



Technical Package Cover Page

This file contains the following documents:

1. Summary of application (in plain language)
 - English
 - Alternative Language (Spanish)
2. First notice (NORI-Notice of Receipt of Application and Intent to Obtain a Permit)
 - English
 - Alternative Language (Spanish)
3. Second notice (NAPD-Notice of Preliminary Decision)
 - English
 - Alternative Language (Spanish)
4. Application materials *
5. Draft permit *
6. Technical summary or fact sheet *

* **NOTE:** This application was declared Administratively Complete before June 1, 2024. The application materials, draft permit, and technical summary or fact sheet are available for review at the Public Viewing Location provided in the NAPD.

Section 15. Plain Language Summary (Instructions Page 40)

If you are subject to the alternative language notice requirements in [30 Texas Administrative Code §39.426](#), **you must provide a translated copy of the completed plain language summary in the appropriate alternative language as part of your application package.** For your convenience, a Spanish template has been provided below.

ENGLISH TEMPLATE FOR TPDES or TLAP NEW/RENEWAL/AMENDMENT APPLICATIONS

DOMESTIC WASTEWATER

The following summary is provided for this pending water quality permit application being reviewed by the Texas Commission on Environmental Quality as required by 30 Texas Administrative Code Chapter 39. The information provided in this summary may change during the technical review of the application and are not federal enforceable representations of the permit application.

Lakeway Municipal Utility District (CN600634513) operates S-5 Water Recycling Plant RN 101714996. an activated sludge process plant using the conventional mode. The facility is located at 251 Highlands Blvd., in Lakeway, Travis County, Texas 78738.

This amendment is intended to reflect completed transfer of permit WQ0014534001, per submitted Application to Transfer a Wastewater Permit (TCEQ Form 20031), and alter permit interim flow to reflect the current S-5 Water Recycling Plant expansion. <<For TLAP applications include the following sentence, otherwise delete:>> This permit will not authorize a discharge of pollutants into water in the state.

Discharges from the facility are expected to contain reclaimed water effluent, per Type 1 effluent standards. Effluent is treated by *treatment units including bar screens, effluent filters, aeration basins, final clarifier, aerobic digester, belt filter press and a chlorine contact chamber.*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



NOTICE OF RECEIPT OF APPLICATION AND INTENT TO OBTAIN WATER QUALITY PERMIT AMENDMENT

PERMIT NO. WQ0011495006

APPLICATION. Lakeway Municipal Utility District, 1097 Lohmans Crossing Road, Lakeway, Texas 78734, has applied to the Texas Commission on Environmental Quality (TCEQ) to amend Texas Land Application Permit (TLAP) No. WQ0011495006 to authorize consolidation with existing TLAP Permit No. WQ0014534001 and a combined total disposal of treated wastewater at a volume not to exceed an annual average flow of 1,030,000 gallons per day via irrigation of approximately 301 acres. The domestic wastewater treatment facility is located at 251 Highlands Boulevard, near the city of Lakeway, in Travis County, Texas 78738. The Cedar Tract disposal site is located southwest of the facility and the Live Oak Golf Course disposal site is located northeast of the facility. TCEQ received this application on May 17, 2024. The permit application will be available for viewing and copying at Lakeway Municipal Utility District Office, 1097 Lohmans Crossing Road, Lakeway, in Travis County, Texas prior to the date this notice is published in the newspaper. The application, including any updates, and associated notices are available electronically at the following webpage:

<https://www.tceq.texas.gov/permitting/wastewater/pending-permits/tlap-applications>.

This link to an electronic map of the site or facility's general location is provided as a public courtesy and not part of the application or notice. For the exact location, refer to the application.

<https://gisweb.tceq.texas.gov/LocationMapper/?marker=-98.00044,30.348531&level=18>

ADDITIONAL NOTICE. TCEQ's Executive Director has determined the application is administratively complete and will conduct a technical review of the application. After technical review of the application is complete, the Executive Director may prepare a draft permit and will issue a preliminary decision on the application. **Notice of the Application and Preliminary Decision will be published and mailed to those who are on the county-wide mailing list and to those who are on the mailing list for this application. That notice will contain the deadline for submitting public comments.**

PUBLIC COMMENT / PUBLIC MEETING. You may submit public comments or request a public meeting on this application. The purpose of a public meeting is to provide the opportunity to submit comments or to ask questions about the application. TCEQ will hold a public meeting if the Executive Director determines that there is a significant degree of public interest in the application or if requested by a local legislator. A public meeting is not a contested case hearing.

OPPORTUNITY FOR A CONTESTED CASE HEARING. After the deadline for submitting public comments, the Executive Director will consider all timely comments and prepare a response to all relevant and material, or significant public comments. **Unless the application is directly referred for a contested case hearing, the response to comments, and the Executive Director's decision on the application, will be mailed to everyone who submitted public comments and to those persons who are on the mailing list for this application.** If comments are received, the mailing will also provide instructions for requesting reconsideration of the Executive Director's decision and for requesting a contested case hearing. A contested case hearing is a legal proceeding similar to a civil trial in state district court.

TO REQUEST A CONTESTED CASE HEARING, YOU MUST INCLUDE THE FOLLOWING ITEMS IN YOUR REQUEST: your name, address, phone number; applicant's name and proposed permit number; the location and distance of your property/activities relative to the proposed facility; a specific description of how you would be adversely affected by the facility in a way not common to the general public; a list of all disputed issues of fact that you submit during the comment period and, the statement "[I/we] request a contested case hearing." If the request for contested case hearing is filed on behalf of a group or association, the request must designate the group's representative for receiving future correspondence; identify by name and physical address an individual member of the group who would be adversely affected by the proposed facility or activity; provide the information discussed above regarding the affected member's location and distance from the facility or activity; explain how and why the member would be affected; and explain how the interests the group seeks to protect are relevant to the group's purpose.

Following the close of all applicable comment and request periods, the Executive Director will forward the application and any requests for reconsideration or for a contested case hearing to the TCEQ Commissioners for their consideration at a scheduled Commission meeting.

The Commission may only grant a request for a contested case hearing on issues the requestor submitted in their timely comments that were not subsequently withdrawn. **If a hearing is granted, the subject of a hearing will be limited to disputed issues of fact or mixed questions of fact and law relating to relevant and material water quality concerns submitted during the comment period.**

MAILING LIST. If you submit public comments, a request for a contested case hearing or a reconsideration of the Executive Director's decision, you will be added to the mailing list for this specific application to receive future public notices mailed by the Office of the Chief Clerk. In addition, you may request to be placed on: (1) the permanent mailing list for a specific applicant name and permit number; and/or (2) the mailing list for a specific county. If you wish to be placed on the permanent and/or the county mailing list, clearly specify which list(s) and send your request to TCEQ Office of the Chief Clerk at the address below.

INFORMATION AVAILABLE ONLINE. For details about the status of the application, visit the Commissioners' Integrated Database at www.tceq.texas.gov/goto/cid. Search the database using the permit number for this application, which is provided at the top of this notice.

AGENCY CONTACTS AND INFORMATION. All public comments and requests must be submitted either electronically at <https://www14.tceq.texas.gov/epic/eComment/>, or in writing to the Texas Commission on Environmental Quality, Office of the Chief Clerk, MC-105,

P.O. Box 13087, Austin, Texas 78711-3087. Please be aware that any contact information you provide, including your name, phone number, email address and physical address will become part of the agency's public record. For more information about this permit application or the permitting process, please call the TCEQ Public Education Program, Toll Free, at 1-800-687-4040 or visit their website at www.tceq.texas.gov/goto/pep. Si desea información en Español, puede llamar al 1-800-687-4040.

Further information may also be obtained from Lakeway Municipal Utility District at the address stated above or by calling Mr. Earl Foster, General Manager, at 512-261-6222, extension 140.

Issuance Date: June 11, 2024

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



NOTICE OF APPLICATION AND PRELIMINARY DECISION FOR WATER QUALITY LAND APPLICATION PERMIT FOR MUNICIPAL WASTEWATER

AMENDMENT

PERMIT NO. WQ0011495006

APPLICATION AND PRELIMINARY DECISION. Lakeway Municipal Utility District, 1097 Lohmans Crossing Road, Lakeway, Texas 78734, has applied to the Texas Commission on Environmental Quality (TCEQ) for a major amendment to TCEQ Permit No. WQ0011495006 to authorize consolidation with existing TLAP Permit No. WQ0014534001 and a combined total disposal of treated wastewater at a volume not to exceed an annual average flow of 1,030,000 gallons per day via irrigation of approximately 301 acres. This permit will not authorize a discharge of pollutants into water in the state. TCEQ received this application on May 17, 2024.

The wastewater treatment facility and disposal site are located at 251 Highlands Boulevard, Lakeway, approximately 2.0 miles northwest of the intersection of Ranch Road 620 and Lohmans Crossing Road and 0.5 miles east of the intersection of Bee Creek Road and State Highway 71, in Travis County, Texas 78734. The wastewater treatment facility and disposal site are located in the drainage basin of Lake Travis in Segment No. 1404 of the Colorado River. This link to an electronic map of the site or facility's general location is provided as a public courtesy and is not part of the application or notice. For the exact location, refer to the application.
<https://gisweb.tceq.texas.gov/LocationMapper/?marker=-98.00044,30.348531&level=18>

The TCEQ Executive Director has completed the technical review of the application and prepared a draft permit. The draft permit, if approved, would establish the conditions under which the facility must operate. The Executive Director has made a preliminary decision that this permit, if issued, meets all statutory and regulatory requirements. The permit application, Executive Director's preliminary decision, and draft permit are available for viewing and copying at Lakeway Municipal Utility District Office, 1097 Lohmans Crossing Road, Lakeway, in Travis County, Texas. The application, including any updates, and associated notices are available electronically at the following webpage:
<https://www.tceq.texas.gov/permitting/wastewater/pending-permits/tlap-applications>.

PUBLIC COMMENT / PUBLIC MEETING. You may submit public comments or request a public meeting about this application. The purpose of a public meeting is to provide the opportunity to submit comments or to ask questions about the application. TCEQ holds a public meeting if the Executive Director determines that there is a significant degree of public interest in the application or if requested by a local legislator. A public meeting is not a contested case hearing.

OPPORTUNITY FOR A CONTESTED CASE HEARING. After the deadline for submitting public comments, the Executive Director will consider all timely comments and prepare a response to all relevant and material, or significant public comments. **Unless the application is directly referred for a contested case hearing, the response to comments will be mailed to everyone who submitted public comments and to those persons who are on the mailing list for this application. If comments are received, the mailing will also provide instructions for requesting a contested case hearing or reconsideration of the Executive Director's decision.** A contested case hearing is a legal proceeding similar to a civil trial in a state district court.

TO REQUEST A CONTESTED CASE HEARING, YOU MUST INCLUDE THE FOLLOWING ITEMS IN YOUR REQUEST: your name, address, phone number; applicant's name and proposed permit number; the location and distance of your property/activities relative to the proposed facility; a specific description of how you would be adversely affected by the facility in a way not common to the general public; a list of all disputed issues of fact that you submit during the comment period; and the statement "[I/we] request a contested case hearing." If the request for contested case hearing is filed on behalf of a group or association, the request must designate the group's representative for receiving future correspondence; identify by name and physical address an individual member of the group who would be adversely affected by the proposed facility or activity; provide the information discussed above regarding the affected member's location and distance from the facility or activity; explain how and why the member would be affected; and explain how the interests the group seeks to protect are relevant to the group's purpose.

Following the close of all applicable comment and request periods, the Executive Director will forward the application and any requests for reconsideration or for a contested case hearing to the TCEQ Commissioners for their consideration at a scheduled Commission meeting.

The Commission may only grant a request for a contested case hearing on issues the requestor submitted in their timely comments that were not subsequently withdrawn. **If a hearing is granted, the subject of a hearing will be limited to disputed issues of fact or mixed questions of fact and law relating to relevant and material water quality concerns submitted during the comment period.**

EXECUTIVE DIRECTOR ACTION. The Executive Director may issue final approval of the application unless a timely contested case hearing request or request for reconsideration is filed. If a timely hearing request or request for reconsideration is filed, the Executive Director will not issue final approval of the permit and will forward the application and request to the TCEQ Commissioners for their consideration at a scheduled Commission meeting.

MAILING LIST. If you submit public comments, a request for a contested case hearing or a reconsideration of the Executive Director's decision, you will be added to the mailing list for this specific application to receive future public notices mailed by the Office of the Chief Clerk. In addition, you may request to be placed on: (1) the permanent mailing list for a specific applicant name and permit number; and/or (2) the mailing list for a specific county. If you wish to be placed on the permanent and/or the county mailing list, clearly specify which list(s) and send your request to TCEQ Office of the Chief Clerk at the address below.

All written public comments and public meeting requests must be submitted to the Office of the Chief Clerk, MC 105, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, TX 78711-3087 or electronically at www.tceq.texas.gov/goto/comment within 30 days from the date of newspaper publication of this notice.

INFORMATION AVAILABLE ONLINE. For details about the status of the application, visit the Commissioners' Integrated Database at www.tceq.texas.gov/goto/cid. Search the database using the permit number for this application, which is provided at the top of this notice.

AGENCY CONTACTS AND INFORMATION. Public comments and requests must be submitted either electronically at www.tceq.texas.gov/goto/comment, or in writing to the Texas Commission on Environmental Quality, Office of the Chief Clerk, MC 105, P.O. Box 13087, Austin, Texas 78711-3087. Any personal information you submit to the TCEQ will become part of the agency's record; this includes email addresses. For more information about this permit application or the permitting process, please call the TCEQ Public Education Program, Toll Free, at 1-800-687-4040 or visit their website at www.tceq.texas.gov/goto/pep. Si desea información en Español, puede llamar al 1-800-687-4040.

Further information may also be obtained from Lakeway Municipal Utility District at the address stated above or by calling Mr. Earl Foster, General Manager, at 512-261-6222, extension 140.

Issuance Date: April 25, 2025



PERMIT NO. WQ0011495006

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
P.O. Box 13087
Austin, Texas 78711-3087

This amendment with renewal
supersedes and replaces Permit
No. WQ0011495006 issued on
January 8, 2015.

PERMIT TO DISCHARGE WASTES
under provisions of Chapter 26
of the Texas Water Code

Lakeway Municipal Utility District

whose mailing address is

1097 Lohmans Crossing Road
Lakeway, Texas 78734

Nature of Business Producing Waste: Domestic wastewater treatment operation, SIC Code 4952.

General Description and Location of Waste Disposal System:

Description: The S5 Water Recycling Plant consists of an activated sludge process plant using the conventional mode. Treatment units in the Interim I phase consist of a mechanical rotating drum fine screen, an anoxic basin, two aeration basins, a final clarifier, an aerobic digester, a belt press, two filters, and a chlorine contact basin. Treatment units in the Interim II phase consist of a mechanical rotating drum fine screen, two anoxic basins, six aeration basins, two final clarifiers, an aerobic digester, a belt press, three filters, and a chlorine contact basin. Treatment units in the Final phase consist of a mechanical rotating fine screen, three anoxic basins, nine aeration basin, three final clarifiers, five aerobic digesters, a belt press, four filters, and two chlorine contact basins.

The permittee is authorized to dispose of treated domestic wastewater effluent at a daily average flow not to exceed 0.40 million gallons per day (MGD) via surface irrigation of 117 acres of the Live Oak Golf Course in the Interim I phase, 0.80 MGD via surface irrigation of 117 acres of the Live Oak Golf Course and 117 acres of non-public access cedar tree land in the Interim II phase, and 1.03 MGD via surface irrigation of 117 acres of the Live Oak Golf Course and 184 acres of non-public access cedar tree land in the Final phase.

For storage of treated effluent prior to irrigation, the Interim I facility includes a storage pond with a total surface area of 6.5 acres and a total capacity of 117 acre-feet, the Interim II phase facility adds a storage tank with a total capacity of 61 acre-feet, and the Final phase facility adds another storage tank with a total capacity of 55 acre-feet for a total combined storage capacity of 233 acre-feet.

Application rates to the irrigated land shall not exceed 3.83 acre-feet per year per acre irrigated. The irrigated crops include Bermuda and Rye grass on the golf course, and native cedar trees on the non-public access land.

Location: The wastewater treatment facility and disposal site are located at 251 Highlands Boulevard, Lakeway, approximately 2.0 miles northwest of the intersection of Ranch Road 620 and Lohmans Crossing Road and 0.5 miles east of the intersection of Bee Creek Road and State Highway 71, in Travis County, Texas 78734. (See Attachment A.)

Drainage Area: The wastewater treatment facility and disposal site are located in the drainage basin of Lake Travis in Segment No. 1404 of the Colorado River. No discharge of pollutants into water in the state is authorized by this permit.

This permit and the authorization contained herein shall expire at midnight, **five years from the date of issuance.**

ISSUED DATE:

For the Commission

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Conditions of the Permit: No discharge of pollutants into water in the state is authorized.

