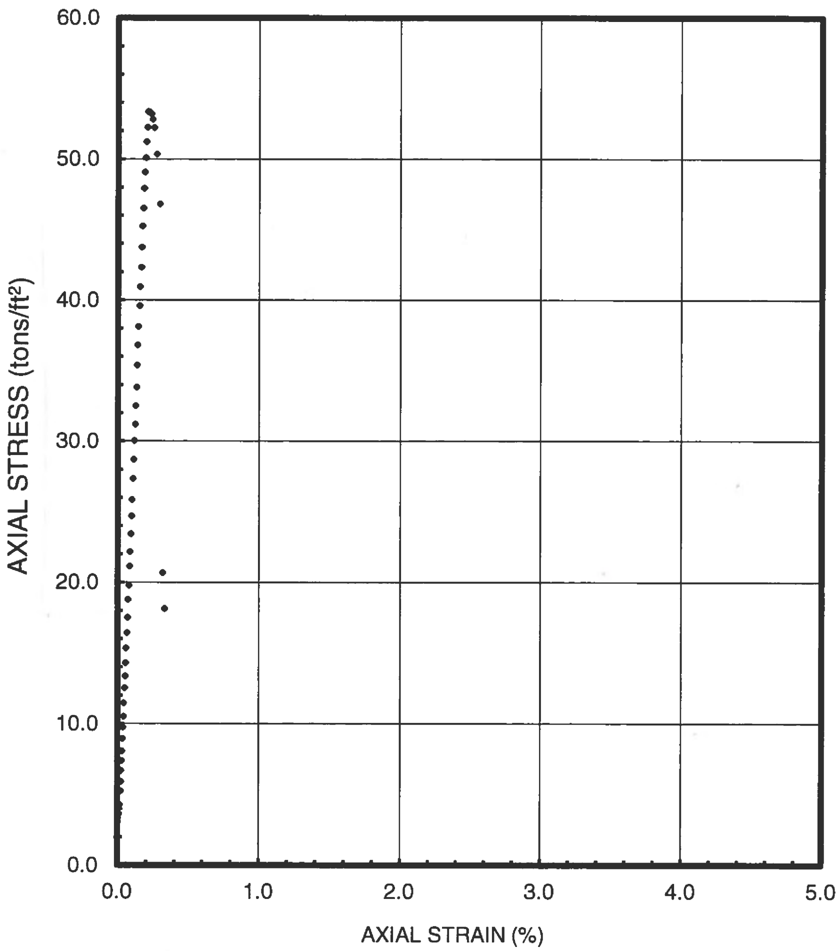
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/19/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: IW-2 SAMPLE: Core 2/2
DEPTH: 1,886.2 - 1,887.1 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C22
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.640	5.128	2.1	22.8	90.1	71	0.0093	0.088	2.40	0.21	**741**	3.60E05	485



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

Loading Rate: 5.1 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

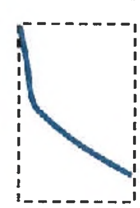
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.090"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.57%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.69 ☐ Assumed ☒ Measured

FAILURE SKETCH



Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18

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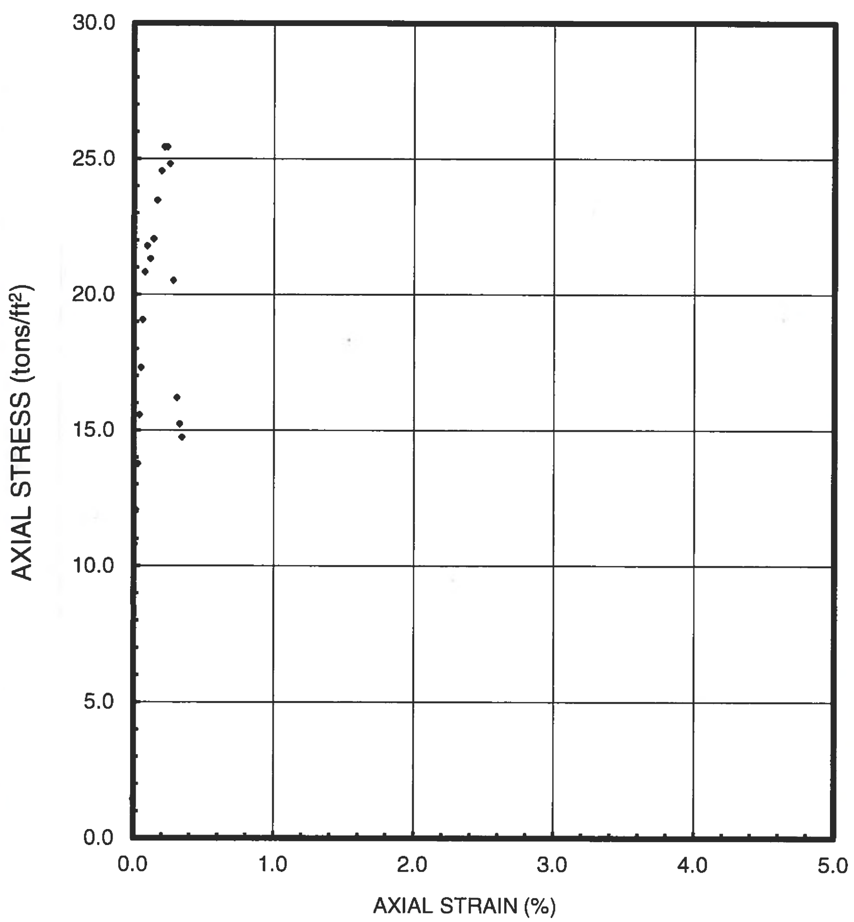
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/17/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: **IW-2** SAMPLE: Core 2/3
DEPTH: 1,889.8 - 1,890.5 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C23
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in^2)	Young's Tangent Modulus, E_{50} (lb/in^2)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft^3)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.388	5.100	2.0	15.9	109.0	78	0.0192	0.184	1.68	0.31	**353**	1.86E05	527



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

Loading Rate: 3.5 lb/in^2/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

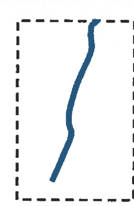
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.109"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.78%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.70 ☐ Assumed ☒ Measured

FAILURE SKETCH



The test data and all associated project information presented here on shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18
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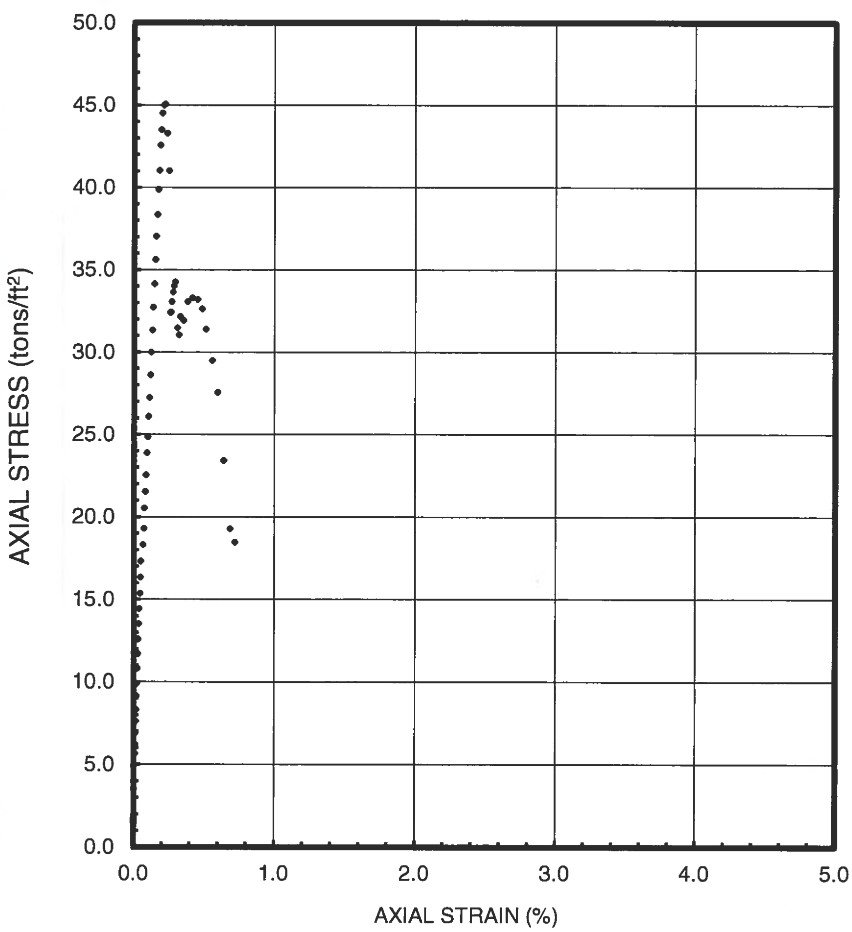
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/18/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: IW-2 SAMPLE: Core 2/4
DEPTH: 1,891.8 - 1,892.6 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C24
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.662	5.107	2.1	15.5	94.4	53	0.0102	0.096	2.30	0.22	**626**	2.82E05	450



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments:

Loading Rate: 4.5 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0

Specimen Sub-Cored for Testing:
☒ Yes
☐ No

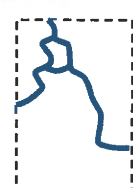
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.149"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.62%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.69 ☐ Assumed ☒ Measured

FAILURE SKETCH



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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18