A. Effluent Limitations

Character: Treated Domestic Sewage Effluent

Volume: Daily Average Flow – Interim I phase: 0.40 MGD from the treatment system
Interim II phase: 0.80 MGD from the treatment system
Final phase: 1.03 MGD from the treatment system

Quality: The following effluent limitations are required:

<u>Parameter</u>	<u>Effluent Concentrations</u> (Not to Exceed)			
	<u>Daily Average</u> mg/l	<u>7-Day Average</u> mg/l	<u>Daily Maximum</u> mg/	<u>Single Grab</u> mg/l
Biochemical Oxygen Demand (5-day)	20	30	45	65
Total Suspended Solids	20	30	45	65

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units.

The effluent shall be chlorinated in a chlorine contact chamber to a residual of 1.0 mg/l with a minimum detention time of 20 minutes. If the effluent is to be transferred to a holding pond or tank, re-chlorination prior to the effluent being delivered into the irrigation system will be required. A trace total chlorine residual shall be maintained in the effluent at the point of irrigation application.

B. Monitoring Requirements:

<u>Parameter</u>	<u>Monitoring Frequency</u>	<u>Sample Type</u>
Flow	Continuous	Totalizing Meter
Biochemical Oxygen Demand (5-day)	One/week	Grab
Total Suspended Solids	One/week	Grab
pH	One/month	Grab
Total Chlorine Residual	Five/week	Grab

The monitoring shall be done after the final treatment unit and prior to storage of the treated effluent. If the effluent is land applied directly from the treatment system, monitoring shall be done after the final treatment unit and prior to land application. These records shall be maintained on a monthly basis and be available at the plant site for inspection by authorized representatives of the Commission for at least three years.

STANDARD PERMIT CONDITIONS

This permit is granted in accordance with the Texas Water Code and the rules and other Orders of the Commission and the laws of the State of Texas.

DEFINITIONS

All definitions in Section 26.001 of the Texas Water Code and 30 TAC Chapter 305 shall apply to this permit and are incorporated by reference. Some specific definitions of words or phrases used in this permit are as follows:

1. Flow Measurements

- a. Daily average flow - the arithmetic average of all determinations of the daily flow within a period of one calendar month. The daily average flow determination shall consist of determinations made on at least four separate days. If instantaneous measurements are used to determine the daily flow, the determination shall be the arithmetic average of all instantaneous measurements taken during that month. Daily average flow determination for intermittent discharges shall consist of a minimum of three flow determinations on days of discharge.
- b. Annual average flow - the arithmetic average of all daily flow determinations taken within the preceding 12 consecutive calendar months. The annual average flow determination shall consist of daily flow volume determinations made by a totalizing meter, charted on a chart recorder and limited to major domestic wastewater discharge facilities with a 1 million gallons per day or greater permitted flow.
- c. Instantaneous flow - the measured flow during the minimum time required to interpret the flow measuring device.

2. Concentration Measurements

- a. Daily average concentration - the arithmetic average of all effluent samples, composite or grab as required by this permit, within a period of one calendar month, consisting of at least four separate representative measurements.
 - i. For domestic wastewater treatment plants - When four samples are not available in a calendar month, the arithmetic average (weighted by flow) of all values in the previous four consecutive month period consisting of at least four measurements shall be utilized as the daily average concentration.
 - ii. For all other wastewater treatment plants - When four samples are not available in a calendar month, the arithmetic average (weighted by flow) of all values taken during the month shall be utilized as the daily average concentration.
- b. 7-day average concentration - the arithmetic average of all effluent samples, composite or grab as required by this permit, within a period of one calendar week, Sunday through Saturday.
- c. Daily maximum concentration - the maximum concentration measured on a single day, by the sample type specified in the permit, within a period of one calendar month.

3. Sample Type

- a. Composite sample - For domestic wastewater, a composite sample is a sample made up of a minimum of three effluent portions collected in a continuous 24-hour period or during the period of daily discharge if less than 24 hours, and combined in volumes proportional to flow, and collected at the intervals required by 30 TAC § 319.9 (a). For industrial wastewater, a composite sample is a sample made up of a minimum of three effluent portions collected in a continuous 24-hour period or during the period of daily discharge if less than 24 hours, and combined in volumes proportional to flow, and collected at the intervals required by 30 TAC § 319.9 (b).
 - b. Grab sample - an individual sample collected in less than 15 minutes.
4. Treatment Facility (facility) - wastewater facilities used in the conveyance, storage, treatment, recycling, reclamation and/or disposal of domestic sewage, industrial wastes, agricultural wastes, recreational wastes, or other wastes including sludge handling or disposal facilities under the jurisdiction of the Commission.
 5. The term “sewage sludge” is defined as solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in 30 TAC Chapter 312. This includes the solids which have not been classified as hazardous waste separated from wastewater by unit processes.
 6. The term “biosolids” is defined as sewage sludge that has been tested or processed to meet Class A, Class AB, or Class B pathogen standards in 30 TAC Chapter 312 for beneficial use.
 7. Bypass - the intentional diversion of a waste stream from any portion of a treatment facility.

MONITORING REQUIREMENTS

1. Monitoring Requirements

Monitoring results shall be collected at the intervals specified in the permit. Unless otherwise specified in this permit or otherwise ordered by the Commission, the permittee shall conduct effluent sampling in accordance with 30 TAC §§ 319.4 - 319.12.

As provided by state law, the permittee is subject to administrative, civil and criminal penalties, as applicable, for negligently or knowingly violating the Texas Water Code, Chapters 26, 27, and 28, and Texas Health and Safety Code, Chapter 361, including but not limited to knowingly making any false statement, representation, or certification on any report, record or other document submitted or required to be maintained under this permit, including monitoring reports, records or reports of compliance or noncompliance, or falsifying, tampering with or knowingly rendering inaccurate any monitoring device or method required by this permit or violating any other requirement imposed by state or federal regulations.

2. Test Procedures

- a. Unless otherwise specified in this permit, test procedures for the analysis of pollutants shall comply with procedures specified in 30 TAC §§ 319.11 - 319.12. Measurements, tests and calculations shall be accurately accomplished in a representative manner.

- b. All laboratory tests submitted to demonstrate compliance with this permit must meet the requirements of 30 TAC Chapter 25, Environmental Testing Laboratory Accreditation and Certification.

3. Records of Results

- a. Monitoring samples and measurements shall be taken at times and in a manner so as to be representative of the monitored activity.
- b. Except for records of monitoring information required by this permit related to the permittee's sewage sludge or biosolids use and disposal activities, which shall be retained for a period of at least five years, monitoring and reporting records, including strip charts and records of calibration and maintenance, copies of all records required by this permit, and records of all data used to complete the application for this permit shall be retained at the facility site, or shall be readily available for review by a TCEQ representative for a period of three years from the date of the record or sample, measurement, report, or application. This period shall be extended at the request of the Executive Director.
- c. Records of monitoring activities shall include the following:
 - i. date, time and place of sample or measurement;
 - ii. identity of individual who collected the sample or made the measurement.
 - iii. date and time of analysis;
 - iv. identity of the individual and laboratory who performed the analysis;
 - v. the technique or method of analysis; and
 - vi. the results of the analysis or measurement and quality assurance/quality control records.

The period during which records are required to be kept shall be automatically extended to the date of the final disposition of any administrative or judicial enforcement action that may be instituted against the permittee.

4. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit using approved analytical methods as specified above, all results of such monitoring shall be included in determining compliance with permit requirements.

5. Calibration of Instruments

All automatic flow measuring or recording devices and all totalizing meters for measuring flows shall be accurately calibrated by a trained person at plant start-up and as often thereafter as necessary to ensure accuracy, but not less often than annually unless authorized by the Executive Director for a longer period. Such person shall verify in writing that the device is operating properly and giving accurate results. Copies of the verification shall be retained at the facility site and/or shall be readily available for review by a TCEQ representative for a period of three years.

6. Compliance Schedule Reports

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of the permit shall be submitted no later than 14 days following each schedule date to the Regional Office and the Enforcement Division (MC 224).

7. Noncompliance Notification

- a. In accordance with 30 TAC § 305.125(9), any noncompliance which may endanger human health or safety, or the environment shall be reported by the permittee to the TCEQ. Except as allowed by 30 TAC § 305.132, report of such information shall be provided orally or by facsimile transmission (FAX) to the Regional Office within 24 hours of becoming aware of the noncompliance. A written submission of such information shall also be provided by the permittee to the Regional Office and the Enforcement Division (MC 224) within five working days of becoming aware of the noncompliance. The written submission shall contain a description of the noncompliance and its cause; the potential danger to human health or safety, or the environment; the period of noncompliance, including exact dates and times; if the noncompliance has not been corrected, the time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance, and to mitigate its adverse effects.
- b. The following violations shall be reported under Monitoring and Reporting Requirement 7.a.:
 - i. Unauthorized discharges as defined in Permit Condition 2(g).
 - ii. Any unanticipated bypass which exceeds any effluent limitation in the permit.
- c. In addition to the above, any effluent violation which deviates from the permitted effluent limitation by more than 40% shall be reported by the permittee in writing to the Regional Office and the Enforcement Division (MC 224) within 5 working days of becoming aware of the noncompliance.
- d. Any noncompliance other than that specified in this section, or any required information not submitted or submitted incorrectly, shall be reported to the Enforcement Division (MC 224) as promptly as possible.

8. In accordance with the procedures described in 30 TAC §§ 35.301 - 35.303 (relating to Water Quality Emergency and Temporary Orders) if the permittee knows in advance of the need for a bypass, it shall submit prior notice by applying for such authorization.

9. Changes in Discharges of Toxic Substances

All existing manufacturing, commercial, mining, and silvicultural permittees shall notify the Regional Office, orally or by facsimile transmission within 24 hours, and both the Regional Office and the Enforcement Division (MC 224) in writing within five (5) working days, after becoming aware of or having reason to believe:

- a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant listed at 40 CFR Part 122, Appendix D, Tables II and III (excluding Total Phenols) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

- i. One hundred micrograms per liter (100 µg/L);
 - ii. Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
 - iii. Five (5) times the maximum concentration value reported for that pollutant in the permit application; or
 - iv. The level established by the TCEQ.
- b. That any activity has occurred or will occur which would result in any discharge, on a nonroutine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following “notification levels”:
- i. Five hundred micrograms per liter (500 µg/L);
 - ii. One milligram per liter (1 mg/L) for antimony;
 - iii. Ten (10) times the maximum concentration value reported for that pollutant in the permit application; or
 - iv. The level established by the TCEQ.

10. Signatories to Reports

All reports and other information requested by the Executive Director shall be signed by the person and in the manner required by 30 TAC § 305.128 (relating to Signatories to Reports).

PERMIT CONDITIONS

1. General

- a. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in an application or in any report to the Executive Director, it shall promptly submit such facts or information.
- b. This permit is granted on the basis of the information supplied and representations made by the permittee during action on an application, and relying upon the accuracy and completeness of that information and those representations. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked, in whole or in part, in accordance with 30 TAC Chapter 305, Subchapter D, during its term for good cause including, but not limited to, the following:
 - i. Violation of any terms or conditions of this permit;
 - ii. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or
 - iii. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.
- c. The permittee shall furnish to the Executive Director, upon request and within a reasonable time, any information to determine whether cause exists for amending, revoking, suspending or terminating the permit. The permittee shall also furnish to the Executive Director, upon request, copies of records required to be kept by the permit.

2. Compliance

- a. Acceptance of the permit by the person to whom it is issued constitutes acknowledgment and agreement that such person will comply with all the terms and conditions embodied in the permit, and the rules and other orders of the Commission.
 - b. The permittee has a duty to comply with all conditions of the permit. Failure to comply with any permit condition constitutes a violation of the permit and the Texas Water Code or the Texas Health and Safety Code, and is grounds for enforcement action, for permit amendment, revocation or suspension, or for denial of a permit renewal application or an application for a permit for another facility.
 - c. 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 the permit.
 - d. The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal or other permit violation which has a reasonable likelihood of adversely affecting human health or the environment.
 - e. Authorization from the Commission is required before beginning any change in the permitted facility or activity that may result in noncompliance with any permit requirements.
 - f. A permit may be amended, suspended and reissued, or revoked for cause in accordance with 30 TAC §§ 305.62 and 305.66 and Texas Water Code Section 7.302. The filing of a request by the permittee for a permit amendment, suspension and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.
 - g. There shall be no unauthorized discharge of wastewater or any other waste. For the purpose of this permit, an unauthorized discharge is considered to be any discharge of wastewater into or adjacent to water in the state at any location not permitted as an outfall or otherwise defined in the Special Provisions section of this permit.
 - h. The permittee is subject to administrative, civil, and criminal penalties, as applicable, under Texas Water Code §§ 7.051 - 7.075 (relating to Administrative Penalties), 7.101 - 7.111 (relating to Civil Penalties), and 7.141 - 7.202 (relating to Criminal Offenses and Penalties).
3. Inspections and Entry
- a. Inspection and entry shall be allowed as prescribed in the Texas Water Code Chapters 26, 27, and 28, and Texas Health and Safety Code Chapter 361.
 - b. The members of the Commission and employees and agents of the Commission are entitled to enter any public or private property at any reasonable time for the purpose of inspecting and investigating conditions relating to the quality of water in the state or the compliance with any rule, regulation, permit or other order of the Commission. Members, employees, or agents of the Commission and Commission contractors are entitled to enter public or private property at any reasonable time to investigate or monitor or, if the responsible party is not responsive or there is an immediate danger to

public health or the environment, to remove or remediate a condition related to the quality of water in the state. Members, employees, Commission contractors, or agents acting under this authority who enter private property shall observe the establishment's rules and regulations concerning safety, internal security, and fire protection, and if the property has management in residence, shall notify management or the person then in charge of his presence and shall exhibit proper credentials. If any member, employee, Commission contractor, or agent is refused the right to enter in or on public or private property under this authority, the Executive Director may invoke the remedies authorized in Texas Water Code Section 7.002. The statement above, that Commission entry shall occur in accordance with an establishment's rules and regulations concerning safety, internal security, and fire protection, is not grounds for denial or restriction of entry to any part of the facility, but merely describes the Commission's duty to observe appropriate rules and regulations during an inspection.

4. Permit Amendment and/or Renewal

- a. The permittee shall give notice to the Executive Director as soon as possible of any planned physical alterations or additions to the permitted facility if such alterations or additions would require a permit amendment or result in a violation of permit requirements. Notice shall also be required under this paragraph when:
 - i. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements in Monitoring and Reporting Requirements No. 9;
 - ii. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.
- b. Prior to any facility modifications, additions, or expansions that will increase the plant capacity beyond the permitted flow, the permittee must apply for and obtain proper authorization from the Commission before commencing construction.
- c. The permittee must apply for an amendment or renewal at least 180 days prior to expiration of the existing permit in order to continue a permitted activity after the expiration date of the permit. If an application is submitted prior to the expiration date of the permit, the existing permit shall remain in effect until the application is approved, denied, or returned. If the application is returned or denied, authorization to continue such activity shall terminate upon the effective date of the action. If an application is not submitted prior to the expiration date of the permit, the permit shall expire and authorization to continue such activity shall terminate.
- d. Prior to accepting or generating wastes which are not described in the permit application or which would result in a significant change in the quantity or quality of the existing discharge, the permittee must report the proposed changes to the Commission. The permittee must apply for a permit amendment reflecting any necessary changes in permit conditions, including effluent limitations for pollutants not identified and limited by this permit.

- e. In accordance with the Texas Water Code § 26.029(b), after a public hearing, notice of which shall be given to the permittee, the Commission may require the permittee, from time to time, for good cause, in accordance with applicable laws, to conform to new or additional conditions.

5. Permit Transfer

- a. Prior to any transfer of this permit, Commission approval must be obtained. The Commission shall be notified in writing of any change in control or ownership of facilities authorized by this permit. Such notification should be sent to the Applications Review and Processing Team (MC 148) of the Water Quality Division.
- b. A permit may be transferred only according to the provisions of 30 TAC § 305.64 (relating to Transfer of Permits) and 30 TAC § 50.133 (relating to Executive Director Action on Application or WQMP update).

6. Relationship to Hazardous Waste Activities

This permit does not authorize any activity of hazardous waste storage, processing, or disposal which requires a permit or other authorization pursuant to the Texas Health and Safety Code.

7. Property Rights

A permit does not convey any property rights of any sort, or any exclusive privilege.

8. Permit Enforceability

The conditions 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.

9. Relationship to Permit Application

The application pursuant to which the permit has been issued is incorporated herein; provided, however, that in the event of a conflict between the provisions of this permit and the application, the provisions of the permit shall control.

10. Notice of Bankruptcy.

- a. Each permittee shall notify the Executive Director, in writing, immediately following the filing of a voluntary or involuntary petition for bankruptcy under any chapter of Title 11 (Bankruptcy) of the United States Code (11 USC) by or against:
 - i. the permittee;
 - ii. an entity (as that term is defined in 11 USC, § 101(14)) controlling the permittee or listing the permit or permittee as property of the estate; or
 - iii. an affiliate (as that term is defined in 11 USC, § 101(2)) of the permittee.