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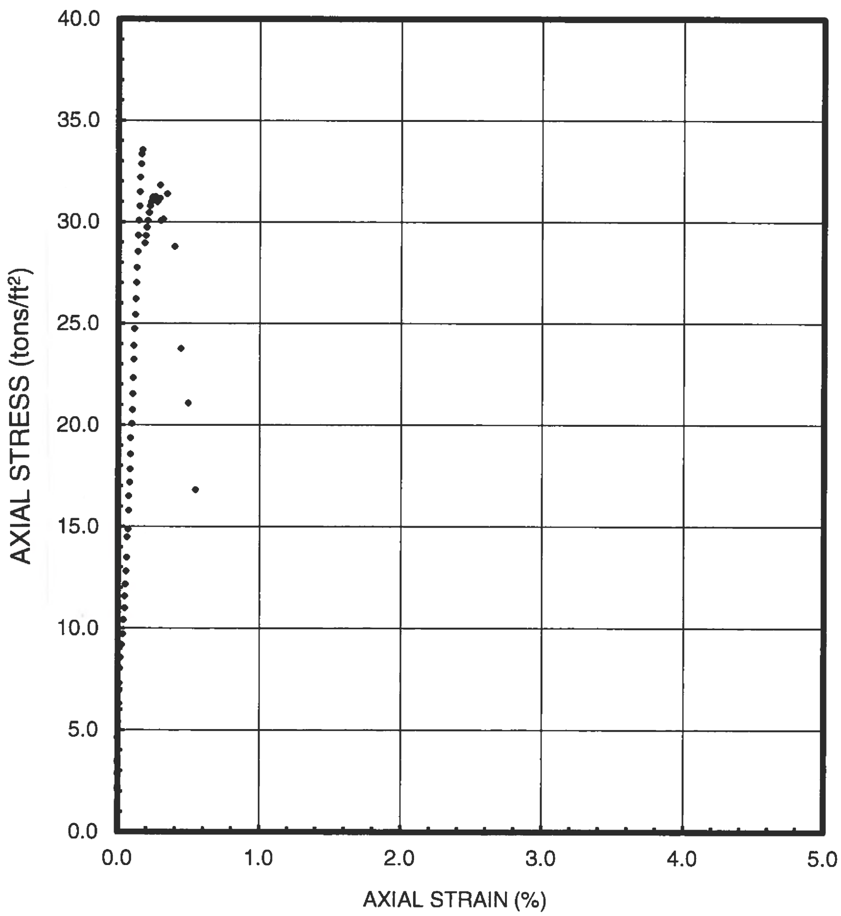
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/19/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: IW-2 SAMPLE: Core 2/5
DEPTH: 1,897.2 - 1,898.0 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C25
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50} / σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.456	5.099	2.1	20.1	91.0	64	0.0075	0.071	2.38	0.17	**466**	2.53E05	543



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

Loading Rate: 3.3 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.115"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 1.36%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.69 ☐ Assumed ☒ Measured

FAILURE SKETCH

Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18
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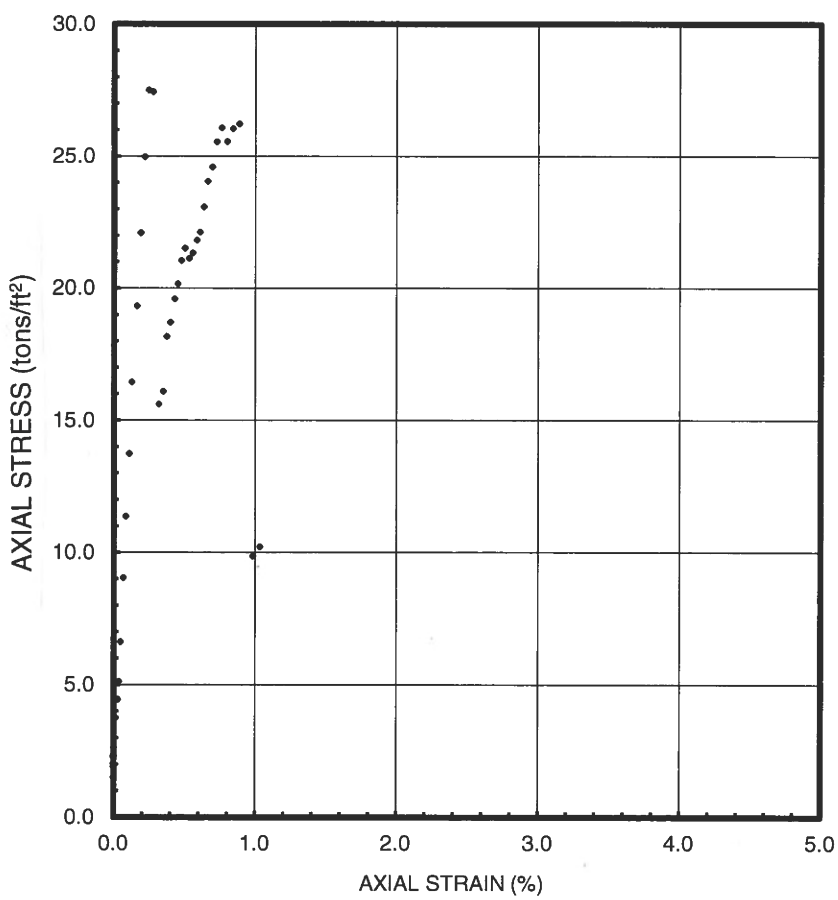
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/17/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: **IW-2** SAMPLE: Core 3/3
DEPTH: 2,060.2 - 2,061.3 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C33
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50} / σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.369	5.091	2.0	20.2	96.2	73	0.0399	0.384	0.65	0.25	**382**	1.76E05	461



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments:

Loading Rate: 9.81 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.089"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.54%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.70 ☐ Assumed ☒ Measured

FAILURE SKETCH

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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18

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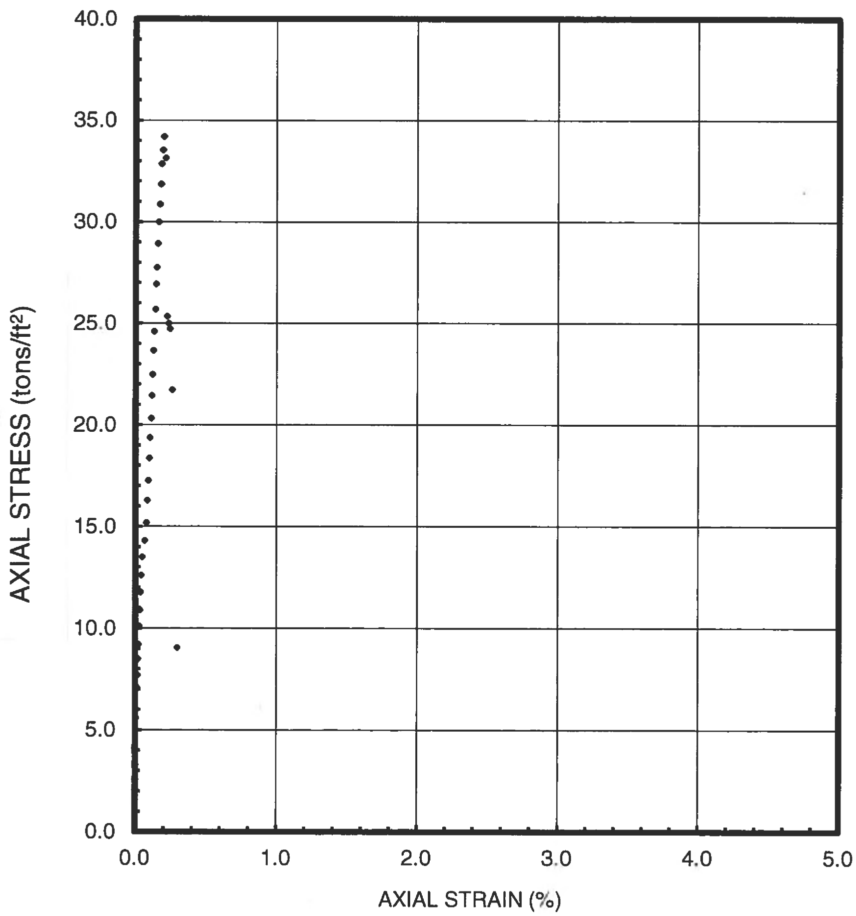
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/18/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: IW-2 SAMPLE: Core 3/3
DEPTH: 2,060.2 - 2,061.3 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C33D
SAMPLE DESCRIPTION: Light brown limestone
[Additional test specimen]

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in^2)	Young's Tangent Modulus, E_{50} (lb/in^2)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft^3)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.824	5.106	2.1	20.3	93.7	69	0.0124	0.114	1.75	0.20	**475**	1.82E05	383



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments:

Loading Rate: 4.5 lb/in^2/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0

Specimen Sub-Cored for Testing:
☒ Yes
☐ No

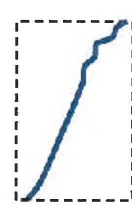
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.090"

Specimen Side Parallelism (Procedure P2)
☒ Satisfies Criterion of ≤ 0.43%
☐ Does Not Satisfy Criterion:

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.70 ☐ Assumed ☒ Measured

FAILURE SKETCH



Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18

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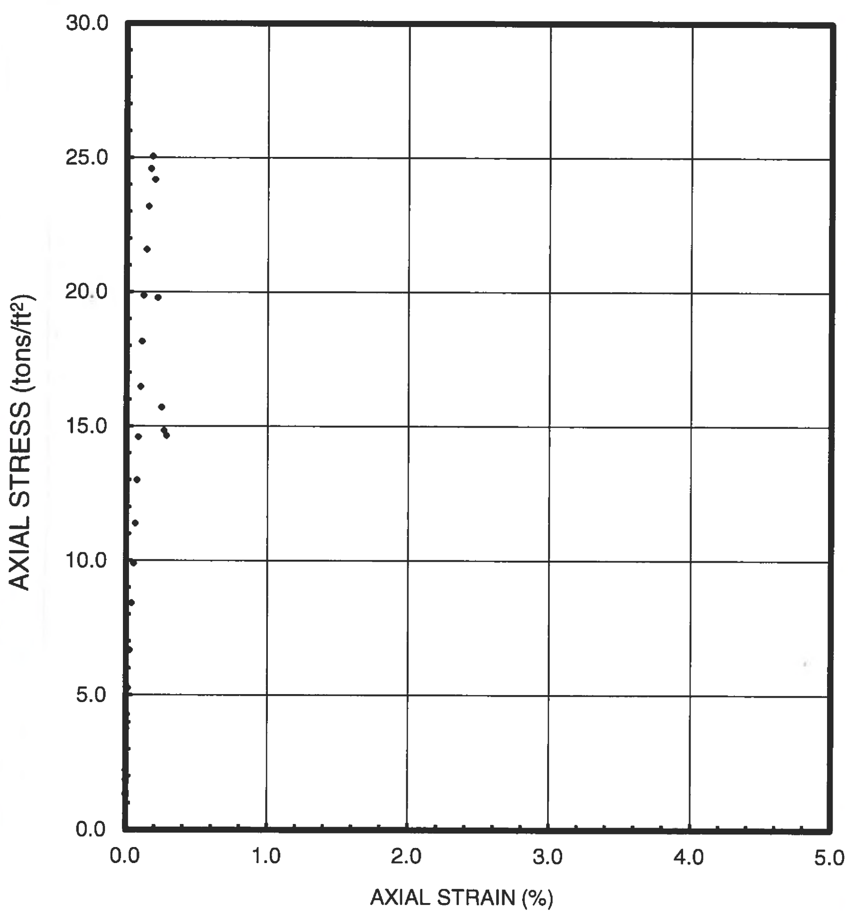
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/17/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: **IW-2** SAMPLE: Core 3/5
DEPTH: 2,066.1 – 2,066.9 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C35
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50} / σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.420	5.099	2.0	25.8	89.4	79	0.0152	0.146	1.23	0.18	**348**	1.90E05	546



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

Loading Rate: 4.7 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.150"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.63%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.70 ☐ Assumed ☒ Measured

FAILURE SKETCH

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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18

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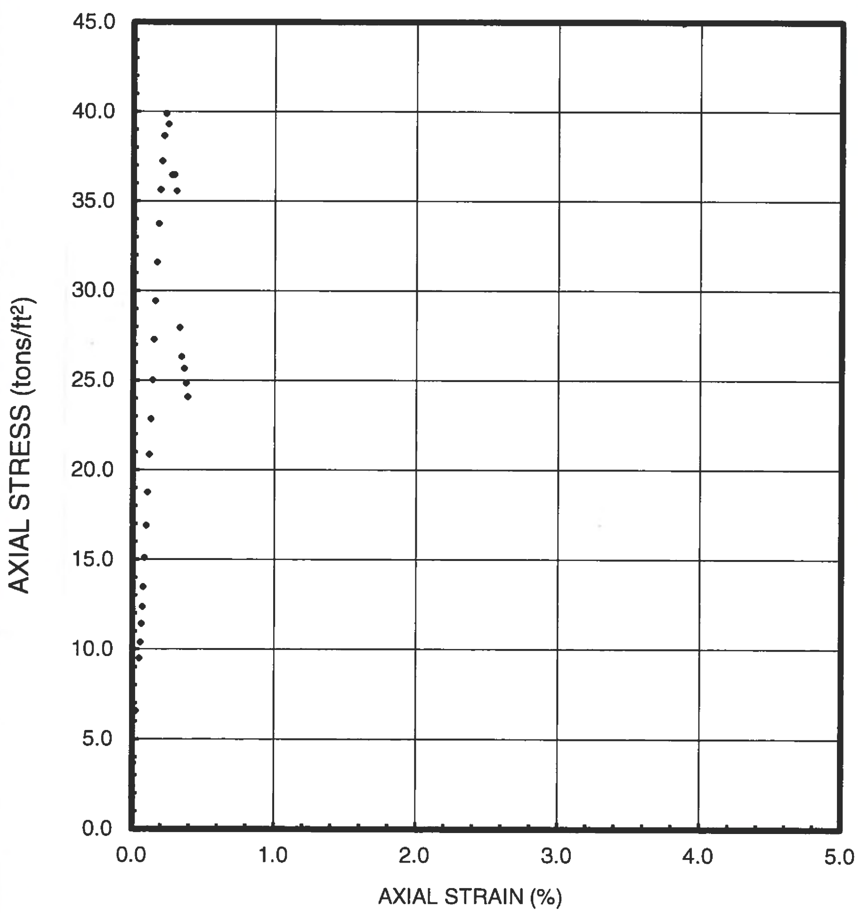
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/18/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: IW-2 SAMPLE: Core 4/5
DEPTH: 2,167.0 - 2,168.1 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C45
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in^2)	Young's Tangent Modulus, E_{50} (lb/in^2)	Modulus Ratio [E_{50} / σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft^3)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.792	5.132	2.1	16.8	104.1	73	0.0219	0.203	1.13	0.23	**554**	2.56E05	462



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments: Bottom of specimen was patched with lab-stone.

Loading Rate: 8.2 lb/in^2/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0

Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.054"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.73%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.71 ☐ Assumed ☒ Measured

FAILURE SKETCH

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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18

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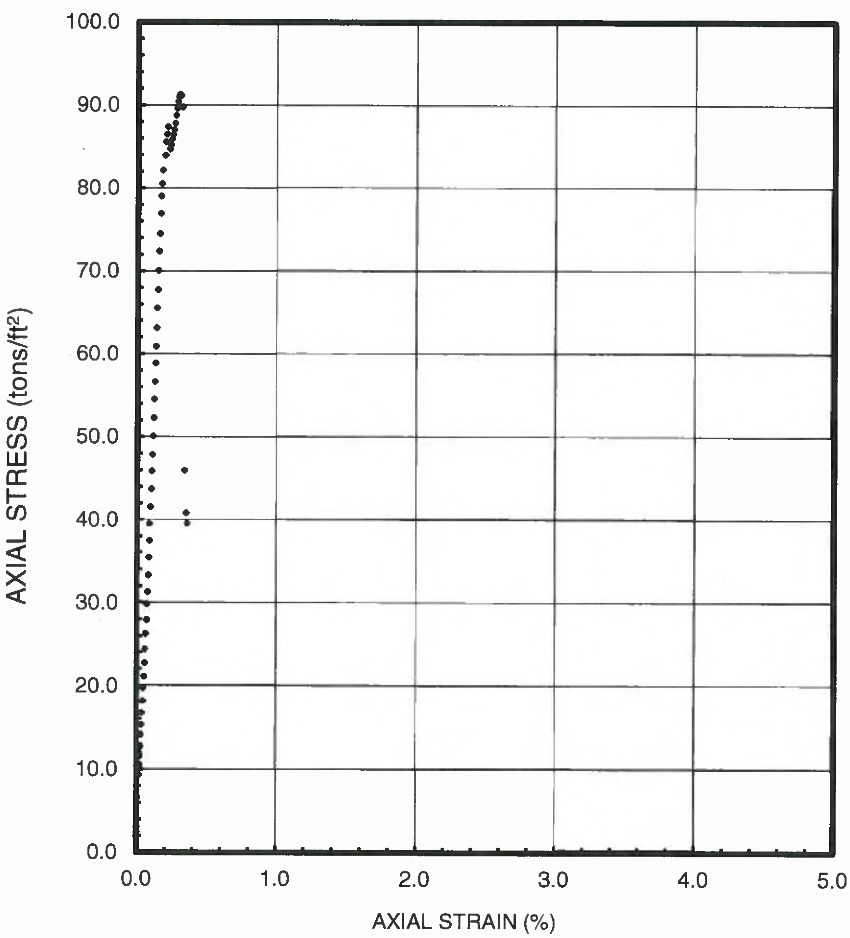
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/18/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: **IW-2** SAMPLE: Core 5/3
DEPTH: 2,299.7 - 2,301.8 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C53
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.495	5.120	2.0	10.2	116.6	61	0.0106	0.101	2.98	0.30	**1,268**	7.16E05	565



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

Loading Rate: 7.1 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

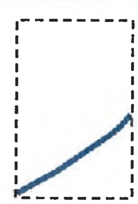
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.063"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.80%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.72 ☐ Assumed ☒ Measured