- b. This notification must indicate:
- i. the name of the permittee;
 - ii. the permit number(s);
 - iii. the bankruptcy court in which the petition for bankruptcy was filed; and
 - iv. the date of filing of the petition.

OPERATIONAL REQUIREMENTS

1. The permittee shall at all times ensure that the facility and all of its systems of collection, treatment, and disposal are properly operated and maintained. This includes, but is not limited to, the regular, periodic examination of wastewater solids within the treatment plant by the operator in order to maintain an appropriate quantity and quality of solids inventory as described in the various operator training manuals and according to accepted industry standards for process control. Process control, maintenance, and operations records shall be retained at the facility site, or shall be readily available for review by a TCEQ representative, for a period of three years.
2. Upon request by the Executive Director, the permittee shall take appropriate samples and provide proper analysis in order to demonstrate compliance with Commission rules. Unless otherwise specified in this permit or otherwise ordered by the Commission, the permittee shall comply with all applicable provisions of 30 TAC Chapter 312 concerning sewage sludge or biosolids use and disposal and 30 TAC §§ 319.21 - 319.29 concerning the discharge of certain hazardous metals.
3. Domestic wastewater treatment facilities shall comply with the following provisions:
 - a. The permittee shall notify the Municipal Permits Team, Wastewater Permitting Section (MC 148) of the Water Quality Division, in writing, of any facility expansion at least 90 days prior to conducting such activity.
 - b. The permittee shall submit a closure plan for review and approval to the Municipal Permits Team, Wastewater Permitting Section (MC 148) of the Water Quality Division, for any closure activity at least 90 days prior to conducting such activity. Closure is the act of permanently taking a waste management unit or treatment facility out of service and includes the permanent removal from service of any pit, tank, pond, lagoon, surface impoundment and/or other treatment unit regulated by this permit.
4. The permittee is responsible for installing prior to plant start-up, and subsequently maintaining, adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failures by means of alternate power sources, standby generators, and/or retention of inadequately treated wastewater.
5. Unless otherwise specified, the permittee shall provide a readily accessible sampling point and, where applicable, an effluent flow measuring device or other acceptable means by which effluent flow may be determined.
6. The permittee shall remit an annual water quality fee to the Commission as required by 30 TAC Chapter 21. Failure to pay the fee may result in revocation of this permit under Texas Water Code § 7.302(b)(6).
7. Documentation

For all written notifications to the Commission required of the permittee by this permit, the permittee shall keep and make available a copy of each such notification under the same conditions as self-monitoring data are required to be kept and made available. Except for information specified as not confidential in 30 TAC § 1.5(d), any information submitted pursuant to this permit may be claimed as confidential by the submitter. Any such claim must be asserted in the manner prescribed in the application form or by stamping the words “confidential business information” on each page containing such information. If no claim is made at the time of submission, information may be made available to the public without further notice. If the Commission or Executive Director agrees with the designation of confidentiality, the TCEQ will not provide the information for public inspection unless required by the Texas Attorney General or a court pursuant to an open records request. If the Executive Director does not agree with the designation of confidentiality, the person submitting the information will be notified.

8. Facilities which generate domestic wastewater shall comply with the following provisions; domestic wastewater treatment facilities at permitted industrial sites are excluded.

- a. Whenever flow measurements for any domestic sewage treatment facility reach 75 percent of the permitted daily average or annual average flow for three consecutive months, the permittee must initiate engineering and financial planning for expansion and/or upgrading of the domestic wastewater treatment and/or collection facilities. Whenever the flow reaches 90 percent of the permitted daily average or annual average flow for three consecutive months, the permittee shall obtain necessary authorization from the Commission to commence construction of the necessary additional treatment and/or collection facilities. In the case of a domestic wastewater treatment facility which reaches 75 percent of the permitted daily average or annual average flow for three consecutive months, and the planned population to be served or the quantity of waste produced is not expected to exceed the design limitations of the treatment facility, the permittee shall submit an engineering report supporting this claim to the Executive Director of the Commission.

If in the judgement of the Executive Director the population to be served will not cause permit noncompliance, then the requirement of this section may be waived. To be effective, any waiver must be in writing and signed by the Director of the Enforcement Division (MC 219) of the Commission, and such waiver of these requirements will be reviewed upon expiration of the existing permit; however, any such waiver shall not be interpreted as condoning or excusing any violation of any permit parameter.

- b. The plans and specifications for domestic sewage collection and treatment works associated with any domestic permit must be approved by the Commission and failure to secure approval before commencing construction of such works or making a discharge is a violation of this permit and each day is an additional violation until approval has been secured.
- c. Permits for domestic wastewater treatment plants are granted subject to the policy of the Commission to encourage the development of area-wide waste collection, treatment and disposal systems. The Commission reserves the right to amend any domestic wastewater permit in accordance with applicable procedural requirements to require the system covered by this permit to be integrated into an area-wide system, should such be developed; to require the delivery of the wastes authorized to be collected in, treated by or discharged from said system, to such area-wide system; or to amend this permit in any

other particular to effectuate the Commission's policy. Such amendments may be made when the changes required are advisable for water quality control purposes and are feasible on the basis of waste treatment technology, engineering, financial, and related considerations existing at the time the changes are required, exclusive of the loss of investment in or revenues from any then existing or proposed waste collection, treatment or disposal system.

9. Domestic wastewater treatment plants shall be operated and maintained by sewage plant operators holding a valid certificate of competency at the required level as defined in 30 TAC Chapter 30.
10. Facilities which generate industrial solid waste as defined in 30 TAC § 335.1 shall comply with these provisions:
 - a. Any solid waste, as defined in 30 TAC § 335.1 (including but not limited to such wastes as garbage, refuse, sludge from a waste treatment, water supply treatment plant or air pollution control facility, discarded materials, discarded materials to be recycled, whether the waste is solid, liquid, or semisolid), generated by the permittee during the management and treatment of wastewater, must be managed in accordance with all applicable provisions of 30 TAC Chapter 335, relating to Industrial Solid Waste Management.
 - b. Industrial wastewater that is being collected, accumulated, stored, or processed before discharge through any final discharge outfall, specified by this permit, is considered to be industrial solid waste until the wastewater passes through the actual point source discharge and must be managed in accordance with all applicable provisions of 30 TAC Chapter 335.
 - c. The permittee shall provide written notification, pursuant to the requirements of 30 TAC § 335.8(b)(1), to the Corrective Action Section (MC 127) of the Remediation Division informing the Commission of any closure activity involving an Industrial Solid Waste Management Unit, at least 90 days prior to conducting such an activity.
 - d. Construction of any industrial solid waste management unit requires the prior written notification of the proposed activity to the Registration and Reporting Section (MC 129) of the Permitting and Remediation Support Division. No person shall dispose of industrial solid waste, including sludge or other solids from wastewater treatment processes, prior to fulfilling the deed recordation requirements of 30 TAC § 335.5.
 - e. The term "industrial solid waste management unit" means a landfill, surface impoundment, waste-pile, industrial furnace, incinerator, cement kiln, injection well, container, drum, salt dome waste containment cavern, or any other structure vessel, appurtenance, or other improvement on land used to manage industrial solid waste.
 - f. The permittee shall keep management records for all sludge (or other waste) removed from any wastewater treatment process. These records shall fulfill all applicable requirements of 30 TAC Chapter 335 and must include the following, as it pertains to wastewater treatment and discharge:
 - i. Volume of waste and date(s) generated from treatment process;
 - ii. Volume of waste disposed of on-site or shipped off-site;
 - iii. Date(s) of disposal;

- iv. Identity of hauler or transporter;
- v. Location of disposal site; and
- vi. Method of final disposal.

The above records shall be maintained on a monthly basis. The records shall be retained at the facility site, or shall be readily available for review by authorized representatives of the TCEQ for at least five years.

- 11. For industrial facilities to which the requirements of 30 TAC Chapter 335 do not apply, sludge and solid wastes, including tank cleaning and contaminated solids for disposal, shall be disposed of in accordance with Chapter 361 of the Texas Health and Safety Code.

TCEQ Revision 06/2020

SLUDGE PROVISIONS

The permittee is authorized to dispose of sludge or biosolids only at a Texas Commission on Environmental Quality (TCEQ) authorized land application site, co-disposal landfill, wastewater treatment facility, or facility that further processes sludge. **The disposal of sludge or biosolids by land application on property owned, leased or under the direct control of the permittee is a violation of the permit unless the site is authorized with the TCEQ. This provision does not authorize Distribution and Marketing of Class A or Class AB Biosolids. This provision does not authorize the permittee to land apply biosolids on property owned, leased or under the direct control of the permittee.**

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE OR BIOSOLIDS LAND APPLICATION

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge or biosolids in accordance with 30 TAC § 312 and all other applicable state and federal regulations in a manner that protects public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present in the sludge or biosolids.
2. In all cases, if the person (permit holder) who prepares the sewage sludge or biosolids supplies the sewage sludge or biosolids to another person for land application use or to the owner or lease holder of the land, the permit holder shall provide necessary information to the parties who receive the sludge or biosolids to assure compliance with these regulations.
3. The land application of processed or unprocessed chemical toilet waste, grease trap waste, grit trap waste, milk solids, or similar non-hazardous municipal or industrial solid wastes, or any of the wastes listed in this provision combined with biosolids, WTP residuals or domestic septage is prohibited unless the grease trap waste is added at a fats, oil and grease (FOG) receiving facility as part of an anaerobic digestion process.

B. Testing Requirements

1. Sewage sludge or biosolids shall be tested once during the term of this permit in the Interim I and Interim II phases, and annually in the Final phase in accordance with the method specified in both 40 CFR Part 261, Appendix II and 40 CFR Part 268, Appendix I [Toxicity Characteristic Leaching Procedure (TCLP)] or other method that receives the prior approval of the TCEQ for the contaminants listed in 40 CFR Part 261.24, Table 1. Sewage sludge or biosolids failing this test shall be managed according to RCRA standards for generators of hazardous waste, and the waste's disposition must be in accordance with all applicable requirements for hazardous waste processing, storage, or disposal. Following failure of any TCLP test, the management or disposal of sewage sludge or biosolids at a facility other than an authorized hazardous waste processing, storage, or disposal facility shall be prohibited until such time as the permittee can demonstrate the sewage sludge or biosolids no longer exhibits the hazardous waste toxicity characteristics (as demonstrated by the results of the TCLP tests). A written report shall be provided to both the TCEQ Registration and Reporting Section (MC 129) of the Permitting and Registration Support Division and the Regional Director (MC

Region 11) within seven (7) days after failing the TCLP Test.

The report shall contain test results, certification that unauthorized waste management has stopped, and a summary of alternative disposal plans that comply with RCRA standards for the management of hazardous waste. The report shall be addressed to: Director, Permitting and Registration Support Division (MC 129), Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087. In addition, the permittee shall prepare an annual report on the results of all sludge toxicity testing. The permittee shall submit the following information in an annual report to the TCEQ by September 30th of each year. The permittee must submit this annual report using the online electronic reporting system available through TCEQ's website. If the permittee requests and obtains an electronic reporting waiver, the annual report can be submitted in hard copy to the TCEQ Regional Office (MC Region 11) and the Enforcement Division (MC 224).

2. Biosolids shall not be applied to the land if the concentration of the pollutants exceeds the pollutant concentration criteria in Table 1. The frequency of testing for pollutants in Table 1 is found in Section I.C. of this permit.

TABLE 1

<u>Pollutant</u>	<u>Ceiling Concentration</u> <u>(Milligrams per kilogram)*</u>
Arsenic	75
Cadmium	85
Chromium	3000
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
PCBs	49
Selenium	100
Zinc	7500

* Dry weight basis

3. Pathogen Control

All sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site must be treated by one of the following methods to ensure that the sludge meets either the Class A, Class AB or Class B biosolids pathogen requirements.

- a. For sewage sludge to be classified as Class A biosolids with respect to pathogens, the density of fecal coliform in the sewage sludge must be less than 1,000 most probable number (MPN) per gram of total solids (dry weight basis), or the density of *Salmonella* sp. bacteria in the sewage sludge must be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. In addition, one of the alternatives listed below must be met:

Alternative 1 - The temperature of the sewage sludge that is used or disposed shall be

maintained at or above a specific value for a period of time. See 30 TAC § 312.82(a)(2)(A) for specific information;

Alternative 5 (PFRP) - Sewage sludge that is used or disposed of must be treated in one of the Processes to Further Reduce Pathogens (PFRP) described in 40 CFR Part 503, Appendix B. PFRP include composting, heat drying, heat treatment, and thermophilic aerobic digestion; or

Alternative 6 (PFRP Equivalent) - Sewage sludge that is used or disposed of must be treated in a process that has been approved by the U. S. Environmental Protection Agency as being equivalent to those in Alternative 5.

- b. For sewage sludge to be classified as Class AB biosolids with respect to pathogens, the density of fecal coliform in the sewage sludge must be less than 1,000 MPN per gram of total solids (dry weight basis), or the density of *Salmonella* sp. bacteria in the sewage sludge be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. In addition, one of the alternatives listed below must be met:

Alternative 2 - The pH of the sewage sludge that is used or disposed shall be raised to above 12 std. units and shall remain above 12 std. units for 72 hours.

The temperature of the sewage sludge shall be above 52° Celsius for 12 hours or longer during the period that the pH of the sewage sludge is above 12 std. units.

At the end of the 72-hour period during which the pH of the sewage sludge is above 12 std. units, the sewage sludge shall be air dried to achieve a percent solids in the sewage sludge greater than 50%; or

Alternative 3 - The sewage sludge shall be analyzed for enteric viruses prior to pathogen treatment. The limit for enteric viruses is less than one Plaque-forming Unit per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 30 TAC § 312.82(a)(2)(C)(i-iii) for specific information. The sewage sludge shall be analyzed for viable helminth ova prior to pathogen treatment. The limit for viable helminth ova is less than one per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 30 TAC § 312.82(a)(2)(C)(iv-vi) for specific information; or

Alternative 4 - The density of enteric viruses in the sewage sludge shall be less than one Plaque-forming Unit per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. The density of viable helminth ova in the sewage sludge shall be less than one per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed.

- c. Sewage sludge that meets the requirements of Class AB biosolids may be classified a Class A biosolids if a variance request is submitted in writing that is supported by substantial documentation demonstrating equivalent methods for reducing odors and written approval is granted by the executive director. The executive director may deny the variance request or revoke that approved variance if it is determined that the variance may potentially endanger human health or the environment, or create nuisance odor conditions.

- d. Three alternatives are available to demonstrate compliance with Class B biosolids criteria.

Alternative 1

- i. A minimum of seven random samples of the sewage sludge shall be collected within 48 hours of the time the sewage sludge is used or disposed of during each monitoring episode for the sewage sludge.
- ii. The geometric mean of the density of fecal coliform in the samples collected shall be less than either 2,000,000 MPN per gram of total solids (dry weight basis) or 2,000,000 Colony Forming Units per gram of total solids (dry weight basis).

Alternative 2 - Sewage sludge that is used or disposed of shall be treated in one of the Processes to Significantly Reduce Pathogens (PSRP) described in 40 CFR Part 503, Appendix B, so long as all of the following requirements are met by the generator of the sewage sludge.

- i. Prior to use or disposal, all the sewage sludge must have been generated from a single location, except as provided in paragraph v. below;
- ii. An independent Texas Licensed Professional Engineer must make a certification to the generator of a sewage sludge that the wastewater treatment facility generating the sewage sludge is designed to achieve one of the PSRP at the permitted design loading of the facility. The certification need only be repeated if the design loading of the facility is increased. The certification shall include a statement indicating the design meets all the applicable standards specified in Appendix B of 40 CFR Part 503;
- iii. Prior to any off-site transportation or on-site use or disposal of any sewage sludge generated at a wastewater treatment facility, the chief certified operator of the wastewater treatment facility or other responsible official who manages the processes to significantly reduce pathogens at the wastewater treatment facility for the permittee, shall certify that the sewage sludge underwent at least the minimum operational requirements necessary in order to meet one of the PSRP. The acceptable processes and the minimum operational and record keeping requirements shall be in accordance with established U.S. Environmental Protection Agency final guidance;
- iv. All certification records and operational records describing how the requirements of this paragraph were met shall be kept by the generator for a minimum of three years and be available for inspection by commission staff for review; and
- v. If the sewage sludge is generated from a mixture of sources, resulting from a person who prepares sewage sludge from more than one wastewater treatment facility, the resulting derived product shall meet one of the PSRP, and shall meet the certification, operation, and record keeping requirements of this paragraph.

Alternative 3 - Sewage sludge shall be treated in an equivalent process that has been approved by the U.S. Environmental Protection Agency, so long as all of the following requirements are met by the generator of the sewage sludge.