FAILURE SKETCH



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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18
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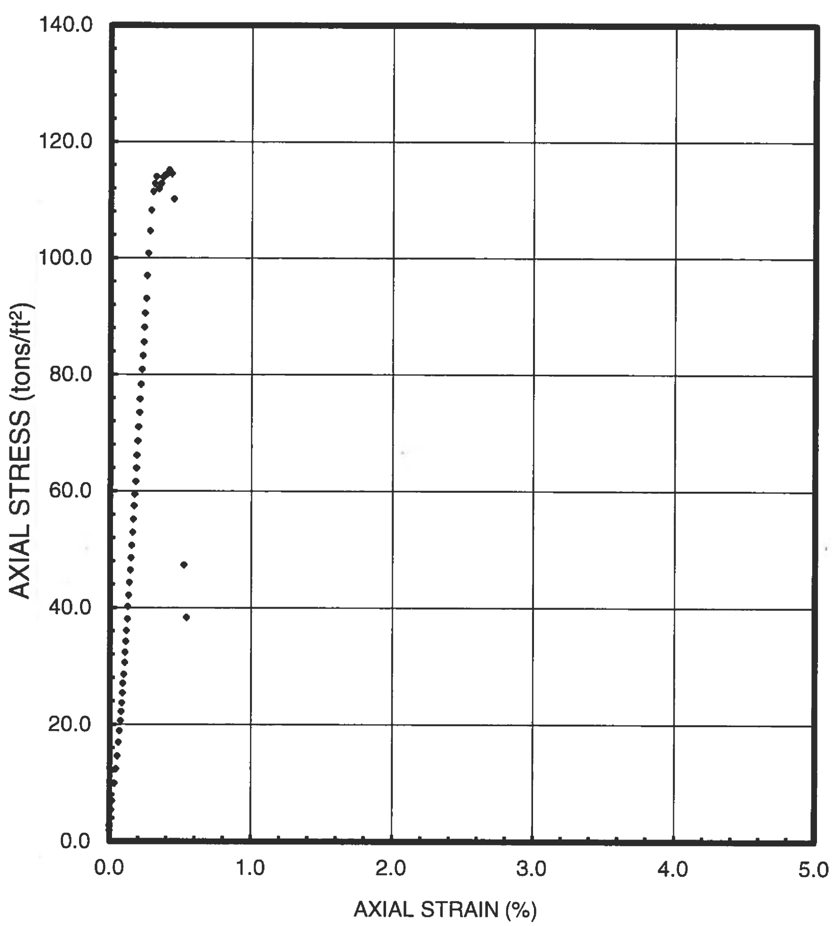
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/18/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: IW-2 SAMPLE: Core 6/1
DEPTH: 2,422.7 - 2,423.7 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C61
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50} / σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.594	5.116	2.1	11.7	117.8	73	0.0157	0.148	2.80	0.42	**1,599**	6.03E05	377



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

Loading Rate: 9.5 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.110"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.55%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.71 ☐ Assumed ☒ Measured

FAILURE SKETCH

Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50% of unconfined compressive strength unless indicated otherwise.

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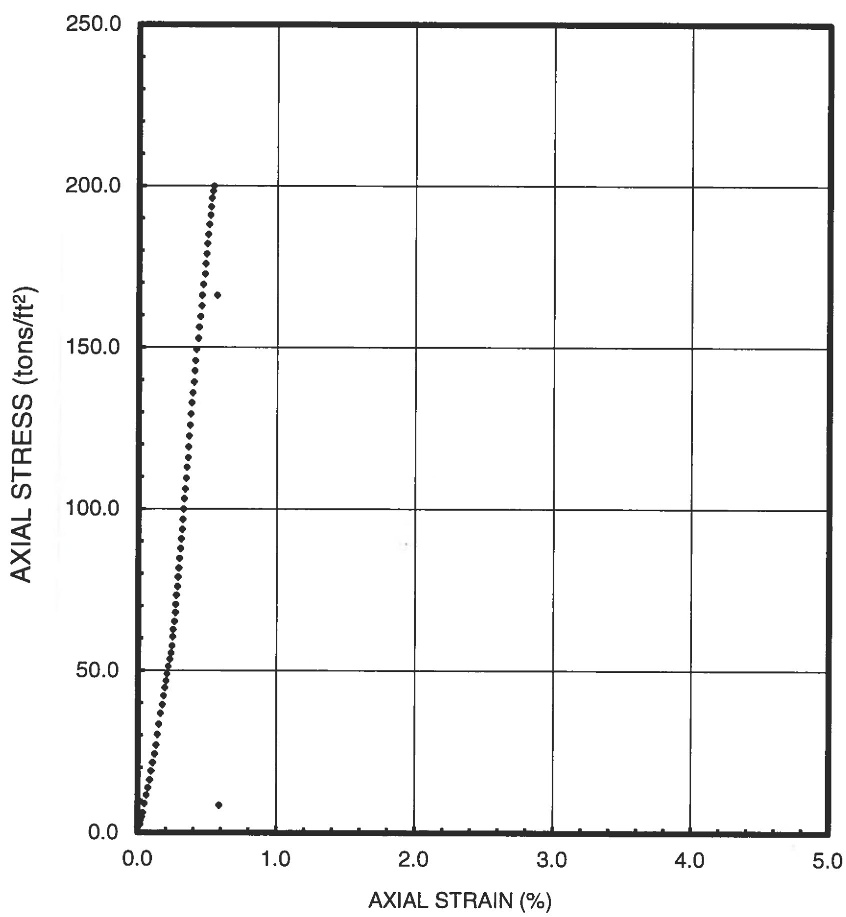
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/17/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: IW-2 SAMPLE: Core 6/2
DEPTH: 2,423.7 - 2,424.5 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C62
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50} / σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.327	5.103	2.0	10.1	124.0	73	0.0159	0.154	3.50	0.54	**2,777**	7.88E05	284



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

Loading Rate: 13.2 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

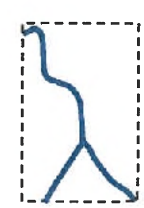
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.078"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.59%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.74 ☐ Assumed ☒ Measured

FAILURE SKETCH



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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

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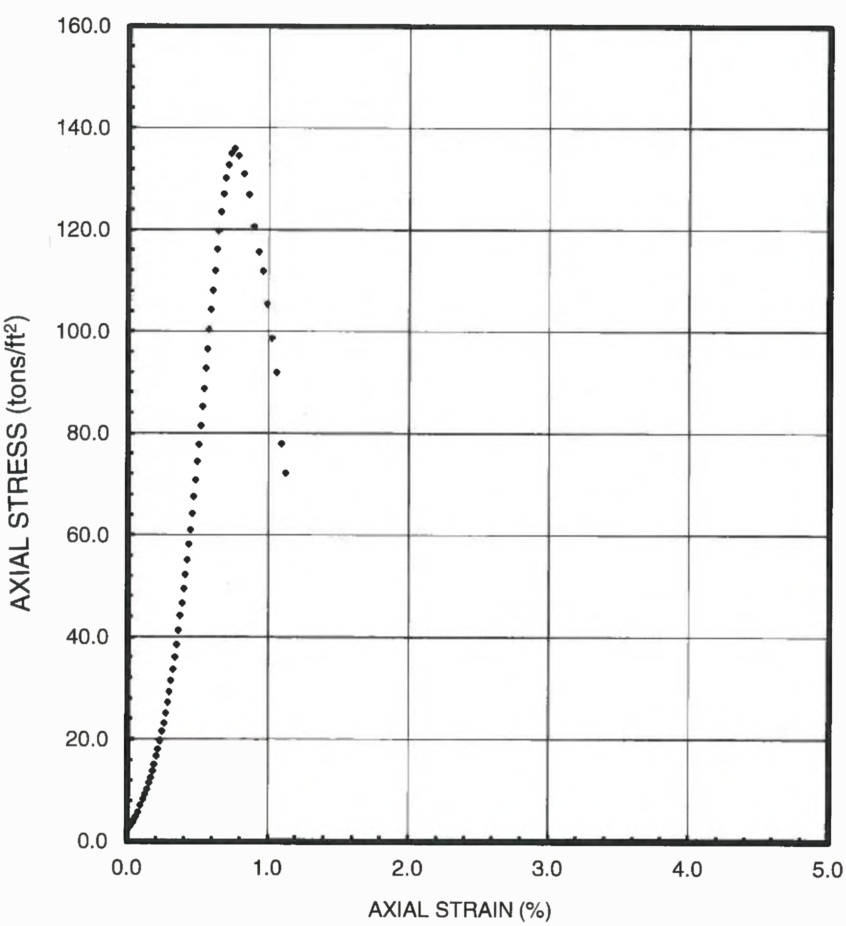
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/30/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: IW-2 SAMPLE: Core 6/4
DEPTH: 2,426.2 - 2,427.0 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C64
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50}/ σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
6.734	5.086	1.3	5.7	130.7	50	0.0187	0.278	2.70	0.75	**1,889**	3.82E05	202



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments: Specimen fractured during coring. Tested shorter length soecimen with H/D=1.3

Loading Rate: 11.7 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0

Specimen Sub-Cored for Testing:
- ☒ Yes
- ☐ No

Specimen Side Straightness (Procedure S1)
- ☐ Satisfies Criterion of ≤ 0.020 inches
- ☒ Does Not Satisfy Criterion: 0.067"

Specimen Side Parallelism (Procedure P2)
- ☐ Satisfies Criterion of ≤ 0.43%
- ☒ Does Not Satisfy Criterion: 0.49%

Specimen End Flatness (Procedure FP2)
- ☒ Specimen Capped – Not Applicable
- ☐ Satisfies Criterion of ≤ 0.001 inches
- ☐ Does Not Satisfy Criterion

G_s: 2.74 ☐ Assumed ☒ Measured

FAILURE SKETCH

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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

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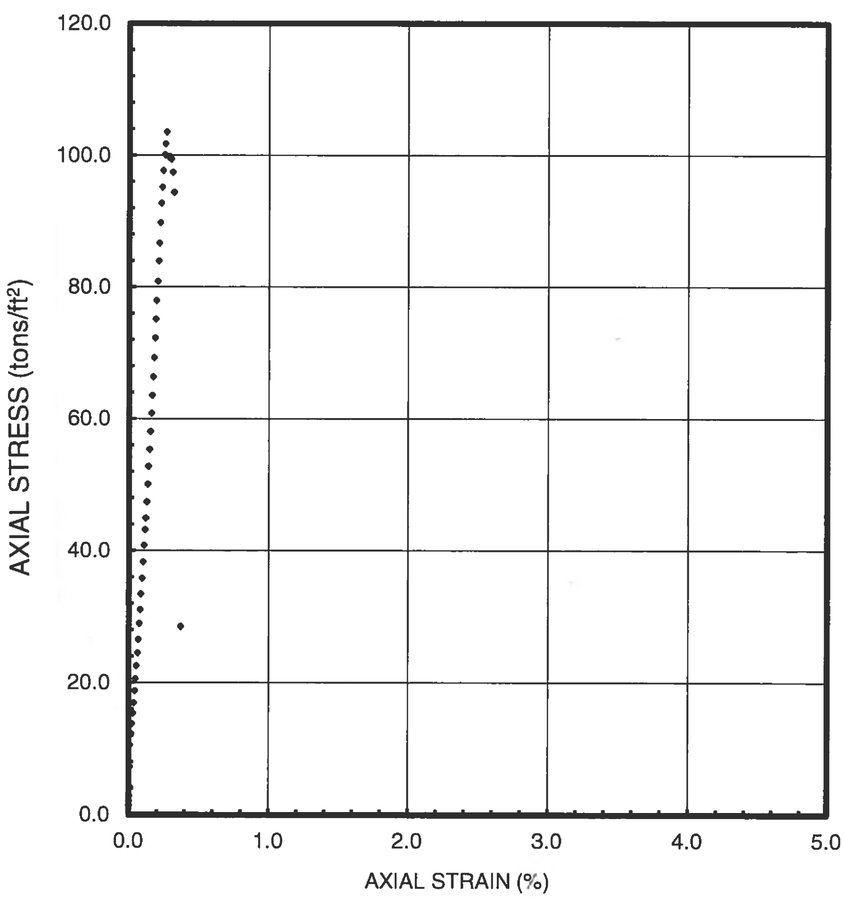
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/17/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: **IW-2** SAMPLE: Core 6/5
DEPTH: 2,427.2 - 2,428.3 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C65
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in²)	Young's Tangent Modulus, E_{50} (lb/in²)	Modulus Ratio [E_{50} / σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft³)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.755	5.104	2.1	12.7	111.8	68	0.0126	0.117	2.30	0.27	**1,438**	5.59E05	389



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

Loading Rate: 12.6 lb/in²/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

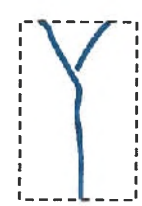
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.079"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.57%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.70 ☐ Assumed ☒ Measured

FAILURE SKETCH



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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18
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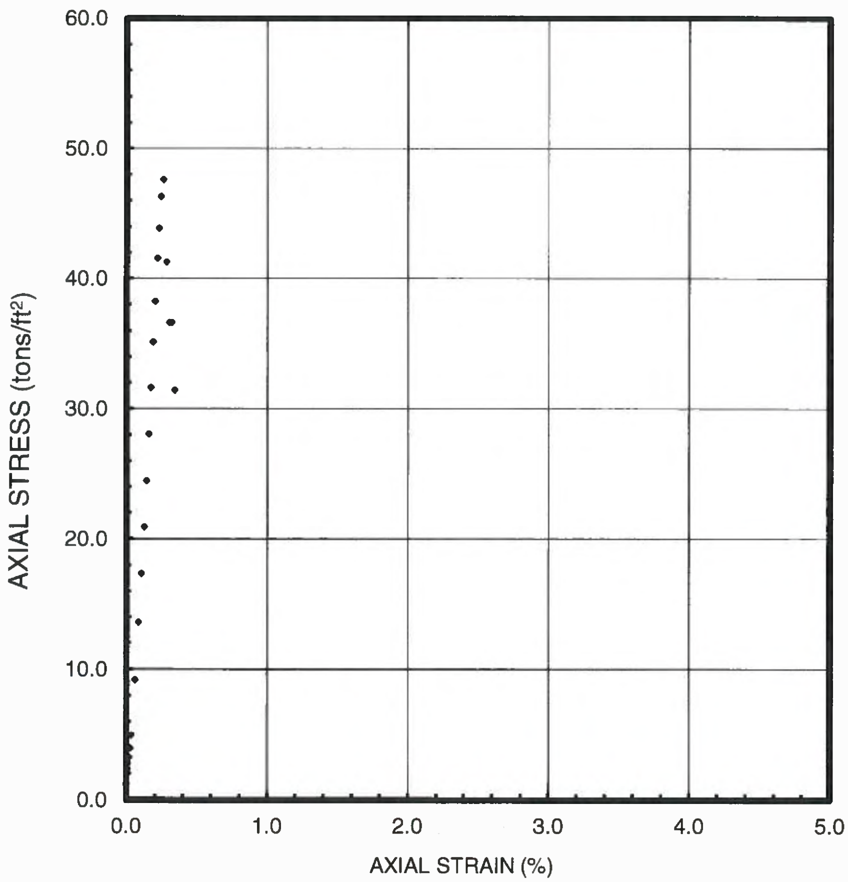
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/17/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: **IW-2** SAMPLE: Core 7R/5
DEPTH: 2,872.3 - 2,873.0 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C7R5
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in^2)	Young's Tangent Modulus, E_{50} (lb/in^2)	Modulus Ratio [E_{50} / σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft^3)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.937	5.087	2.1	17.3	108.3	83	0.0316	0.289	0.90	0.26	**662**	3.00E05	453



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation

Air Temperature (°C): 21.0

Capping Material: ☐ None ☒ Lab-Stone

Comments: Specimen failed along existing fracture plane.

Loading Rate: 12.2 lb/in^2/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

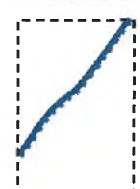
Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.134"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.70%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.71 ☐ Assumed ☒ Measured

FAILURE SKETCH



Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18

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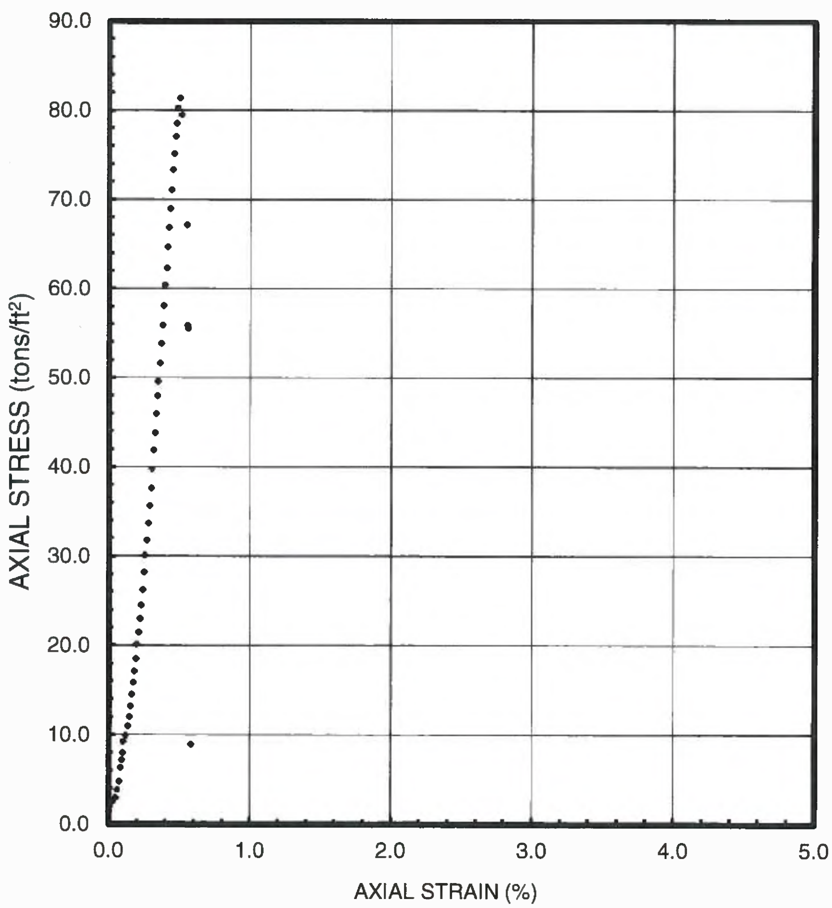
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
PROJECT: Seminole Tribe – Hollywood Reservation
FILE NO.: 17-13-0137

DATE SAMPLE RECEIVED: 11/02/17
DATE TEST SET-UP: 01/17/18
DATE REPORTED: 03/09/18

INCOMING SAMPLE NO.: ---
BORING: **IW-2** SAMPLE: Core 8/3
DEPTH: 2,930.6 – 2,931.2 ☒ feet; ☐ meters
LABORATORY IDENTIFICATION NO.: 170137/IW2C83
SAMPLE DESCRIPTION: Light brown limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Strain at Failure (%)	Unconfined Compressive Strength, σ_a(ult) (lb/in^2)	Young's Tangent Modulus, E_{50} (lb/in^2)	Modulus Ratio [E_{50} / σ_a(ult)]
H (cm)	D (cm)	H/D	w_c (%)	γ_d (lb/ft^3)	S (%)	$\dot{\varepsilon}$ (cm/minute)	$\dot{\varepsilon}$ (%/minute)					
10.758	5.123	2.1	15.2	108.8	74	0.0220	0.204	2.45	0.50	**1,131**	2.89E05	256