- i. Prior to use or disposal, all the sewage sludge must have been generated from a single location, except as provided in paragraph v. below;
- ii. Prior to any off-site transportation or on-site use or disposal of any sewage sludge generated at a wastewater treatment facility, the chief certified operator of the wastewater treatment facility or other responsible official who manages the processes to significantly reduce pathogens at the wastewater treatment facility for the permittee, shall certify that the sewage sludge underwent at least the minimum operational requirements necessary in order to meet one of the PSRP. The acceptable processes and the minimum operational and record keeping requirements shall be in accordance with established U.S. Environmental Protection Agency final guidance;
- iii. All certification records and operational records describing how the requirements of this paragraph were met shall be kept by the generator for a minimum of three years and be available for inspection by commission staff for review;
- iv. The Executive Director will accept from the U.S. Environmental Protection Agency a finding of equivalency to the defined PSRP; and
- v. If the sewage sludge is generated from a mixture of sources resulting from a person who prepares sewage sludge from more than one wastewater treatment facility, the resulting derived product shall meet one of the Processes to Significantly Reduce Pathogens, and shall meet the certification, operation, and record keeping requirements of this paragraph.

In addition to the Alternatives 1 – 3, the following site restrictions must be met if Class B biosolids are land applied:

- i. Food crops with harvested parts that touch the biosolids /soil mixture and are totally above the land surface shall not be harvested for 14 months after application of biosolids.
- ii. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of biosolids when the biosolids remain the land surface for 4 months or longer prior to incorporation into the soil.
- iii. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of biosolids when the biosolids remain on the land surface for less than 4 months prior to incorporation into the soil.
- iv. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of biosolids.
- v. Domestic livestock shall not be allowed to graze on the land for 30 days after application of biosolids.
- vi. Turf grown on land where biosolids are applied shall not be harvested for 1 year after application of the biosolids when the harvested turf is placed on either land with a high potential for public exposure or a lawn.

- vii. Public access to land with a high potential for public exposure shall be restricted for 1 year after application of biosolids.
 - viii. Public access to land with a low potential for public exposure shall be restricted for 30 days after application of biosolids.
 - ix. Land application of biosolids shall be in accordance with the buffer zone requirements found in 30 TAC § 312.44.
4. Vector Attraction Reduction Requirements

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by one of the following Alternatives 1 through 10 for vector attraction reduction.

- Alternative 1 - The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38%.
- Alternative 2 - If Alternative 1 cannot be met for an anaerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30° and 37° Celsius. Volatile solids must be reduced by less than 17% to demonstrate compliance.
- Alternative 3 - If Alternative 1 cannot be met for an aerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge with percent solids of two percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20° Celsius. Volatile solids must be reduced by less than 15% to demonstrate compliance.
- Alternative 4 - The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20° Celsius.
- Alternative 5 - Sewage sludge shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the sewage sludge shall be higher than 40° Celsius and the average temperature of the sewage sludge shall be higher than 45° Celsius.
- Alternative 6 - The pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali shall remain at 12 or higher for two hours and then remain at a pH of 11.5 or higher for an additional 22 hours at the time the sewage sludge is prepared for sale or given away in a bag or other container.
- Alternative 7 - The percent solids of sewage sludge that does not contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 75% based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are

defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 8 - The percent solids of sewage sludge that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90% based on the moisture content and total solids prior to mixing with other materials at the time the sludge is used. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 9 -

- i. Sewage sludge shall be injected below the surface of the land.
- ii. No significant amount of the sewage sludge shall be present on the land surface within one hour after the sewage sludge is injected.
- iii. When sewage sludge that is injected below the surface of the land is Class A or Class AB with respect to pathogens, the biosolids shall be injected below the land surface within eight hours after being discharged from the pathogen treatment process.

Alternative 10 -

- i. Biosolids applied to the land surface or placed on a surface disposal site shall be incorporated into the soil within six hours after application to or placement on the land.
- ii. When biosolids that are incorporated into the soil is Class A or Class AB with respect to pathogens, the sewage sludge shall be applied to or placed on the land within eight hours after being discharged from the pathogen treatment process.

C. Monitoring Requirements

Toxicity Characteristic Leaching Procedure (TCLP) Test	- once during the term of this permit in the Interim I and Interim II phases, and annually in the Final phase
PCBs	- once during the term of this permit in the Interim I and Interim II phases, and annually in the Final phase

All metal constituents and fecal coliform or *Salmonella* sp. bacteria shall be monitored at the appropriate frequency shown below, pursuant to 30 TAC § 312.46(a)(1):

<u>Amount of biosolids (*) metric tons per 365-day period</u>	<u>Monitoring Frequency</u>
0 to less than 290	Once/Year
290 to less than 1,500	Once/Quarter
1,500 to less than 15,000	Once/Two Months

15,000 or greater

Once/Month

(*) *The amount of bulk biosolids applied to the land (dry wt. basis).*

Representative samples of sewage sludge shall be collected and analyzed in accordance with the methods referenced in 30 TAC § 312.7

Identify each of the analytic methods used by the facility to analyze enteric viruses, fecal coliforms, helminth ova, *Salmonella* sp., and other regulated parameters.

Identify in the following categories (as applicable) the sewage sludge or biosolids treatment process or processes at the facility: preliminary operations (e.g., sludge or biosolids grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

Identify the nature of material generated by the facility (such as a biosolid for beneficial use or land-farming, sewage sludge or biosolids for disposal at a monofill) and whether the material is ultimately conveyed off-site in bulk or in bags.

SECTION II. REQUIREMENTS SPECIFIC TO BULK SEWAGE SLUDGE FOR APPLICATION TO THE LAND MEETING CLASS A, CLASS AB or B BIOSOLIDS PATHOGEN REDUCTION AND THE CUMULATIVE LOADING RATES IN TABLE 2, OR CLASS B PATHOGEN REDUCTION AND THE POLLUTANT CONCENTRATIONS IN TABLE 3

For those permittees meeting Class A, Class AB or B pathogen reduction requirements and that meet the cumulative loading rates in Table 2 below, or the Class B pathogen reduction requirements and contain concentrations of pollutants below listed in Table 3, the following conditions apply:

A. Pollutant Limits

Table 2

<u>Pollutant</u>	Cumulative Pollutant Loading Rate (pounds per acre)*
Arsenic	36
Cadmium	35
Chromium	2677
Copper	1339
Lead	268
Mercury	15
Molybdenum	Report Only
Nickel	375
Selenium	89
Zinc	2500

Table 3

<u>Pollutant</u>	Monthly Average Concentration (milligrams per kilogram)*
Arsenic	41
Cadmium	39
Chromium	1200
Copper	1500
Lead	300
Mercury	17
Molybdenum	Report Only
Nickel	420
Selenium	36
Zinc	2800

*Dry weight basis

B. Pathogen Control

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, a reclamation site, shall be treated by either Class A, Class AB or Class B biosolids pathogen reduction requirements as defined above in Section I.B.3.

C. Management Practices

1. Bulk biosolids shall not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen, or snow-covered so that the bulk sewage sludge or biosolids enters a wetland or other waters in the State.
2. Bulk sewage sludge not meeting Class A biosolids requirements shall be land applied in a manner which complies with Applicability in accordance with 30 TAC §312.41 and the Management Requirements in accordance with 30 TAC § 312.44.
3. Bulk biosolids shall be applied at or below the agronomic rate of the cover crop.
4. An information sheet shall be provided to the person who receives bulk Class A or AB biosolids sold or given away. The information sheet shall contain the following information:
 - a. The name and address of the person who prepared the Class A or AB biosolids that are sold or given away in a bag or other container for application to the land.
 - b. A statement that application of the Class A or AB biosolids to the land is prohibited except in accordance with the instruction on the label or information sheet.
 - c. The annual whole sludge application rate for the sewage sludge application rate for the biosolids that does not cause any of the cumulative pollutant loading rates in Table 2 above to be exceeded, unless the pollutant concentrations in Table 3 found in Section II above are met.

D. Notification Requirements

1. If bulk biosolids are applied to land in a State other than Texas, written notice shall be provided prior to the initial land application to the permitting authority for the State in which the bulk biosolids are proposed to be applied. The notice shall include:
 - a. The location, by street address, and specific latitude and longitude, of each land application site.
 - b. The approximate time period bulk biosolids will be applied to the site.
 - c. The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) for the person who will apply the bulk biosolids.
2. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the biosolids disposal practice.

E. Record Keeping Requirements

The documents will be retained at the facility site and/or shall be readily available for review by a TCEQ representative. The person who prepares bulk sewage sludge or a biosolids material shall develop the following information and shall retain the information at the facility site and/or shall be readily available for review by a TCEQ representative for a period

of five years. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for record keeping found in 30 TAC § 312.47 for persons who land apply.

1. The concentration (mg/kg) in the sludge of each pollutant listed in Table 3 above and the applicable pollutant concentration criteria (mg/kg), or the applicable cumulative pollutant loading rate and the applicable cumulative pollutant loading rate limit (lbs/ac) listed in Table 2 above.
2. A description of how the pathogen reduction requirements are met (including site restrictions for Class AB and Class B biosolids, if applicable).
3. A description of how the vector attraction reduction requirements are met.
4. A description of how the management practices listed above in Section II.C are being met.
5. The following certification statement:

“I certify, under penalty of law, that the applicable pathogen requirements in 30 TAC § 312.82(a) or (b) and the vector attraction reduction requirements in 30 TAC § 312.83(b) have been met for each site on which bulk biosolids are applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices have been met. I am aware that there are significant penalties for false certification including fine and imprisonment.”

6. The recommended agronomic loading rate from the references listed in Section II.C.3. above, as well as the actual agronomic loading rate shall be retained. The person who applies bulk biosolids shall develop the following information and shall retain the information at the facility site and/or shall be readily available for review by a TCEQ representative indefinitely. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for record keeping found in 30 TAC § 312.47 for persons who land apply:
 - a. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 30 TAC § 312.47(a)(4)(A)(ii) or 30 TAC § 312.47(a)(5)(A)(ii), as applicable, and to the permittee’s specific sludge or biosolids treatment activities.
 - b. The location, by street address, and specific latitude and longitude, of each site on which sludge or biosolids are applied.
 - c. The number of acres in each site on which bulk sludge or biosolids are applied.
 - d. The date and time sludge or biosolids are applied to each site.
 - e. The cumulative amount of each pollutant in pounds/acre listed in Table 2 applied to each site.
 - f. The total amount of sludge applied to each site in dry tons.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

F. Reporting Requirements

The permittee shall submit the following information in an annual report to the TCEQ by September 30th of each year. The permittee must submit this annual report using the online electronic reporting system available through TCEQ's website. If the permittee requests and obtains an electronic reporting waiver, the annual report can be submitted in hard copy to the TCEQ Regional Office (MC Region 11) and the Enforcement Division (MC 224).

1. Identify in the following categories (as applicable) the sewage sludge or biosolids treatment process or processes at the facility: preliminary operations (e.g., sludge or biosolids grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.
2. Identify the nature of material generated by the facility (such as a biosolid for beneficial use or land-farming, or sewage sludge for disposal at a monofill) and whether the material is ultimately conveyed off-site in bulk or in bags.
3. Results of tests performed for pollutants found in either Table 2 or 3 as appropriate for the permittee's land application practices.
4. The frequency of monitoring listed in Section I.C. that applies to the permittee.
5. Toxicity Characteristic Leaching Procedure (TCLP) results.
6. PCB concentration in sludge or biosolids in mg/kg.
7. Identity of hauler(s) and TCEQ transporter number.
8. Date(s) of transport.
9. Texas Commission on Environmental Quality registration number, if applicable.
10. Amount of sludge or biosolids disposal dry weight (lbs/acre) at each disposal site.
11. The concentration (mg/kg) in the sludge or biosolids of each pollutant listed in Table 1 (defined as a monthly average) as well as the applicable pollutant concentration criteria (mg/kg) listed in Table 3 above, or the applicable pollutant loading rate limit (lbs/acre) listed in Table 2 above if it exceeds 90% of the limit.
12. Level of pathogen reduction achieved (Class A, Class AB or Class B).
13. Alternative used as listed in Section I.B.3.(a. or b.). Alternatives describe how the pathogen reduction requirements are met. If Class B biosolids, include information on how site restrictions were met.
14. Identify each of the analytic methods used by the facility to analyze enteric viruses, fecal coliforms, helminth ova, *Salmonella* sp., and other regulated parameters.
15. Vector attraction reduction alternative used as listed in Section I.B.4.

16. Amount of sludge or biosolids transported in dry tons/year.
17. The certification statement listed in either 30 TAC § 312.47(a)(4)(A)(ii) or 30 TAC § 312.47(a)(5)(A)(ii) as applicable to the permittee's sludge or biosolids treatment activities, shall be attached to the annual reporting form.
18. When the amount of any pollutant applied to the land exceeds 90% of the cumulative pollutant loading rate for that pollutant, as described in Table 2, the permittee shall report the following information as an attachment to the annual reporting form.
 - a. The location, by street address, and specific latitude and longitude.
 - b. The number of acres in each site on which bulk biosolids are applied.
 - c. The date and time bulk biosolids are applied to each site.
 - d. The cumulative amount of each pollutant (i.e., pounds/acre) listed in Table 2 in the bulk biosolids applied to each site.
 - e. The amount of biosolids (i.e., dry tons) applied to each site.

The above records shall be maintained on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

SECTION III. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE OR BIOSOLIDS DISPOSED IN A MUNICIPAL SOLID WASTE LANDFILL

- A. The permittee shall handle and dispose of sewage sludge or biosolids in accordance with 30 TAC § 330 and all other applicable state and federal regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present. The permittee shall ensure that the sewage sludge or biosolids meet the requirements in 30 TAC § 330 concerning the quality of the sludge disposed in a municipal solid waste landfill.
- B. If the permittee generates sewage sludge or biosolids and supplies that sewage sludge or biosolids to the owner or operator of a municipal solid waste landfill (MSWLF) for disposal, the permittee shall provide to the owner or operator of the MSWLF appropriate information needed to be in compliance with the provisions of this permit.
- C. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the sewage sludge or biosolids disposal practice.
- D. Sewage sludge or biosolids shall be tested once during the term of this permit in the Interim I and Interim II phases, and annually in the Final phase in accordance with the method specified in both 40 CFR Part 261, Appendix II and 40 CFR Part 268, Appendix I (Toxicity Characteristic Leaching Procedure) or other method, which receives the prior approval of the TCEQ for contaminants listed in Table 1 of 40 CFR § 261.24. Sewage sludge or biosolids failing this test shall be managed according to RCRA standards for generators of hazardous waste, and the waste's disposition must be in accordance with all applicable requirements for hazardous waste processing, storage, or disposal.

Following failure of any TCLP test, the management or disposal of sewage sludge or biosolids at a facility other than an authorized hazardous waste processing, storage, or disposal facility shall be prohibited until such time as the permittee can demonstrate the sewage sludge or biosolids no longer exhibits the hazardous waste toxicity characteristics (as demonstrated by the results of the TCLP tests). A written report shall be provided to both the TCEQ Registration and Reporting Section (MC 129) of the Permitting and Registration Support Division and the Regional Director (MC Region 11) of the appropriate TCEQ field office within 7 days after failing the TCLP Test.

The report shall contain test results, certification that unauthorized waste management has stopped, and a summary of alternative disposal plans that comply with RCRA standards for the management of hazardous waste. The report shall be addressed to: Director, Permitting and Registration Support Division (MC 129), Texas Commission on Environmental Quality, P. O. Box 13087, Austin, Texas 78711-3087. In addition, the permittee shall prepare an annual report on the results of all sludge toxicity testing. This annual report shall be submitted to the TCEQ Regional Office (MC Region 11) and the Enforcement Division (MC 224), by September 30th of each year.

- E. Sewage sludge or biosolids shall be tested as needed, in accordance with the requirements of 30 TAC Chapter 330.
- F. Record Keeping Requirements

The permittee shall develop the following information and shall retain the information for five years.

1. The description (including procedures followed and the results) of all liquid Paint Filter Tests performed.
2. The description (including procedures followed and results) of all TCLP tests performed.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

G. Reporting Requirements

The permittee shall submit the following information in an annual report to the TCEQ by September 30th of each year. The permittee must submit this annual report using the online electronic reporting system available through TCEQ's website. If the permittee requests and obtains an electronic reporting waiver, the annual report can be submitted in hard copy to the TCEQ Regional Office (MC Region 11) and the Enforcement Division (MC224).

1. Identify in the following categories (as applicable) the sewage sludge or biosolids treatment process or processes at the facility: preliminary operations (e.g., sludge or biosolids grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.
2. Toxicity Characteristic Leaching Procedure (TCLP) results.
3. Annual sludge or biosolids production in dry tons/year.
4. Amount of sludge or biosolids disposed in a municipal solid waste landfill in dry tons/year.
5. Amount of sludge or biosolids transported interstate in dry tons/year.
6. A certification that the sewage sludge or biosolids meets the requirements of 30 TAC § 330 concerning the quality of the sludge disposed in a municipal solid waste landfill.
7. Identity of hauler(s) and transporter registration number.
8. Owner of disposal site(s).
9. Location of disposal site(s).
10. Date(s) of disposal.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

SECTION IV. REQUIREMENTS APPLYING TO SLUDGE OR BIOSOLIDS TRANSPORTED TO ANOTHER FACILITY FOR FURTHER PROCESSING

These provisions apply to sludge or biosolids that is transported to another wastewater treatment facility or facility that further processes sludge or biosolids. These provisions are intended to allow transport of sludge or biosolids to facilities that have been authorized to accept sludge or biosolids. These provisions do not limit the ability of the receiving facility to determine whether to accept the sludge or biosolids, nor do they limit the ability of the receiving facility to request additional testing or documentation.