TEST PROCEDURES

ASTM Standard D7012 [Method C] and D4543 for specimen preparation
Air Temperature (°C): 21.0
Capping Material: ☐ None ☒ Lab-Stone
Comments:

Loading Rate: 7.7 lb/in^2/sec

SPECIMEN PREPARATION

Original Core Diameter (inch): 4.0
Specimen Sub-Cored for Testing:
☒ Yes
☐ No

Specimen Side Straightness (Procedure S1)
☐ Satisfies Criterion of ≤ 0.020 inches
☒ Does Not Satisfy Criterion: 0.035"

Specimen Side Parallelism (Procedure P2)
☐ Satisfies Criterion of ≤ 0.43%
☒ Does Not Satisfy Criterion: 0.71%

Specimen End Flatness (Procedure FP2)
☒ Specimen Capped – Not Applicable
☐ Satisfies Criterion of ≤ 0.001 inches
☐ Does Not Satisfy Criterion

G_s: 2.71 ☐ Assumed ☒ Measured

FAILURE SKETCH

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Where: H = Specimen height; D = Specimen diameter; w_c = Water content (ASTM D2216); γ_d = Dry density; S = Saturation; $\dot{\varepsilon}$ = Vertical displacement rate; G_s = Specific gravity; and E_{50} = Young's tangent modulus at 50%of unconfined compressive strength unless indicated otherwise.

Checked By: TM Date: 03/09/18
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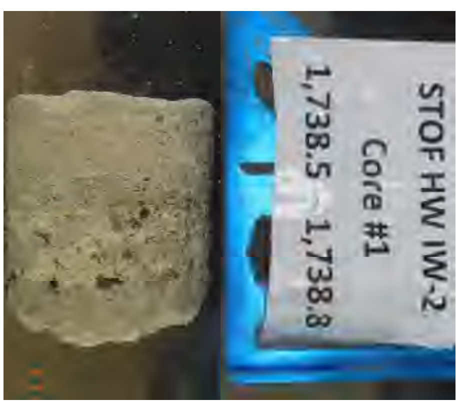
Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

AS-RECEIVED CORE 1 SAMPLE 1
1,731.5' - 1,732.4'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

AS-RECEIVED CORE 1 SAMPLE 2
1,734.5' - 1,735.3'

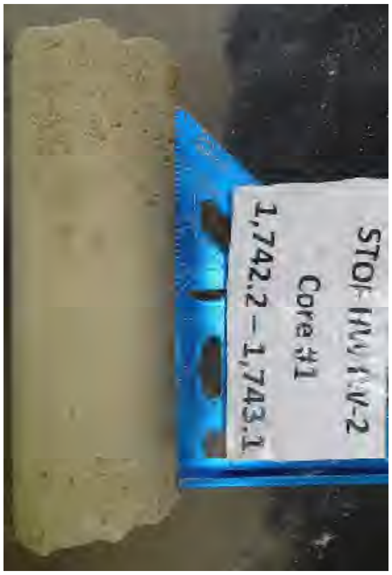
Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137



AS-RECEIVED CORE 1 SAMPLE 3
1,738.5' - 1,738.8'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

AS-RECEIVED CORE 1 SAMPLE 4
1,739.0' - 1,740.0'



AS-RECEIVED CORE 1 SAMPLE 5
1,742.2' - 1,743.1'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

AS-RECEIVED CORE 2 SAMPLE 1
1,885.3' - 1,886.2'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

AS-RECEIVED CORE 2 SAMPLE 2
1,886.2' - 1,887.1'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

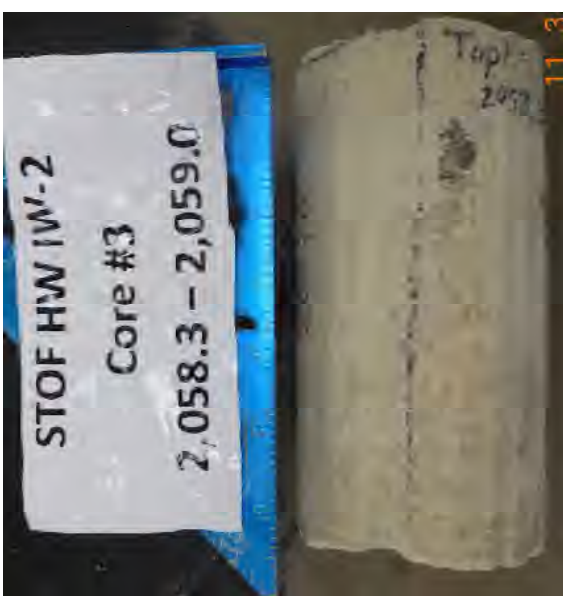
AS-RECEIVED CORE 2 SAMPLE 3
1,889.8' - 1,890.5'

AS-RECEIVED CORE 2 SAMPLE 4
1,891.8' - 1,892.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

AS-RECEIVED CORE 2 SAMPLE 5
1,897.2' - 1,898.0'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137



AS-RECEIVED CORE 3 SAMPLE 1
2,058.3' – 2,059.0'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

AS-RECEIVED CORE 3 SAMPLE 2
2,059.5' – 2,060.2'

AS-RECEIVED CORE 3 SAMPLE 3
2,060.2' – 2,061.3'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

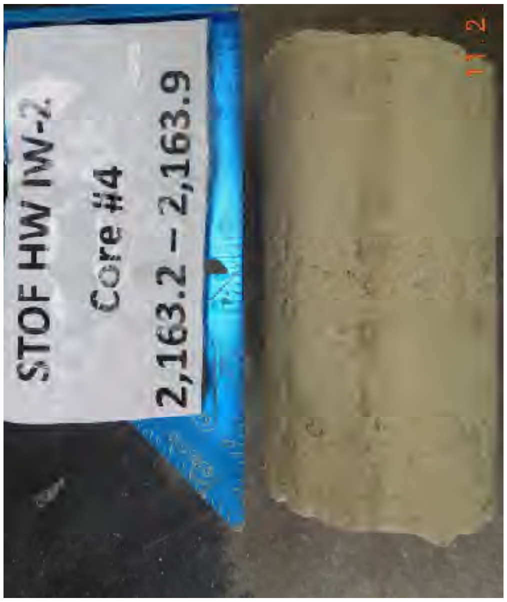
AS-RECEIVED CORE 3 SAMPLE 4
2,061.3' – 2,062.0'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

AS-RECEIVED CORE 3 SAMPLE 5
2,066.1' – 2,066.9'

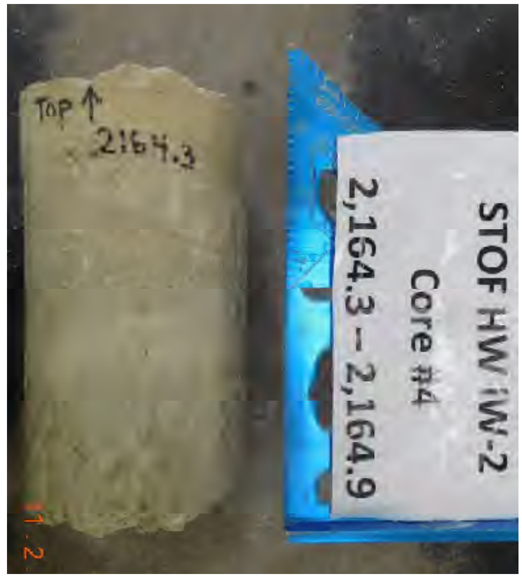
Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

AS-RECEIVED CORE 4 SAMPLE 1
2,162.8' – 2,163.2'



AS-RECEIVED CORE 4 SAMPLE 2
2,163.2' – 2,163.9'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

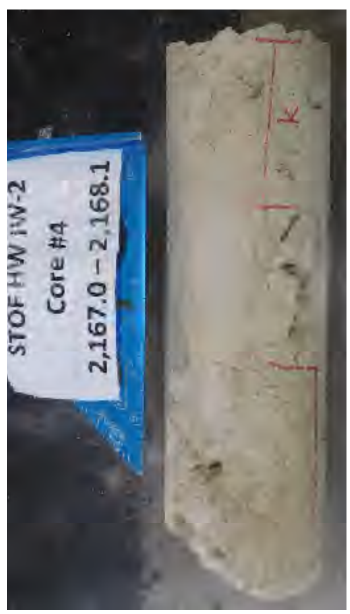


AS-RECEIVED CORE 4 SAMPLE 3
2,164.3' – 2,164.9'

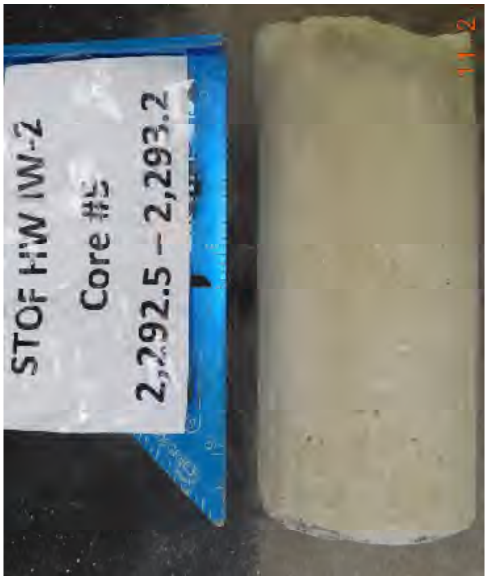
Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