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge or biosolids in accordance with 30 TAC Chapter 312 and all other applicable state and federal regulations in a manner that protects public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present in the sludge.
2. Sludge or biosolids may only be transported using a registered transporter or using an approved pipeline.

B. Record Keeping Requirements

1. For sludge or biosolids transported by an approved pipeline, the permittee must maintain records of the following:
 - a. the amount of sludge or biosolids transported;
 - b. the date of transport;
 - c. the name and TCEQ permit number of the receiving facility or facilities;
 - d. the location of the receiving facility or facilities;
 - e. the name and TCEQ permit number of the facility that generated the waste; and
 - f. copy of the written agreement between the permittee and the receiving facility to accept sludge or biosolids.
2. For sludge or biosolids transported by a registered transporter, the permittee must maintain records of the completed trip tickets in accordance with 30 TAC § 312.145(a)(1)-(7) and amount of sludge or biosolids transported.
3. The above records shall be maintained on-site on a monthly basis and shall be made available to the TCEQ upon request. These records shall be retained for at least five years.

C. Reporting Requirements

The permittee shall submit the following information in an annual report to the TCEQ by September 30th of each year. The permittee must submit this annual report using the online electronic reporting system available through TCEQ's website. If the permittee requests and obtains an electronic reporting waiver, the annual report can be submitted in hard copy to the TCEQ Regional Office (MC Region 11) and the Enforcement Division (MC 224).

1. Identify in the following categories (as applicable) the sewage sludge or biosolids treatment process or processes at the facility: preliminary operations (e.g., sludge or biosolids grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.
2. the annual sludge or biosolids production;
3. the amount of sludge or biosolids transported;
4. the owner of each receiving facility;
5. the location of each receiving facility; and
6. the date(s) of disposal at each receiving facility.

TCEQ Revision 06/2020

SPECIAL PROVISIONS for both Sites:

1. This permit is granted subject to the policy of the Commission to encourage the development of area-wide waste collection, treatment, and disposal systems. The Commission reserves the right to amend this permit in accordance with applicable procedural requirements to require the system covered by this permit to be integrated into an area-wide system, if an area-wide system is developed; to require the delivery of the wastes authorized to be collected in, treated by, or discharged from the system, to an area-wide system; or to amend this permit in any other particular to effectuate the Commission's policy. Such amendments may be made when the changes required are advisable for water quality control purposes and are feasible on the basis of waste treatment technology, engineering, financial, and related considerations existing at the time the changes are required, exclusive of the loss of investment in or revenues from any then existing or proposed waste collection, treatment, or disposal system.
2. The permittee shall employ or contract with one or more licensed wastewater treatment facility operators or wastewater system operations companies holding a valid license or registration according to the requirements of 30 TAC Chapter 30, Occupational Licenses and Registrations, and in particular 30 TAC Chapter 30, Subchapter J, Wastewater Operators and Operations Companies.

This Category C facility must be operated by a chief operator or an operator holding a Class C license or higher. The facility must be operated a minimum of five days per week by the licensed chief operator or an operator holding the required level of license or higher. The licensed chief operator or operator holding the required level of license or higher must be available by telephone or pager seven days per week. Where shift operation of the wastewater treatment facility is necessary, each shift which does not have the on-site supervision of the licensed chief operator must be supervised by an operator in charge who is licensed not less than one level below the category for the facility.

3. Prior to construction of the wastewater treatment facilities for the Interim II and Final phases, the permittee shall submit to the TCEQ Wastewater Permitting Section (MC 148) of the Water Quality Division, a summary transmittal letter according to the requirements in 30 TAC § 217.6(d). If requested by the Wastewater Permitting Section, the permittee shall submit plans, specifications and a final engineering design report which comply with the requirements of 30 TAC Chapter 217, Design Criteria for Domestic Wastewater Systems. The permittee shall clearly show how the treatment system will meet the permitted effluent limitations required on Page 2 of the permit. A copy of the summary transmittal letter shall be available at the plant site for inspection by authorized representatives of the TCEQ.

Plans and specifications have been approved for the 0.40 MGD wastewater treatment facility, in accordance with 30 TAC § 217, Design Criteria for Domestic Wastewater Systems. A summary transmittal approval letter was issued January 31, 1999 (Log No. 0299/157).

4. The permittee shall notify the TCEQ Regional Office (MC Region 11) and the Applications Review and Processing Team (MC 148) of the Water Quality Division, in writing at least forty-five (45) days prior to the completion of the new facilities on Notification of Completion Form 20007.
5. The permittee shall comply with the requirements of 30 TAC § 309.13(a) through (d). In addition, by ownership of the required buffer zone area, the permittee shall comply with the requirements of 30 TAC § 309.13(e).

6. The permittee shall comply with buffer zone requirements of 30 TAC §309.13(c). A wastewater treatment plant unit, defined by 30 TAC Section §309.11(9), must be located a minimum horizontal distance of 250 feet from a private well and a minimum horizontal distance of 500 feet from a public water well site, spring, or other similar sources of public drinking water, as provided by §290.41(c)(1)(C) of this title.
7. The permittee shall comply with the buffer zone requirements of 30 TAC §309.13(c), specifically regarding water wells and waters in the state. The permittee must locate the wastewater irrigation fields a minimum horizontal distance of 500 feet from public water wells, springs, or other similar sources of public drinking water; 150 feet from private water wells; and 100 feet from surface waters in the state.
8. Plugging reports for wells that are planned to be plugged shall be submitted to the Water Quality Assessment Team (MC-150) and the TCEQ Regional Office (MC-Region 11) within 30 days of plugging.
9. A wastewater treatment plant unit may not be located in wetlands per 30 TAC §309.13(b).
10. Any new or modified wastewater pond shall be adequately lined to control seepage in accordance with 30 TAC §217.203 and 30 TAC §309.13(d) since the facility overlies the recharge zone of an aquifer. New or modified wastewater ponds shall not be put into service until the permittee demonstrates that the pond liners meet the requirements of 30 TAC §217.203 and 30 TAC §309.13(d). The permittee shall demonstrate that the number, location, and test results of samples collected for geotechnical testing are in accordance with 30 TAC §217.203(d) and (e), and that the liner has a minimum thickness of 3 feet in accordance with 30 TAC §309.13(d) since the facility overlies the recharge zone of an aquifer. The report providing this demonstration shall be submitted to the Water Quality Assessment Team (MC-150) and the TCEQ Regional Office (MC-Region 11) for review and approval prior to use of the wastewater ponds. If a synthetic liner is to be used, the liner thickness shall be a minimum of 40 mils and be constructed with an underground leak detection system with appropriate sampling points.
11. The permittee shall submit the liner certification for a newly-constructed or modified wastewater pond to the Water Quality Assessment Team (MC-150), the TCEQ Regional Office (MC-Region 11), and the TCEQ Compliance Monitoring Section (MC-224) within 30 days of completion and prior to use. The certification shall be signed and sealed by a Texas-licensed Professional Engineer and include a description of how the liner meets the requirements of 30 TAC §217.203 and 30 TAC §309.13(d).
12. Existing facilities for the retention of treated or untreated wastewater shall be adequately managed and lined to control seepage. At least once per month, the permittee shall inspect the sides and bottom (if visible) of the wastewater ponds for signs of damage and leakage, and any pond leak detection systems that are in service. Leaking ponds shall be removed from service, or operated in a manner to prevent discharge, until repairs are made or replacement ponds are constructed.
13. Pond liner certifications and all liner construction and repair documentation shall be maintained by the Permittee for the life of the facility and be made available for TCEQ personnel for inspection and review.

14. The permittee must develop a Seeps/Springs Monitoring Plan for the Cedar Tract irrigation area and submit the plan to the TCEQ Water Quality Assessment Team (MC 150) for review and approval at least 30 days of prior to the commencement of wastewater application.

- a. At a minimum, the plan must include:

- i. A procedure to conduct field checks at the irrigation fields located along and adjacent to (within 50 feet) of all tributaries shown on the USGS topographic map. The field checks must be conducted by a Texas licensed professional engineer or geoscientist.

- A. Prior to operation of the irrigation systems, the permittee must sample a minimum of one existing seep or spring onsite to establish background groundwater quality, if available. The sample(s) must be analyzed in accordance with ii.A. below. Subsequent analyses of seeps or springs onsite must be compared to this background analysis.

- B. Field checks must be conducted quarterly. If possible, the field checks must be within 3 days of a 0.5 inch or greater rain event.

- C. The locations of the field checks must be recorded in a field log kept onsite for TCEQ inspection for 5 years.

- D. The quarterly checks must continue for the life of the system.

- ii. A procedure to obtain grab samples of springs or seeps in the event that springs/seeps develop after irrigation.

- A. The samples from the springs/seeps must be analyzed for chloride, specific conductivity, the complete nitrogen series [$\text{NO}_3 + \text{NO}_2 - \text{N}$], Total Kjeldahl Nitrogen, ammonia-N], total phosphorus, and ortho-phosphate. The laboratory and analytical methods used must be NELAC accredited and comply with 30 Texas Administrative Code (TAC) Chapter 25.

- B. The locations of the seeps/springs that were sampled must be recorded in a field log kept onsite for TCEQ inspection for 5 years, along with the results of the laboratory analyses.

- C. Monitoring of emerging springs/seeps and of existing seeps must continue for the life of the system.

- b. Permittee must implement the plan upon approval by the Water Quality Assessment Team. The permittee or executive director may request modification of the approved plan if future information indicates that it would be necessary for the protection of the environment.

- c. Permittee must submit the data from the Seeps/Springs Monitoring Plan to the Water Quality Assessment Team (MC 150) of the Water Quality Division and the Compliance Monitoring Section (MC-224) by September 30th of each year for review.

- d. The presence of seep and springs in the irrigation area may require the removal/adjustment of irrigation spray heads, revisions to the irrigation application rate, revisions to the irrigation methods, or other corrective measures, such as buffers, to prevent the discharge of wastewater to surface waters in the state.
15. The permittee shall provide facilities for the protection of its wastewater treatment facility from a 100-year flood.
16. Holding or storage ponds shall conform to the design criteria for stabilization ponds with regard to construction and levee design and shall maintain a minimum freeboard of two feet according to 30 TAC Chapter 217, Design Criteria for Domestic Wastewater Systems.
17. Permanent transmission lines shall be installed from the holding pond to each tract of land to be irrigated utilizing effluent from that pond.

Golf Course Provisions

18. The irrigated crops include Bermuda grass and Rye grass. Application rates to the irrigated land shall not exceed 3.83 acre-feet per year per acre irrigated. The permittee is responsible for providing equipment to determine application rates and maintaining accurate records of the volume of effluent applied. These records shall be made available for review by the Texas Commission on Environmental Quality and shall be maintained for at least three years.
19. Irrigation practices shall be designed and managed as to prevent ponding of effluent or contamination of ground and surface waters and to prevent the occurrence of nuisance conditions in the area. The Bermuda grass and ryegrass shall be established and well maintained in the irrigation area throughout the year for effluent and nutrient uptake by the crop and to prevent pathways for effluent surfacing. Tailwater control facilities shall be provided as necessary to prevent the discharge of any effluent from the irrigated land.
20. Effluent shall not be applied for irrigation during rainfall events or when the ground is frozen or saturated.
21. The permittee shall erect adequate signs stating that the irrigation water is from a non-potable water supply for any area where treated effluent is stored or where there exist hose bibs or faucets. Signs shall consist of a red slash superimposed over the international symbol for drinking water accompanied by the message "DO NOT DRINK THE WATER" in both English and Spanish. All piping transporting the effluent shall be clearly marked with these same signs.
22. Spray fixtures for the irrigation system shall be of such design that they cannot be operated by unauthorized personnel.
23. Irrigation with effluent shall be accomplished only when the area specified is not in use.
24. The permittee shall ensure the use of cultural practices to promote and maintain the health and propagation of the Bermuda grass and ryegrass crops and avoid plant lodging. The permittee shall ensure the harvest of the crops (cut and remove it from the field) at least once during the year.

25. The physical condition of the spray irrigation fields will be monitored on a weekly basis when the fields are being utilized for the purpose of wastewater irrigation. Any areas with problems such as surface runoff, surficial erosion, stressed or damaged vegetation will be recorded in the field log kept onsite and corrective measures will be initiated within 24 hours of discovery.
26. The permittee shall obtain representative soil samples from the root zones of the land application area. Composite sampling techniques shall be used. Each composite sample shall represent no more than 80 acres with no less than 10 to 15 subsamples representing each composite sample. Subsamples shall be composited by like sampling depth, type of crop and soil type for analysis and reporting. Soil types are soils that have like topsoil or plow layer textures. These soils shall be sampled individually from 0 to 6 inches, 6 to 18 inches and 18 to 30 inches below ground level. The permittee shall sample soils in December to February of each year. Soil samples shall be analyzed within 30 days of sample collection.

Samples shall be analyzed annually according to the following table:

Parameter	Method	Minimum Analytical Level (MAL)	Reporting units
pH	2:1 (v/v) water to soil mixture		Reported to 0.1 pH units after calibration of pH meter
Electrical Conductivity	2:1 (v/v) water to soil mixture	0.01	dS/m (same as mmho/cm)
Nitrate-nitrogen	From a 1 <u>N</u> KCl soil extract	1	mg/kg (dry weight basis)
Total Kjeldahl Nitrogen (TKN)	For determination of Organic plus Ammonium Nitrogen. Procedures that use Mercury (Hg) are not acceptable.	20	mg/kg (dry weight basis)
Total Nitrogen	= TKN plus Nitrate-nitrogen		mg/kg (dry weight basis)
Plant-available: Phosphorus	Mehlich III with inductively coupled plasma	1 (P)	mg/kg (dry weight basis)
Plant-available: Potassium (K)	May be determined in the	5 (K)	mg/kg (dry weight basis)

	same Mehlich III extract with inductively coupled plasma		
Amendment addition, e.g., gypsum			Report in <i>short tons/acre</i> in the year effected

A copy of this soil testing plan shall be provided to the analytical laboratory prior to sample analysis. The permittee shall submit the results of the annual soil sample analyses with copies of the laboratory reports and a map depicting the areas that have received wastewater within the permanent land application fields to the TCEQ Regional Office (MC Region 11), the Water Quality Assessment Team (MC 150), and the Compliance Monitoring Team (MC 224) of the Enforcement Division, no later than the end of September of each sampling year. If wastewater is not applied in a particular year, the permittee shall notify the same TCEQ offices and indicate that wastewater has not been applied on the approved land irrigation site(s) during that year.

Cedar Tree Non-public access Land Provisions

27. The permittee will maintain native cedar trees on the disposal site. Application rates to the Interim II phase of 117 acres, and Final phase of 184 acres irrigated land shall not exceed 3.83 acre-feet per year per acre irrigated. The permittee is responsible for providing equipment to determine application rates and maintaining accurate records of the volume of effluent applied. These records shall be made available for review by the Texas Commission on Environmental Quality and shall be maintained for at least three years.
28. Irrigation practices shall be designed and managed as to prevent ponding of effluent or contamination of ground and surface waters and to prevent the occurrence of nuisance conditions in the area. The cedar tree field shall be established and well maintained in the irrigation area throughout the year for effluent and nutrient uptake by the crop and to prevent pathways for effluent surfacing. Tailwater control facilities shall be provided as necessary to prevent the discharge of any effluent from the irrigated land.
29. Effluent shall not be applied for irrigation during rainfall events or when the ground is frozen or saturated.
30. The permittee shall erect adequate signs stating that the irrigation water is from a non-potable water supply for any area where treated effluent is stored or where there exist hose bibs or faucets. Signs shall consist of a red slash superimposed over the international symbol for drinking water accompanied by the message "DO NOT DRINK THE WATER" in both English and Spanish. All piping transporting the effluent shall be clearly marked with these same signs.
31. Spray fixtures for the irrigation system shall be of such design that they cannot be operated by unauthorized personnel.
32. Irrigation with effluent shall be accomplished only when the area specified is not in use.