AS-RECEIVED CORE 4 SAMPLE 4
2,165.6' – 2,166.1'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

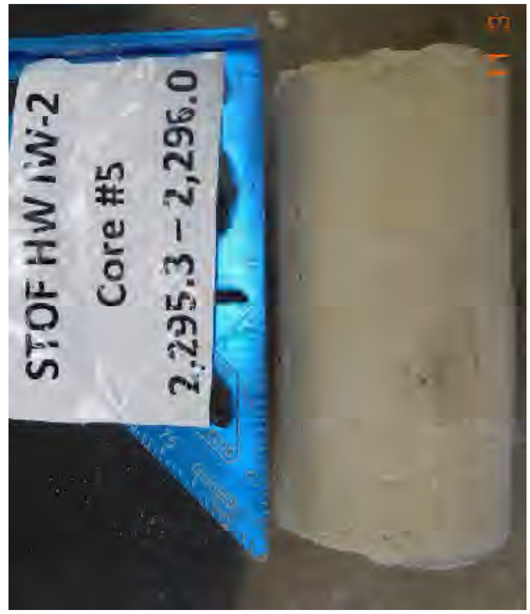


AS-RECEIVED CORE 4 SAMPLE 5
2,167.0' – 2,168.1'



AS-RECEIVED CORE 5 SAMPLE 1
2,292.5' – 2,293.2'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

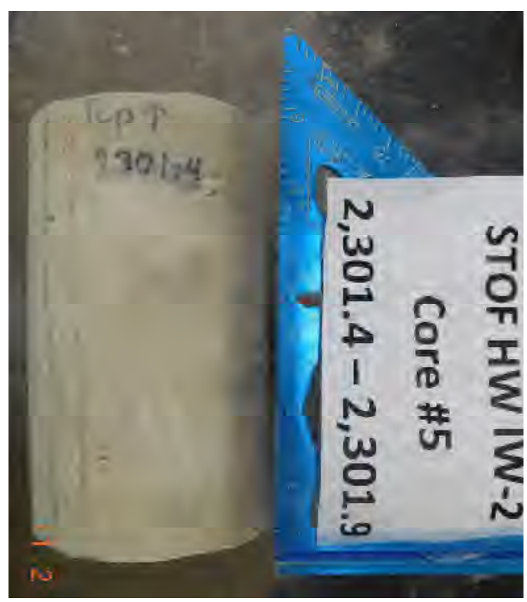


AS-RECEIVED CORE 5 SAMPLE 2
2,295.3' – 2,296.0'

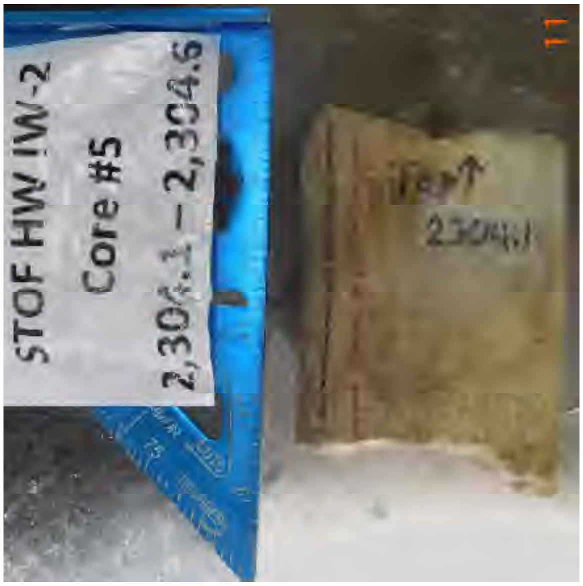
Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

AS-RECEIVED CORE 5 SAMPLE 3
2,299.7' – 2,301.0'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137



AS-RECEIVED CORE 5 SAMPLE 4
2,301.4' – 2,301.9'



AS-RECEIVED CORE 5 SAMPLE 5
2,304.1' – 2,304.6'

AS-RECEIVED CORE 6 SAMPLE 1
2,422.7' – 2,423.7'

AS-RECEIVED CORE 6 SAMPLE 2
2,423.7' – 2,424.5'

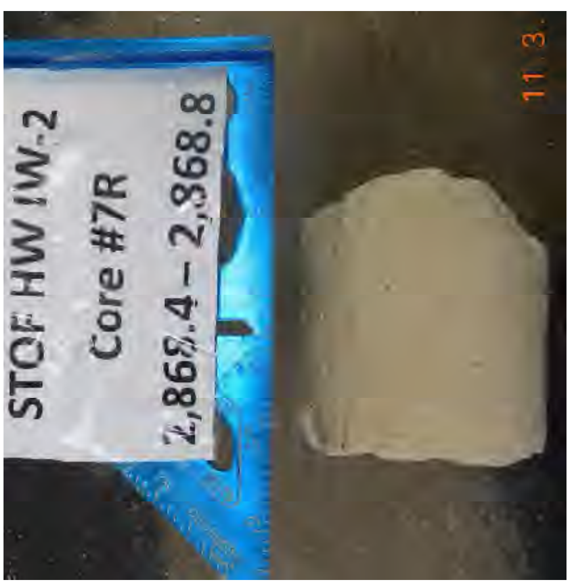
AS-RECEIVED CORE 6 SAMPLE 3
2,424.5' – 2,425.2'

AS-RECEIVED CORE 6 SAMPLE 4
2,426.2' – 2,427.0'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

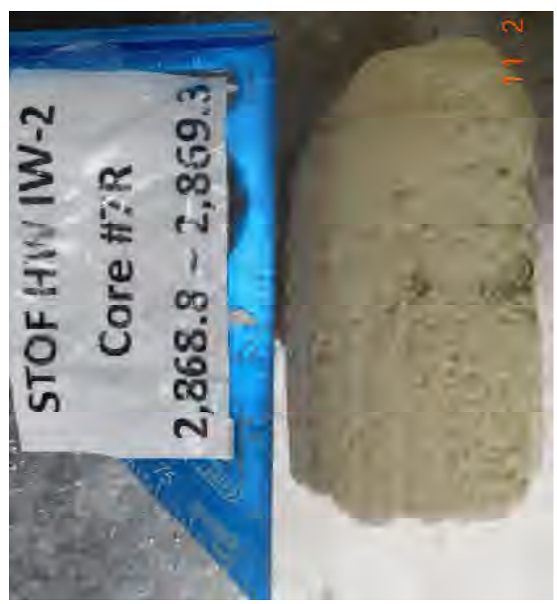
AS-RECEIVED CORE 6 SAMPLE 5
2,427.2' – 2,428.3'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137



AS-RECEIVED CORE 7R SAMPLE 1
2,868.4' – 2,868.8'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137



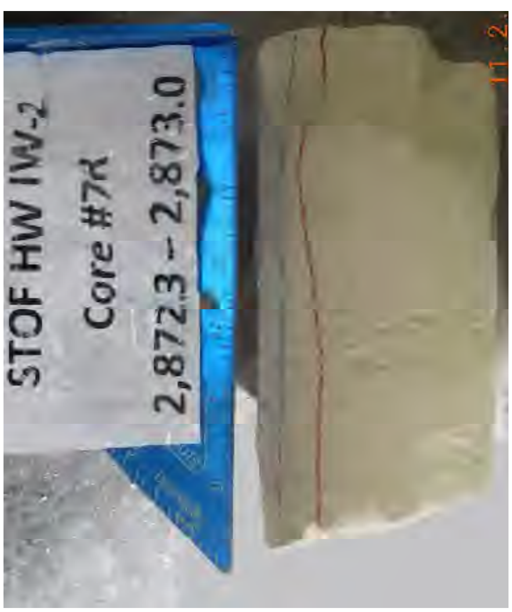
AS-RECEIVED CORE 7R SAMPLE 2
2,868.8' – 2,869.3'

AS-RECEIVED CORE 7R SAMPLE 3
2,871.4' – 2,871.9'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

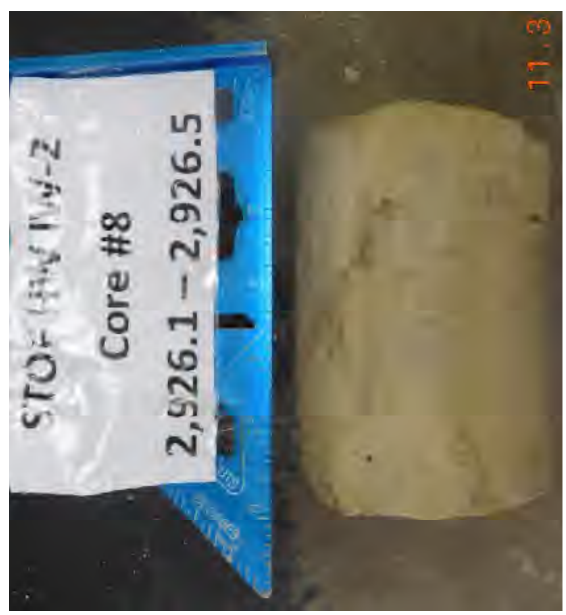
AS-RECEIVED CORE 7R SAMPLE 4
2,871.9' – 2,872.3'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

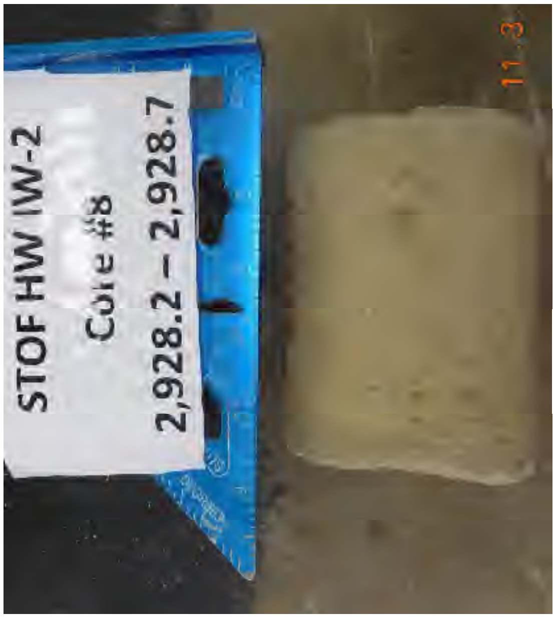


AS-RECEIVED CORE 7R SAMPLE 5
2,872.3' – 2,873.0'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

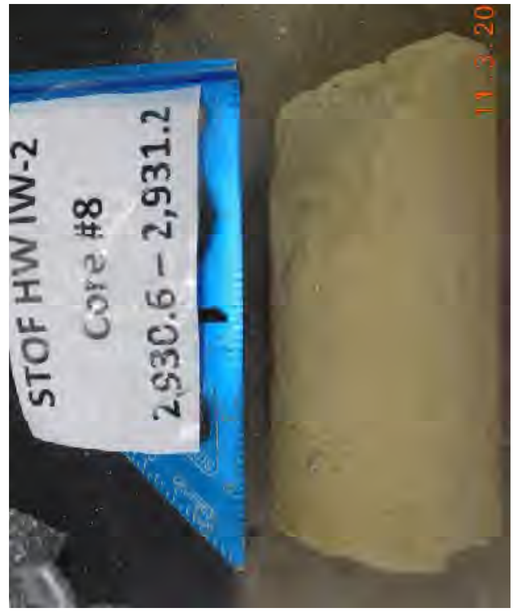


AS-RECEIVED CORE 8 SAMPLE 1
2,926.1' – 2,926.5'



AS-RECEIVED CORE 8 SAMPLE 2
2,928.2' – 2,928.7'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137



AS-RECEIVED CORE 8 SAMPLE 3
2,930.6' – 2,931.2'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

AS-RECEIVED CORE 8 SAMPLE 4
2,931.8' – 2,932.2'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

AS-RECEIVED CORE 8 SAMPLE 5
2,932.8' – 2,933.5'

CORE 1 SAMPLE 1 PERMEABILITY TEST SPECIMEN
1,731.5' - 1,732.4'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

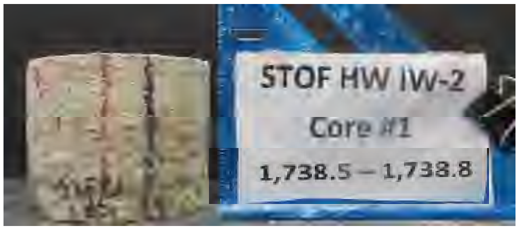
CORE 1 SAMPLE 1 PERMEABILITY TEST SPECIMEN
1,731.5' – 1,732.4'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 1 SAMPLE 2 PERMEABILITY TEST SPECIMEN
1,734.5' - 1,735.3'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 1 SAMPLE 2 PERMEABILITY TEST SPECIMEN
1,734.5' – 1,735.3'



CORE 1 SAMPLE 3 PERMEABILITY TEST SPECIMEN
1,738.5' - 1,738.8'

CORE 1 SAMPLE 3 PERMEABILITY TEST SPECIMEN
1,738.5' – 1,738.8'

CORE 1 SAMPLE 4 PERMEABILITY TEST SPECIMEN
1,739.0' - 1,740.0'

CORE 1 SAMPLE 4 PERMEABILITY TEST SPECIMEN
1,739.0' – 1,740.0'

CORE 1 SAMPLE 5 PERMEABILITY TEST SPECIMEN
1,742.2' - 1,743.1'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 1 SAMPLE 5 PERMEABILITY TEST SPECIMEN
1,742.2' – 1,743.1'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 2 SAMPLE 1 PERMEABILITY TEST SPECIMEN
1,885.3' - 1,886.2'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 2 SAMPLE 1 PERMEABILITY TEST SPECIMEN
1,885.3' – 1,886.2'

CORE 2 SAMPLE 2 PERMEABILITY TEST SPECIMEN
1,886.2' - 1,887.1'

CORE 2 SAMPLE 2 PERMEABILITY TEST SPECIMEN
1,886.2' – 1,887.1'

CORE 2 SAMPLE 3 PERMEABILITY TEST SPECIMEN
1,889.8' - 1,890.5'

CORE 2 SAMPLE 3 PERMEABILITY TEST SPECIMEN
1,889.8' – 1,890.5'

CORE 2 SAMPLE 4 PERMEABILITY TEST SPECIMEN
1,891.8' - 1,892.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 2 SAMPLE 4 PERMEABILITY TEST SPECIMEN
1,891.8' – 1,892.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 2 SAMPLE 5 PERMEABILITY TEST SPECIMEN
1,897.2' - 1,898.0'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 2 SAMPLE 5 PERMEABILITY TEST SPECIMEN
1,897.2' – 1,898.0'

CORE 3 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,058.3' – 2,059.0'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 3 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,058.3' – 2,059.0'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 3 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,059.5' – 2,060.2'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 3 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,059.5' – 2,060.2'

CORE 3 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,060.2' – 2,061.3'

CORE 3 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,060.2' – 2,061.3'

CORE 3 SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,061.3' – 2,062.0'

CORE 3 SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,061.3' – 2,062.0'

CORE 3 SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,066.1' – 2,066.9'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 3 SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,066.1' – 2,066.9'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 4 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,162.8' – 2,163.2'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 4 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,162.8' – 2,163.2'

CORE 4 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,163.2' – 2,163.9'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 4 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,163.2' – 2,163.9'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 4 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,164.3' – 2,164.9'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 4 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,164.3' – 2,164.9'

CORE 4 SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,165.6' – 2,166.1'

CORE 4 SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,165.6' – 2,166.1'

CORE 4 SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,167.0' – 2,168.1'

CORE 4 SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,167.0' – 2,168.1'

CORE 5 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,292.5' – 2,293.2'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 5 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,292.5' – 2,293.2'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

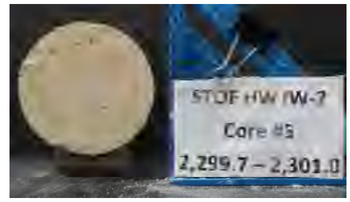
CORE 5 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,295.3' – 2,296.0'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 5 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,295.3' – 2,296.0'

CORE 5 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,299.7' – 2,301.0'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137



CORE 5 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,299.7' – 2,301.0'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 5 SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,301.4' – 2,301.9'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 5 SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,301.4' – 2,301.9'

CORE 5 SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,304.1' – 2,304.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 5 SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,304.1' – 2,304.6'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 6 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,422.7' – 2,423.7'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 6 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,422.7' – 2,423.7'

CORE 6 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,423.7' – 2,424.5'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 6 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,423.7' – 2,424.5'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 6 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,424.5' – 2,425.2'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 6 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,424.5' – 2,425.2'

CORE 6 SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,426.2' – 2,427.0'

CORE 6 SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,426.2' – 2,427.0'

CORE 6 SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,427.2' – 2,428.3'

CORE 6 SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,427.2' – 2,428.3'

CORE 7R SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,868.4' – 2,868.8'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 7R SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,868.4' – 2,868.8'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 7R SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,868.8' – 2,869.3'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 7R SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,868.8' – 2,869.3'

CORE 7R SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,871.4' – 2,871.9'

CORE 7R SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,871.4' – 2,871.9'

CORE 7R SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,871.9' – 2,872.3'

CORE 7R SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,871.9' – 2,872.3'

CORE 7R SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,872.3' – 2,873.0'

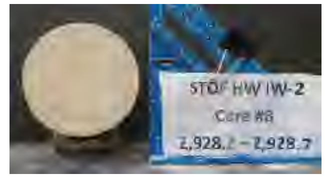
CORE 7R SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,872.3' – 2,873.0'

CORE 8 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,926.1' – 2,926.5'

CORE 8 SAMPLE 1 PERMEABILITY TEST SPECIMEN
2,926.1' – 2,926.5'

CORE 8 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,928.2' – 2,928.7'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137



CORE 8 SAMPLE 2 PERMEABILITY TEST SPECIMEN
2,928.2' – 2,928.7'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 8 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,930.6' – 2,931.2'

Youngquist Brothers, Inc.
Seminole Tribe Hollywood Reservation WWTP IW-2
File No. 17-13-0137

CORE 8 SAMPLE 3 PERMEABILITY TEST SPECIMEN
2,930.6' – 2,931.2'

CORE 8 SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,931.8' – 2,932.2'

CORE 8 SAMPLE 4 PERMEABILITY TEST SPECIMEN
2,931.8' – 2,932.2'

CORE 8 SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,932.8' – 2,933.5'

CORE 8 SAMPLE 5 PERMEABILITY TEST SPECIMEN
2,932.8' – 2,933.5'