33. The permittee shall use cultural practices to promote and maintain the health and propagation of cedar tree crops and avoid plant lodging. The herbaceous vegetation existing amongst the cedar trees shall be harvested (cut and removed from the field) by the permittee at least once during the year. Harvesting and/or mowing dates shall be recorded in a log book kept on site to be made available to TCEQ personnel upon request
34. The physical condition of the spray irrigation fields will be monitored on a weekly basis when the fields are being utilized for the purpose of wastewater irrigation. Any areas with problems such as surface runoff, surficial erosion, stressed or damaged vegetation will be recorded in the field log kept onsite and corrective measures will be initiated within 24 hours of discovery.
35. The permittee shall provide automatic shutdown alarm controls for the irrigation system of the elevated heads that will be continuously responsive to the measured wind speed and direction to prevent nuisance spray drift off the irrigation site.
36. The permittee shall provide a continuous on-line chlorine residual analyzer at the irrigation pumps for the elevated heads that shut down the system if the required chlorine disinfection residual is not maintained.
37. The permittee shall analyze the irrigation effluent once a year for total Kjeldahl nitrogen, nitrate-nitrogen and total phosphorus. Total nitrogen equals TKN plus nitrate-nitrogen. The permittee shall include the irrigation effluent result with the soil testing results by September of each year.
38. Open areas in the spray circle shall be managed with agronomic cultural practices that will ensure success of establishment and permanence of the Bermuda and ryegrasses. The grasses shall be established with adequate vegetative cover and maintained for year-round erosion control.
39. The permittee shall submit a Final Irrigation Management Plan to the TCEQ Water Quality Assessment Team (MC-150) for approval and/or modification before any wastewater is applied to the permitted area. The Final Irrigation Management Plan will include the layout of the main lines of the irrigation system, the locations of each spray nozzle, height of the spray nozzles, wastewater dosing schedule, and a proposal to prevent freezing, rupture or averting mechanical damage to the irrigation lines.

The Final Irrigation Management Plan will also include a recent leaf off aerial photograph that will show the spatial distribution and density of the cedar and other evergreen tree canopy. The aerial photograph should support the individual location of the irrigation spray nozzles that will assure complete canopy coverage within the nozzle circular spray area and minimize fall through to the ground.
40. The permittee shall obtain representative soil samples from the root zones of the land application area. Composite sampling techniques shall be used. Each composite sample shall represent no more than 80 acres with no less than 10 subsamples representing each composite sample. Subsamples shall be composited by like sampling depth, type of crop and soil type for analysis and reporting. Soil types are soils that have like topsoil or plow layer textures. These soils shall be sampled individually from 0 to 6 inches, 6 to 18 inches and 18 to 30 inches below ground level. The permittee shall sample soils in December to February of each year. Soil samples shall be analyzed within 30 days of sample collection.

Samples shall be analyzed annually according to the following table:

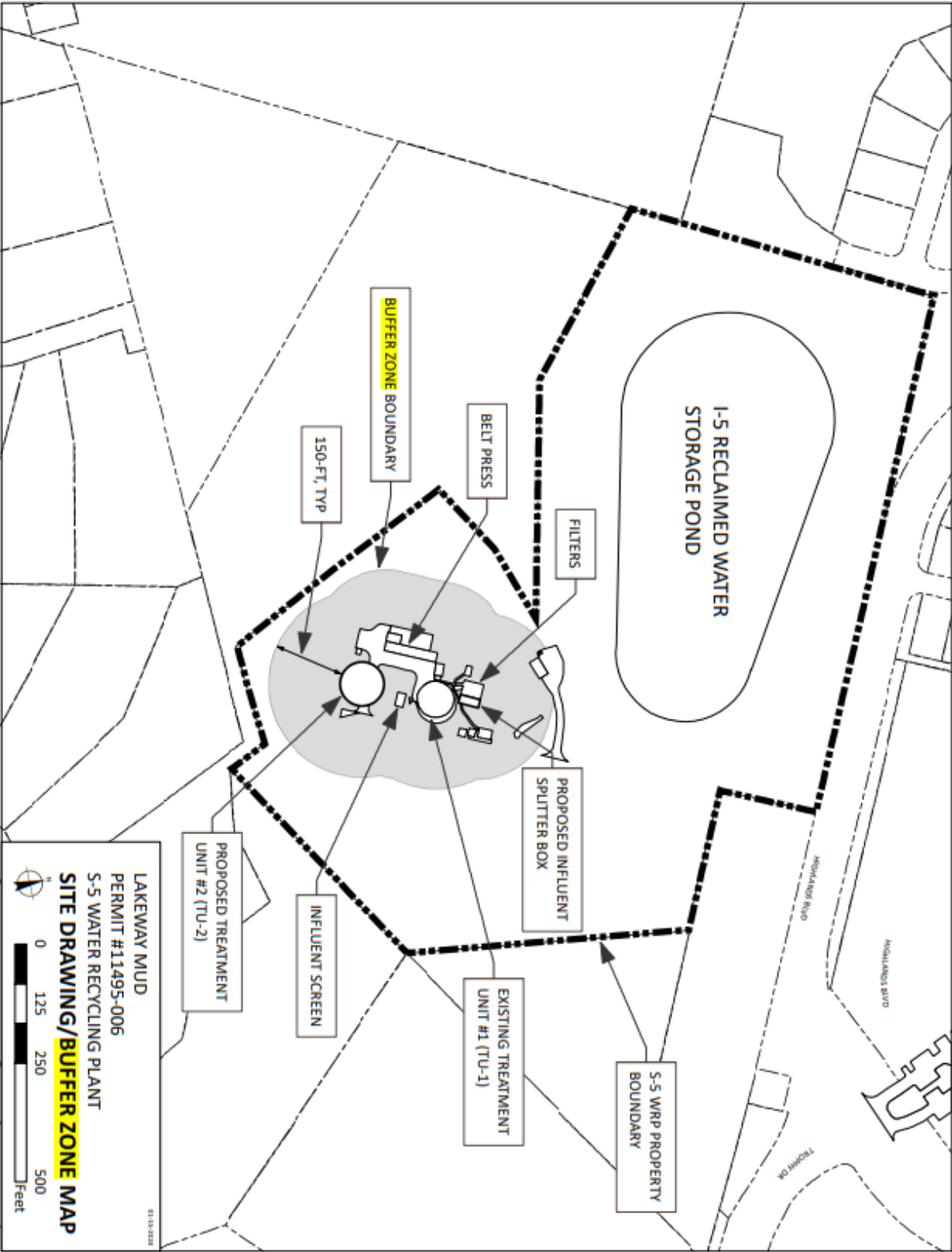
Parameter	Method	Minimum Analytical Level (MAL)	Reporting units
pH	2:1 (v/v) water to soil mixture		Reported to 0.1 pH units after calibration of pH meter
Electrical Conductivity	2:1 (v/v) water to soil mixture	0.01	dS/m (same as mmho/cm)
Nitrate-nitrogen	From a 1 <u>N</u> KCl soil extract	1	mg/kg (dry weight basis)
Total Kjeldahl Nitrogen (TKN)	For determination of Organic plus Ammonium Nitrogen. Procedures that use Mercury (Hg) are not acceptable.	20	mg/kg (dry weight basis)
Total Nitrogen	= TKN plus Nitrate-nitrogen		mg/kg (dry weight basis)
Plant-available: Phosphorus	Mehlich III with inductively coupled plasma	1 (P)	mg/kg (dry weight basis)
Plant-available: Potassium (K)	May be determined in the same Mehlich III extract with inductively coupled plasma	5 (K)	mg/kg (dry weight basis)
Amendment addition, e.g., gypsum			Report in <i>short tons/acre</i> in the year effected

A copy of this soil testing plan shall be provided to the analytical laboratory prior to sample analysis. The permittee shall submit the results of the annual soil sample analyses with copies of the laboratory reports and a map depicting the areas that have received wastewater within the permanent land application fields to the TCEQ Regional Office (MC Region 11), the Water Quality Assessment Team (MC 150), and the Compliance Monitoring Team (MC 224) of the Enforcement Division, no later than the end of September of each sampling year.

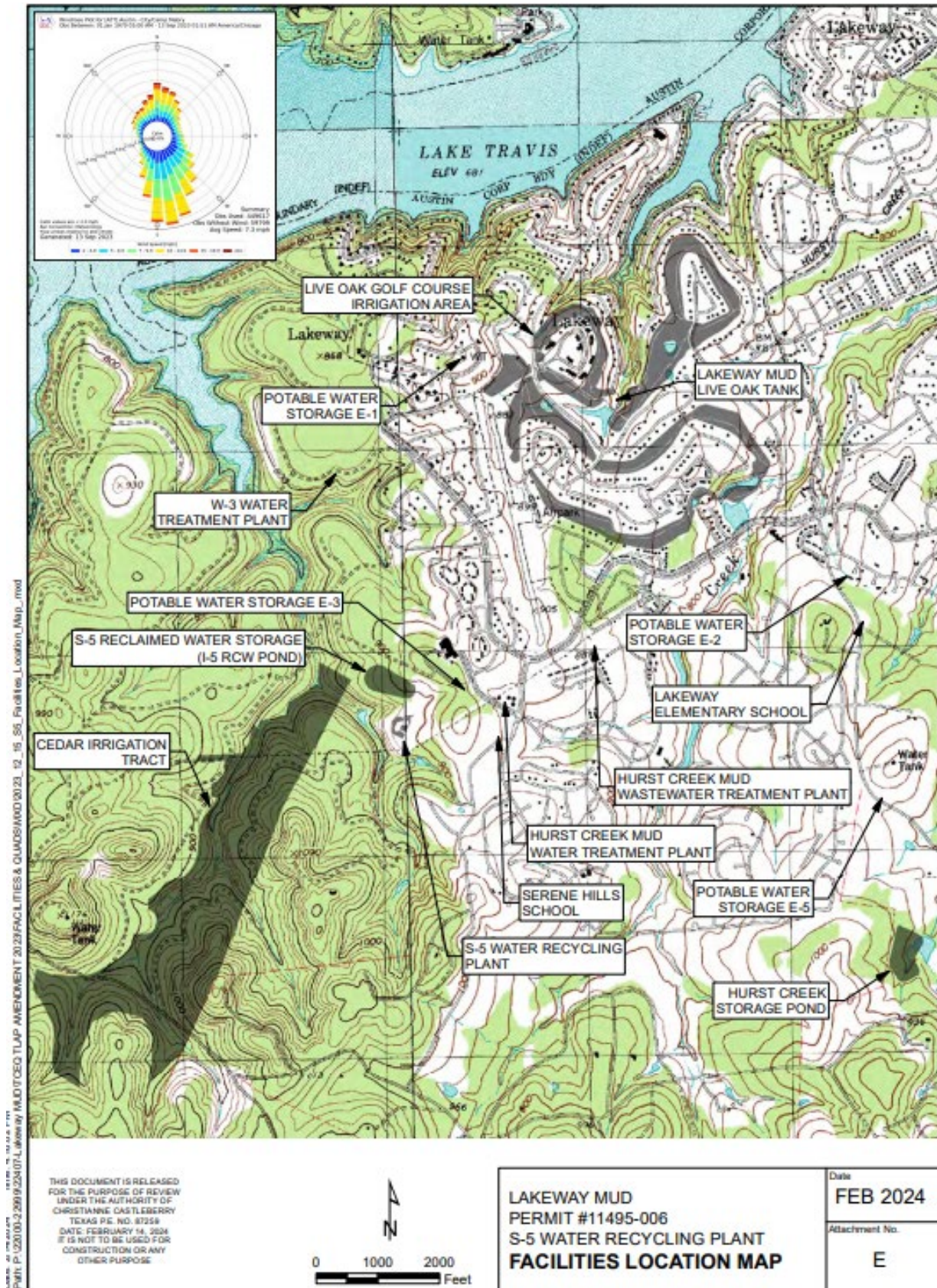
If wastewater is not applied in a particular year, the permittee shall notify the same TCEQ offices and indicate that wastewater has not been applied on the approved land irrigation site(s) during that year.

41. Within 120 days of permit issuance, the Permittee shall cancel TCEQ Permit No. WQ0014534001 in order to not have the same field permitted under separate authorizations.

ATTACHMENT A – WWTP Site Map
TCEQ Permit No. WQ0011495006
Lakeway Municipal Utility District



ATTACHMENT B – Irrigation/Facilities Location Map
TCEQ Permit No. WQ0011495006
Lakeway Municipal Utility District



TECHNICAL SUMMARY AND EXECUTIVE DIRECTOR'S PRELIMINARY DECISION

DESCRIPTION OF APPLICATION

Applicant:	Lakeway Municipal Utility District TCEQ Permit No. WQ0011495006
Regulated Activity:	Domestic Wastewater Permit
Type of Application:	Major Amendment with Renewal
Request:	Major Amendment
Authority:	Texas Water Code (TWC) § 26.027; 30 Texas Administrative Code (TAC) Chapters 305, 309, 312, 319, and 30; and Commission policies.

EXECUTIVE DIRECTOR RECOMMENDATION

The Executive Director has made a preliminary decision that this permit, if issued, meets all statutory and regulatory requirements. The draft permit includes an expiration date of **five years from the date of issuance**, according to 30 TAC Section 305.127(1)(C)(ii)(III).

REASON FOR PROJECT PROPOSED

Lakeway Municipal Utility District (MUD) has applied to the Texas Commission on Environmental Quality (TCEQ) for a major amendment of Permit No. WQ0011495006 to authorize consolidation with existing permit No. WQ0014534001 and authorize the disposal of treated domestic wastewater at a daily average flow not to exceed 0.40 million gallons per day (MGD) via surface irrigation of 117 acres of the Live Oak Golf Course in the Interim I phase, 0.80 MGD via surface irrigation of 117 acres of the Live Oak Golf Course and 117 acres of non-public access cedar tree land in the Interim II phase, and 1.03 MGD via surface irrigation of 117 acres of the Live Oak Golf Course and 184 acres of non-public access cedar tree land in the Final phase. For storage of treated effluent prior to irrigation, the existing Interim I facility includes a storage pond with a total surface area of 6.5 acres and a total capacity of 117 acre-feet, the Interim II phase facility will add a storage tank with a total capacity of 61 acre-feet, and the Final phase facility will add another storage tank with a total capacity of 55 acre-feet for a total combined storage capacity of 233 acre-feet. The existing wastewater treatment facility serves Lakeway MUD.

PROJECT DESCRIPTION AND LOCATION

The S5 Water Recycling Plant consists of an activated sludge process plant using the conventional mode. Treatment units in the existing Interim I phase consist of a mechanical rotating drum fine screen, an anoxic basin, two aeration basins, a final clarifier, an aerobic digester, a belt press, two filters, and a chlorine contact basin. Treatment units in the Interim II phase will consist of a mechanical rotating drum fine screen, two anoxic basins, six aeration basins, two final clarifiers, an aerobic digester, a belt press, three filters, and a chlorine contact basin. Treatment units in the Final phase will consist of a mechanical rotating fine screen, three

Lakeway Municipal Utility District

Permit No. WQ0011495006

Statement of Basis/Technical Summary and Executive Director's Preliminary Decision

anoxic basins, nine aeration basin, three final clarifiers, five aerobic digesters, a belt press, four filters, and two chlorine contact basins. The facility is currently operating in the Interim I phase.

Sludge generated from the treatment facility is hauled by a registered transporter and disposed of at a TCEQ-permitted landfill, JV Dirt + Loam, MSW Permit No. 2310, in Travis County. The draft permit also authorizes the disposal of sludge at a TCEQ-authorized land application site, co-disposal landfill, wastewater treatment facility, or facility that further processes sludge.

The wastewater treatment facility and disposal site are located at 251 Highlands Boulevard, Lakeway, approximately 2.0 miles northwest of the intersection of Ranch Road 620 and Lohmans Crossing Road and 0.5 miles east of the intersection of Bee Creek Road and State Highway 71 in Travis County, Texas 78734.

The wastewater treatment facility and disposal site are located in the drainage basin of Lake Travis in Segment No. 1404 of the Colorado River. No discharge of pollutants into water in the state is authorized by this permit.

SUMMARY OF EFFLUENT DATA

The following is a summary of the applicant's effluent monitoring data of permit No. WQ0011495006 for the period January 2022 through February 2024. The average of Daily Average value is computed by averaging of all 30-day average values for the reporting period for each parameter: flow, five-day biochemical oxygen demand (BOD₅), and total suspended solids (TSS).

<u>Parameter</u>	<u>Average of Daily Average</u>
Flow, MGD	0.30
BOD ₅ , mg/l	2.8
TSS, mg/l	3.0

The treatment facilities for TCEQ Permit No. WQ0014534001 was not constructed, so no effluent data is available.

DRAFT PERMIT CONDITIONS

The draft permit authorizes the disposal of treated domestic wastewater effluent at a daily average flow not to exceed 0.40 MGD via surface irrigation of 117 acres of the Live Oak Golf Course in the Interim I phase, 0.80 MGD via surface irrigation of 117 acres of the Live Oak Golf Course and 117 acres of non-public access cedar tree land in the Interim II phase, and 1.03 MGD via surface irrigation of 117 acres of the Live Oak Golf Course and 184 acres of non-public access cedar tree land in the Final phase. For storage of treated effluent prior to irrigation, the existing Interim I facility includes a storage pond with a total surface area of 6.5 acres and a total capacity of 117 acre-feet, the Interim II phase facility will add a storage tank with a total capacity of 61 acre-feet, and the Final phase facility will add another storage tank with a total capacity of 55 acre-feet for a total combined storage capacity of 233 acre-feet. Application rates to the irrigated land shall not exceed 3.83 acre-feet per year per acre irrigated. The irrigated crops include Bermuda and Rye grass on the golf course, and native cedar trees on the non-public access land.

The effluent limitations in the draft permit, based on a daily average, are 20 mg/l biochemical oxygen demand (BOD₅) and 20 mg/l total suspended solids (TSS). The effluent shall contain a total chlorine residual of at least 1.0 mg/l after a detention time of at least 20 minutes based on peak flow.

The draft permit includes Sludge Provisions according to the requirements of 30 TAC Chapter 312, Sludge Use, Disposal, and Transportation. Sludge generated from the treatment facility is hauled by a registered transporter and disposed of at a TCEQ-permitted landfill, JV Dirt + Loam, MSW Permit No. 2310, in Travis County. The draft permit also authorizes the disposal of sludge at a TCEQ-authorized land application site, co-disposal landfill, wastewater treatment facility, or facility that further processes sludge.

SUMMARY OF CHANGES FROM APPLICATION

None.

SUMMARY OF CHANGES FROM EXISTING PERMIT

Effluent limitations and monitoring requirements in the draft permit remain the same as the existing permits effluent limitations and monitoring requirements.

Based on the application request and the consolidation with permit WQ0014534001, an Interim II phase with a daily average flow of 0.80 MGD, and a Final phase with a daily average flow of 1.03 MGD have been added to the draft permit.

The Special Provisions section has been updated to reflect the consolidation with permit No. WQ0014534001.

Special Provision No. 41 was added to cancel Permit No. WQ0014534001 within 120 days from permit issuance.

Certain accidental discharges or spills of treated or untreated wastewater from wastewater treatment facilities or collection systems owned or operated by a local government may be reported on a monthly basis in accordance with 30 TAC § 305.132.

The draft permit includes all updates based on the 30 TAC 312 rule change effective April 23, 2020.

BASIS FOR DRAFT PERMIT

The following items were considered in developing the draft permit:

1. Application received on May 17, 2024, and additional information received May 24, 2024, and December 19, 2024.
2. Existing TCEQ permits: Permit No. WQ0011495006 issued on January 8, 2015, and Permit No. WQ0014534001 issued on January 17, 2020.
3. Interoffice Memorandum from the Water Quality Assessment Team, Water Quality

Assessment & Standards Section, Water Quality Division.

PROCEDURES FOR FINAL DECISION

When an application is declared administratively complete, the Chief Clerk sends a letter to the applicant advising the applicant to publish the Notice of Receipt of Application and Intent to Obtain Permit in the newspaper. In addition, the Chief Clerk instructs the applicant to place a copy of the application in a public place for review and copying in the county where the facility is or will be located. This application will be in a public place throughout the comment period. The Chief Clerk also mails this notice to any interested persons and, if required, to landowners identified in the permit application. This notice informs the public about the application and provides that an interested person may file comments on the application or request a contested case hearing or a public meeting.

Once a draft permit is completed, it is sent, along with the Executive Director's preliminary decision, as contained in the technical summary or fact sheet, to the Chief Clerk. At that time, the Notice of Application and Preliminary Decision will be mailed to the same people and published in the same newspaper as the prior notice. This notice sets a deadline for making public comments. The applicant must place a copy of the Executive Director's preliminary decision and draft permit in the public place with the application.

Any interested person may request a public meeting on the application until the deadline for filing public comments. A public meeting is intended for the taking of public comment and is not a contested case proceeding.

After the public comment deadline, the Executive Director prepares a response to all significant public comments on the application or the draft permit raised during the public comment period. The Chief Clerk then mails the Executive Director's response to comments and final decision to people who have filed comments, requested a contested case hearing, or requested to be on the mailing list. This notice provides that if a person is not satisfied with the Executive Director's response and decision, they can request a contested case hearing or file a request to reconsider the Executive Director's decision within 30 days after the notice is mailed.

The Executive Director will issue the permit unless a written hearing request or request for reconsideration is filed within 30 days after the Executive Director's response to comments and final decision is mailed. If a hearing request or request for reconsideration is filed, the Executive Director will not issue the permit and will forward the application and request to the TCEQ Commissioners for their consideration at a scheduled Commission meeting. If a contested case hearing is held, it will be a legal proceeding similar to a civil trial in state district court.

If the Executive Director calls a public meeting or the Commission grants a contested case hearing as described above, the Commission will give notice of the date, time, and place of the meeting or hearing. If a hearing request or request for reconsideration is made, the Commission will consider all public comments in making its decision and shall either adopt the Executive Director's response to public comments or prepare its own response.

Lakeway Municipal Utility District

Permit No. WQ0011495006

Statement of Basis/Technical Summary and Executive Director's Preliminary Decision

For additional information about this application, contact Shaun M. Speck at (512) 239-4549.

Shaun M. Speck

Shaun M. Speck

Municipal Permits Team

Wastewater Permitting Section (MC 148)

Date

May 17, 2024

Texas Commission on Environmental Quality
Attn: Applications Review & Processing Team
Bldg. F, Rm. 2101
12100 Park 35 Circle
Austin, TX 78753

**RE: Lakeway MUD - S-5 Water Recycling Plant (a.k.a. New World of Tennis Wastewater Plant S5)
Permit No. WQ0011495006
Permit Major Amendment**

Dear Applications Review & Processing Team:

The enclosed application and supporting documents for major amendment of the above referenced permit are submitted for the Commission's review and processing. The documents have been prepared by Castleberry Engineering & Consulting, P.L.L.C. as an independent consultant retained by the applicant.

The purpose of the amendment is to reflect the complete transfer of the existing wastewater permit WQ0014534001, previously maintained by Travis County Municipal Utility District No. 12 (TCMUD 12; RN 104372941) to the existing permit WQ0011495006 maintained by Lakeway Municipal Utility District (LMUD; RN 101714996). Transfer of permits was initiated via TCEQ Form 20031 Application to Transfer a Wastewater Permit filed on March 22, 2024, and accepted by TCEQ on May 15, 2024 (See Attachments B and C for Basis of Permit and copy of transfer form, respectively). **The amendment proposes to combine and maintain all previously approved and permitted Final permit conditions, including treatment facility capacity, reclaimed water storage volume, irrigation application rate, and irrigation disposal sites.**

The combined permit authorizations amount to a daily average flow not to exceed 1.03 million gallons per day (MGD) with surface irrigation disposal of 301 acres and total combined storage capacity of 233 acre-feet (76 MG) in the Final phase. However, an Interim II permit condition for a daily average flow of 0.8 MGD with surface irrigation of 234 acres and total combined storage capacity of 178 acre-feet (58 MG) is also requested to reflect current S-5 Water Recycling Plant expansion needs.

Please contact us if there are any questions regarding this application for renewal to the existing Permit WQ0011495006.

Sincerely,

Castleberry Engineering & Consulting



Christianne Castleberry, P.E.
District Engineer

Enclosures

cc: Mr. Earl Foster, General Manager



**Application to the
Texas Commission on Environmental Quality
for**

PERMIT AMENDMENT

Permit No. 11495-006

LAKEWAY MUNICIPAL UTILITY DISTRICT



May 2024

Prepared by:

CE&C | **P.L.L.C.**

Castleberry Engineering & Consulting, P.L.L.C.
Texas Firm Registration Number 10084

James R. Glaser, P.E. Engineering & Consulting, P.L.L.C.
Texas Firm Registration Number 16693



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

DOMESTIC WASTEWATER PERMIT APPLICATION CHECKLIST

Complete and submit this checklist with the application.

APPLICANT: Lakeway Municipal Utility District

PERMIT NUMBER: WQ0011495006

Indicate if each of the following items is included in your application.

	Y	N		Y	N
Administrative Report 1.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Original USGS Map	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Administrative Report 1.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Affected Landowners Map	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SPIF	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Landowner Disk or Labels	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Core Data Form	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Buffer Zone Map	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Public Involvement Plan Form	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Flow Diagram	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Technical Report 1.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Site Drawing	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Technical Report 1.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Original Photographs	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Worksheet 2.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Design Calculations	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Worksheet 2.1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Solids Management Plan	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Worksheet 3.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Water Balance	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Worksheet 3.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
Worksheet 3.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Worksheet 3.3	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Worksheet 4.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Worksheet 5.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Worksheet 6.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
Worksheet 7.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>			

For TCEQ Use Only

Segment Number _____ County _____
 Expiration Date _____ Region _____
 Permit Number _____



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

**APPLICATION FOR A DOMESTIC WASTEWATER PERMIT
ADMINISTRATIVE REPORT 1.0**

If you have questions about completing this form please contact the Applications Review and Processing Team at 512-239-4671.

Section 1. Application Fees (Instructions Page 29)

Indicate the amount submitted for the application fee (check only one).

Flow	New/Major Amendment	Renewal
<0.05 MGD	\$350.00 <input type="checkbox"/>	\$315.00 <input type="checkbox"/>
≥0.05 but <0.10 MGD	\$550.00 <input type="checkbox"/>	\$515.00 <input type="checkbox"/>
≥0.10 but <0.25 MGD	\$850.00 <input type="checkbox"/>	\$815.00 <input type="checkbox"/>
≥0.25 but <0.50 MGD	\$1,250.00 <input type="checkbox"/>	\$1,215.00 <input type="checkbox"/>
≥0.50 but <1.0 MGD	\$1,650.00 <input type="checkbox"/>	\$1,615.00 <input type="checkbox"/>
≥1.0 MGD	\$2,050.00 <input checked="" type="checkbox"/>	\$2,015.00 <input type="checkbox"/>

Minor Amendment (for any flow) \$150.00 ☐

Payment Information:

Mailed Check/Money Order Number: 70139
Check/Money Order Amount: \$ 2,300.00
Name Printed on Check: Lakeway Municipal Utility District

EPAY Voucher Number:

Copy of Payment Voucher enclosed? Yes ☐

Section 2. Type of Application (Instructions Page 29)

- | | |
|---|---|
| <input type="checkbox"/> New TPDES | <input type="checkbox"/> New TLAP |
| <input checked="" type="checkbox"/> Major Amendment <u>with</u> Renewal | <input type="checkbox"/> Minor Amendment <u>with</u> Renewal |
| <input type="checkbox"/> Major Amendment <u>without</u> Renewal | <input type="checkbox"/> Minor Amendment <u>without</u> Renewal |
| <input type="checkbox"/> Renewal without changes | <input type="checkbox"/> Minor Modification of permit |

For amendments or modifications, describe the proposed changes: Reflect transferred permit WQ0014534001 and alter permit interim flow to reflect the current S-5 Water Recycling Plant expansion as flows to the facility are approaching 75 percent of the current permitted flow. See Attachment B for Basis of Permit explanation.

For existing permits:

Permit Number: WQ0011495-006

EPA I.D. (TPDES only): TX

Expiration Date: December 1, 2024

Section 3. Facility Owner (Applicant) and Co-Applicant Information (Instructions Page 29)

A. The owner of the facility must apply for the permit.

What is the Legal Name of the entity (applicant) applying for this permit?

Lakeway Municipal Utility District

(The legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal documents forming the entity.)

If the applicant is currently a customer with the TCEQ, what is the Customer Number (CN)?

You may search for your CN on the TCEQ website at <http://www15.tceq.texas.gov/crpub/>

CN: 600634513

What is the name and title of the person signing the application? The person must be an executive official meeting signatory requirements in 30 TAC § 305.44.

Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Lawrence M. Christian

Credential (P.E, P.G., Ph.D., etc.):

Title: Lakeway MUD Board President

B. Co-applicant information. Complete this section only if another person or entity is required to apply as a co-permittee.

What is the Legal Name of the co-applicant applying for this permit?

(The legal name must be spelled exactly as filed with the TX SOS, with the County, or in the legal documents forming the entity.)

If the co-applicant is currently a customer with the TCEQ, what is the Customer Number (CN)? You may search for your CN on the TCEQ website at:

<http://www15.tceq.texas.gov/crpub/>

CN:

What is the name and title of the person signing the application? The person must be an executive official meeting signatory requirements in 30 TAC § 305.44.

Prefix (Mr., Ms., Miss):

First and Last Name:

Credential (P.E, P.G., Ph.D., etc.):

Title: [Redacted]

Provide a brief description of the need for a co-permittee: [Redacted]

C. Core Data Form

Complete the Core Data Form for each customer and include as an attachment. If the customer type selected on the Core Data Form is **Individual**, complete **Attachment 1** of Administrative Report 1.0.

Attachment: See Attachment A1.

Section 4. Application Contact Information (Instructions Page 30)

This is the person(s) TCEQ will contact if additional information is needed about this application. Provide a contact for administrative questions and technical questions.

A. Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Earl Foster

Credential (P.E, P.G., Ph.D., etc.): MA ; AA W/WW Operator License

Title: General Manager

Organization Name: Lakeway Municipal Utility District

Mailing Address: 1097 Lohmans Crossing

City, State, Zip Code: Lakeway, TX 78734

Phone No.: 512-261-6222 Ext.: 140 Fax No.: 512-261-6681

E-mail Address: efoster@lakewaymud.org

Check one or both: ☒ Administrative Contact ☐ Technical Contact

B. Prefix (Mr., Ms., Miss): Ms.

First and Last Name: Christianne Castleberry

Credential (P.E, P.G., Ph.D., etc.): P.E.

Title: District Engineer

Organization Name: Castleberry Engineering & Consulting, PLLC

Mailing Address: P.O. Box 40546

City, State, Zip Code: Austin, TX 78704

Phone No.: 512-751-9272 Ext.: [Redacted] Fax No.: [Redacted]

E-mail Address: c.castleberry@castleberryengineering.com

Check one or both: ☐ Administrative Contact ☒ Technical Contact

Section 5. Permit Contact Information (Instructions Page 30)

Provide two names of individuals that can be contacted throughout the permit term.

A. Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Earl Foster

Credential (P.E, P.G., Ph.D., etc.): MA ; AA W/WW Operator License

Title: General Manager

Organization Name: Lakeway Municipal Utility District

Mailing Address: 1097 Lohmans Crossing

City, State, Zip Code: Lakeway, TX 78734

Phone No.: 512-261-6222 Ext.: 140 Fax No.: 512-261-6681

E-mail Address: efoster@lakewaymud.org

B. Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Lawrence M. Christian

Credential (P.E, P.G., Ph.D., etc.):

Title: Lakeway MUD Board President

Organization Name: Lakeway Municipal Utility District

Mailing Address: 1097 Lohmans Crossing

City, State, Zip Code: Lakeway, TX 78734

Phone No.: 512-261-6222 Ext.: Fax No.: 512-261-6681

E-mail Address: LChristian@LakewayMUD.org

Section 6. Billing Information (Instructions Page 30)

The permittee is responsible for paying the annual fee. The annual fee will be assessed to permits ***in effect on September 1 of each year***. The TCEQ will send a bill to the address provided in this section. The permittee is responsible for terminating the permit when it is no longer needed (using form TCEQ-20029).

Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Earl Foster

Credential (P.E, P.G., Ph.D., etc.): MA; AA W/WW Operator License

Title: General Manager

Organization Name: Lakeway Municipal Utility District

Mailing Address: 1097 Lohmans Crossing

City, State, Zip Code: Lakeway, TX 78734

Phone No.: 512-261-6222 Ext.: 140 Fax No.: 512-261-6681

E-mail Address: efoster@lakewaymud.org

Section 7. DMR/MER Contact Information (Instructions Page 31)

Provide the name and complete mailing address of the person delegated to receive and submit Discharge Monitoring Reports (EPA 3320-1) or maintain Monthly Effluent Reports.

Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Earl Foster

Credential (P.E, P.G., Ph.D., etc.): MA; AA W/WW Operator License

Title: General Manager

Organization Name: Lakeway Municipal Utility District

Mailing Address: 1097 Lohmans Crossing

City, State, Zip Code: Lakeway, TX 78734

Phone No.: 512-261-6222 Ext.: 140 Fax No.: 512-261-6681

E-mail Address: efoster@lakewaymud.org

DMR data is required to be submitted electronically. Create an account at:

<https://www.tceq.texas.gov/permitting/netdmr/netdmr.html>.

Section 8. Public Notice Information (Instructions Page 31)

A. Individual Publishing the Notices

Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Earl Foster

Credential (P.E, P.G., Ph.D., etc.): MA; AA W/WW Operator License

Title: General Manager

Organization Name: Lakeway Municipal Utility District

Mailing Address: 1097 Lohmans Crossing

City, State, Zip Code: Lakeway, TX 78734

Phone No.: 512-261-6222 Ext.: 140 Fax No.: 512-261-6681

E-mail Address: efoster@lakewaymud.org

B. Method for Receiving Notice of Receipt and Intent to Obtain a Water Quality Permit Package

Indicate by a check mark the preferred method for receiving the first notice and instructions:

☒ E-mail Address

☐ Fax

☒ Regular Mail

C. Contact person to be listed in the Notices

Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Earl Foster

Credential (P.E, P.G., Ph.D., etc.): MA; AA W/WW Operator License

Title: General Manager

Organization Name: Lakeway Municipal Utility District

Phone No.: 512-261-6222 Ext.: 140

E-mail: efoster@lakewaymud.org

D. Public Viewing Information

If the facility or outfall is located in more than one county, a public viewing place for each county must be provided.

Public building name: Lakeway Municipal Utility District

Location within the building: District Office reception desk

Physical Address of Building: 1097 Lohmans Crossing

City: Lakeway

County: Travis

Contact Name: Earl Foster

Phone No.: 512-261-6222 Ext.: 140

E. Bilingual Notice Requirements:

This information **is required** for **new, major amendment, minor amendment or minor modification, and renewal applications.**

This section of the application is only used to determine if alternative language notices will be needed. Complete instructions on publishing the alternative language notices will be in your public notice package.

Please call the bilingual/ESL coordinator at the nearest elementary and middle schools and obtain the following information to determine whether an alternative language notices are required.

1. Is a bilingual education program required by the Texas Education Code at the elementary or middle school nearest to the facility or proposed facility?

☐ Yes ☒ No

If **no**, publication of an alternative language notice is not required; **skip to** Section 9 below.

2. Are the students who attend either the elementary school or the middle school enrolled in a bilingual education program at that school?

☐ Yes ☐ No

3. Do the students at these schools attend a bilingual education program at another location?

☐

Yes

☐

No

4. Would the school be required to provide a bilingual education program but the school has waived out of this requirement under 19 TAC §89.1205(g)?

☐

Yes

☐

No

5. If the answer is yes to question 1, 2, 3, or 4, public notices in an alternative language are required. Which language is required by the bilingual program?

F. Public Involvement Plan Form

Complete the Public Involvement Plan Form (TCEQ Form 20960) for each application for a **new permit or major amendment to a permit** and include as an attachment.

Attachment: Attachment A2

Section 9. Regulated Entity and Permitted Site Information (Instructions Page 33)

A. If the site is currently regulated by TCEQ, provide the Regulated Entity Number (RN) issued to this site. RN101714996

Search the TCEQ's Central Registry at <http://www15.tceq.texas.gov/crpub/> to determine if the site is currently regulated by TCEQ.

B. Name of project or site (the name known by the community where located):

New World of Tennis Wastewater Plant S5 (should be "S-5 Water Recycling Plant"; see Attachment A1)

C. Owner of treatment facility: Lakeway Municipal Utility District

Ownership of Facility: ☒ Public ☐ Private ☐ Both ☐ Federal

D. Owner of land where treatment facility is or will be:

Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Earl Foster (LMUD General Manager)

Mailing Address: 1097 Lohmans Crossing

City, State, Zip Code: Lakeway, TX 78734

Phone No.: 512.261.6222

E-mail Address: efoster@lakewaymud.org

If the landowner is not the same person as the facility owner or co-applicant, attach a lease agreement or deed recorded easement. See instructions.

Attachment:

E. Owner of effluent disposal site:

Prefix (Mr., Ms., Miss): [REDACTED]

First and Last Name: [REDACTED]

Mailing Address: [REDACTED]

City, State, Zip Code: [REDACTED]

Phone No.: [REDACTED] E-mail Address: [REDACTED]

If the landowner is not the same person as the facility owner or co-applicant, attach a lease agreement or deed recorded easement. See instructions.

Attachment: See Attachment C.

- F. Owner of sewage sludge disposal site (if authorization is requested for sludge disposal on property owned or controlled by the applicant):

Prefix (Mr., Ms., Miss): [REDACTED]

First and Last Name: [REDACTED]

Mailing Address: [REDACTED]

City, State, Zip Code: [REDACTED]

Phone No.: [REDACTED] E-mail Address: [REDACTED]

If the landowner is not the same person as the facility owner or co-applicant, attach a lease agreement or deed recorded easement. See instructions.

Attachment: N/A

Section 10. TPDES Discharge Information (Instructions Page 34)

- A. Is the wastewater treatment facility location in the existing permit accurate?

☒ Yes ☐ No

If **no**, or a new permit application, please give an accurate description:

The location is the same as in the original permit, but the address has changed to 251 Highlands Blvd., Lakeway, TX 78734 (from 123 Trophy Drive). (See Attachment A1.)

- B. Are the point(s) of discharge and the discharge route(s) in the existing permit correct?

☒ Yes ☐ No

If **no**, or a new or amendment permit application, provide an accurate description of the point of discharge and the discharge route to the nearest classified segment as defined in 30 TAC Chapter 307:

N/A

City nearest the outfall(s): N/A

County in which the outfalls(s) is/are located: N/A

Outfall Latitude: N/A

Longitude: N/A

- C. Is or will the treated wastewater discharge to a city, county, or state highway right-of-way, or a flood control district drainage ditch?

☐ Yes ☒ No

If **yes**, indicate by a check mark if:

☐ Authorization granted ☐ Authorization pending

For **new and amendment** applications, provide copies of letters that show proof of contact and the approval letter upon receipt.

Attachment: N/A

- D. For all applications involving an average daily discharge of 5 MGD or more, provide the names of all counties located within 100 statute miles downstream of the point(s) of discharge.

N/A

Section 11. TLAP Disposal Information (Instructions Page 36)

- A. For TLAPs, is the location of the effluent disposal site in the existing permit accurate?

☒ Yes ☐ No

If **no, or a new or amendment permit application**, provide an accurate description of the disposal site location:

Considering transfer of TCMUD 12 permit WO0014534001 to the existing Lakeway MUD permit, all proposed irrigation area has already been permitted.

- B. City nearest the disposal site: Lakeway, TX

- C. County in which the disposal site is located: Travis

- D. Disposal Site Latitude: 30.362 (GC)/30.348 (cedar) Longitude: -97.993 (GC)/-98.006 (cedar)

- E. For **TLAPs**, describe the routing of effluent from the treatment facility to the disposal site:

See Attachment D.

- F. For **TLAPs**, please identify the nearest watercourse to the disposal site to which rainfall runoff might flow if not contained:

See Attachment D.

Section 12. Miscellaneous Information (Instructions Page 37)

A. Is the facility located on or does the treated effluent cross American Indian Land?

☐ Yes ☒ No

B. If the existing permit contains an onsite sludge disposal authorization, is the location of the sewage sludge disposal site in the existing permit accurate?

☐ Yes ☐ No ☒ Not Applicable

If No, or if a new onsite sludge disposal authorization is being requested in this permit application, provide an accurate location description of the sewage sludge disposal site.

C. Did any person formerly employed by the TCEQ represent your company and get paid for service regarding this application?

☒ Yes ☐ No

If yes, list each person formerly employed by the TCEQ who represented your company and was paid for service regarding the application:

Paul Reynolds - agronomist

D. Do you owe any fees to the TCEQ?

☐ Yes ☒ No

If **yes**, provide the following information:

Account number:

Amount past due:

E. Do you owe any penalties to the TCEQ?

☐ Yes ☒ No

If **yes**, please provide the following information:

Enforcement order number:

Amount past due:

Section 13. Attachments (Instructions Page 38)

Indicate which attachments are included with the Administrative Report. Check all that apply:

- ☒ Lease agreement or deed recorded easement, if the land where the treatment facility is located or the effluent disposal site are not owned by the applicant or co-applicant.
- ☒ Original full-size USGS Topographic Map with the following information:
 - Applicant's property boundary
 - Treatment facility boundary
 - Labeled point of discharge for each discharge point (TPDES only)
 - Highlighted discharge route for each discharge point (TPDES only)
 - Onsite sewage sludge disposal site (if applicable)
 - Effluent disposal site boundaries (TLAP only)
 - New and future construction (if applicable)
 - 1 mile radius information
 - 3 miles downstream information (TPDES only)
 - All ponds.
- ☐ Attachment 1 for Individuals as co-applicants
- ☒ Other Attachments. Please specify: See Attachment Index.

Section 14. Signature Page (Instructions Page 39)

If co-applicants are necessary, each entity must submit an original, separate signature page.

Permit Number: WQ00011495-006

Applicant: Lakeway Municipal Utility District

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 there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code § 305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

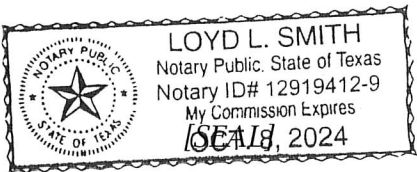
Signatory name (typed or printed): Lawrence M. Christian

Signatory title: Lakeway MUD Board President

Signature:  Date: 4.29.2024
(Use blue ink)

Subscribed and Sworn to before me by the said LAWRENCE M. CHRISTIAN
on this 29th day of APRIL, 20 24.
My commission expires on the 8th day of OCTOBER, 20 24.


Notary Public



TRAVIS
County, Texas

Section 15. Plain Language Summary (Instructions Page 40)

If you are subject to the alternative language notice requirements in [30 Texas Administrative Code §39.426](#), **you must provide a translated copy of the completed plain language summary in the appropriate alternative language as part of your application package.** For your convenience, a Spanish template has been provided below.

ENGLISH TEMPLATE FOR TPDES or TLAP NEW/RENEWAL/AMENDMENT APPLICATIONS

DOMESTIC WASTEWATER

The following summary is provided for this pending water quality permit application being reviewed by the Texas Commission on Environmental Quality as required by 30 Texas Administrative Code Chapter 39. The information provided in this summary may change during the technical review of the application and are not federal enforceable representations of the permit application.

Lakeway Municipal Utility District (CN600634513) operates S-5 Water Recycling Plant RN 101714996. an activated sludge process plant using the conventional mode. The facility is located at 251 Highlands Blvd., in Lakeway, Travis County, Texas 78738.

This amendment is intended to reflect completed transfer of permit WQ0014534001, per submitted Application to Transfer a Wastewater Permit (TCEQ Form 20031), and alter permit interim flow to reflect the current S-5 Water Recycling Plant expansion. <<For TLAP applications include the following sentence, otherwise delete:>> This permit will not authorize a discharge of pollutants into water in the state.

Discharges from the facility are expected to contain reclaimed water effluent, per Type 1 effluent standards. Effluent is treated by *treatment units including bar screens, effluent filters, aeration basins, final clarifier, aerobic digester, belt filter press and a chlorine contact chamber.*

PLANTILLA EN ESPAÑOL PARA SOLICITUDES NUEVAS/RENOVACIONES/ENMIENDAS TPDES o TLAP

AGUAS RESIDUALES DOMÉSTICAS

El siguiente resumen se proporciona para esta solicitud de permiso de calidad del agua pendiente que está siendo revisada por la Comisión de Calidad Ambiental de Texas según lo requerido por el Capítulo 39 del Código Administrativo de Texas 30. La información proporcionada en este resumen puede cambiar durante la revisión técnica de la solicitud y no son representaciones federales exigibles de la solicitud de permiso.

1. Introduzca el nombre del solicitante aquí. (2. Introduzca el número de cliente aquí (es decir, CN6 #####).) 3. Elija del menú desplegable. 4. Introduzca el nombre de la instalación aquí. 5. Introduzca el número de entidad regulada aquí (es decir, RN1 #####). 6. Elija del menú desplegable. 7. Introduzca la descripción de la instalación aquí. . La instalación 8. Elija del menú desplegable. ubicado 9. Introduzca la ubicación aquí. , en 10. Introduzca el nombre de la ciudad aquí. , Condado de 11. Introduzca el nombre del condado aquí. , Texas 12. Introduzca el código postal aquí. . 13. Introduzca el resumen de la solicitud de solicitud aquí. <<Para las aplicaciones de TLAP incluya la siguiente oración, de lo contrario, elimine:>> Este permiso no autorizará una descarga de contaminantes en el agua en el estado.

Se espera que las descargas de la instalación contengan 14. Liste todos los contaminantes esperados aquí. . 15. Introduzca los tipos de aguas residuales descargadas aquí. 16. Elija del menú desplegable. tratado por 17. Introduzca una descripción del tratamiento de aguas residuales utilizado en la instalación aquí.

DOMESTIC ADMINISTRATIVE REPORT 1.1

The following information is required for new and amendment applications.

Section 1. Affected Landowner Information (Instructions Page 41)

- A. Indicate by a check mark that the landowners map or drawing, with scale, includes the following information, as applicable:
- ☒ The applicant's property boundaries
 - ☒ The facility site boundaries within the applicant's property boundaries
 - ☒ The distance the buffer zone falls into adjacent properties and the property boundaries of the landowners located within the buffer zone
 - ☒ The property boundaries of all landowners surrounding the applicant's property (Note: if the application is a major amendment for a lignite mine, the map must include the property boundaries of all landowners adjacent to the new facility (ponds).)
 - ☐ The point(s) of discharge and highlighted discharge route(s) clearly shown for one mile downstream
 - ☐ The property boundaries of the landowners located on both sides of the discharge route for one full stream mile downstream of the point of discharge
 - ☐ The property boundaries of the landowners along the watercourse for a one-half mile radius from the point of discharge if the point of discharge is into a lake, bay, estuary, or affected by tides
 - ☒ The boundaries of the effluent disposal site (for example, irrigation area or subsurface drainfield site) and all evaporation/holding ponds within the applicant's property
 - ☒ The property boundaries of all landowners surrounding the effluent disposal site
 - ☐ The boundaries of the sludge land application site (for land application of sewage sludge for beneficial use) and the property boundaries of landowners surrounding the applicant's property boundaries where the sewage sludge land application site is located
 - ☐ The property boundaries of landowners within one-half mile in all directions from the applicant's property boundaries where the sewage sludge disposal site (for example, sludge surface disposal site or sludge monofill) is located
- B. ☒ Indicate by a check mark that a separate list with the landowners' names and mailing addresses cross-referenced to the landowner's map has been provided.
- C. Indicate by a check mark in which format the landowners list is submitted:
- ☐ USB Drive
 - ☒ Four sets of labels
- D. Provide the source of the landowners' names and mailing addresses: Travis County Appraisal District and Lakeway MUD customer records
- E. As required by *Texas Water Code § 5.115*, is any permanent school fund land affected by this application?
- ☐ Yes
 - ☒ No

If **yes**, provide the location and foreseeable impacts and effects this application has on the land(s):

Section 2. Original Photographs (Instructions Page 44)

Provide original ground level photographs. Indicate with checkmarks that the following information is provided.

- ☒ At least one original photograph of the new or expanded treatment unit location
- ☐ At least two photographs of the existing/proposed point of discharge and as much area downstream (photo 1) and upstream (photo 2) as can be captured. If the discharge is to an open water body (e.g., lake, bay), the point of discharge should be in the right or left edge of each photograph showing the open water and with as much area on each respective side of the discharge as can be captured.
- ☒ At least one photograph of the existing/proposed effluent disposal site
- ☒ A plot plan or map showing the location and direction of each photograph

Section 3. Buffer Zone Map (Instructions Page 44)

A. Buffer zone map. Provide a buffer zone map on 8.5 x 11-inch paper with all of the following information. The applicant's property line and the buffer zone line may be distinguished by using dashes or symbols and appropriate labels.

- The applicant's property boundary;
- The required buffer zone; and
- Each treatment unit; and
- The distance from each treatment unit to the property boundaries.

B. Buffer zone compliance method. Indicate how the buffer zone requirements will be met. Check all that apply.

- ☒ Ownership
- ☐ Restrictive easement
- ☐ Nuisance odor control
- ☐ Variance

C. Unsuitable site characteristics. Does the facility comply with the requirements regarding unsuitable site characteristic found in 30 TAC § 309.13(a) through (d)?

- ☒ Yes ☐ No

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

SUPPLEMENTAL PERMIT INFORMATION FORM (SPIF)

FOR AGENCIES REVIEWING DOMESTIC TPDES WASTEWATER PERMIT APPLICATIONS

TCEQ USE ONLY:

Application type: ____Renewal ____Major Amendment ____Minor Amendment ____New

County: _____ Segment Number: _____

Admin Complete Date: _____

Agency Receiving SPIF:

____ Texas Historical Commission

____ U.S. Fish and Wildlife

____ Texas Parks and Wildlife Department

____ U.S. Army Corps of Engineers

This form applies to TPDES permit applications only. (Instructions, Page 53)

The SPIF must be completed as a separate document. The TCEQ will mail a copy of the SPIF to each agency as required by the TCEQ agreement with EPA. If any of the items are not completely addressed or further information is needed, you will be contacted to provide the information before the permit is issued. Each item must be completely addressed.

Do not refer to a response of any item in the permit application form. Each attachment must be provided with this form separately from the administrative report of the application. The application will not be declared administratively complete without this form being completed in its entirety including all attachments.

The following applies to all applications:

1. Permittee: _____

Permit No. WQ00 _____

EPA ID No. TX _____

Address of the project (or a location description that includes street/highway, city/vicinity, and county):

Provide the name, address, phone and fax number of an individual that can be contacted to answer specific questions about the property.

Prefix (Mr., Ms., Miss):

First and Last Name:

Credential (P.E, P.G., Ph.D., etc.):

Title:

Mailing Address:

City, State, Zip Code:

Phone No.: Ext.: Fax No.:

E-mail Address:

2. List the county in which the facility is located:
3. If the property is publicly owned and the owner is different than the permittee/applicant, please list the owner of the property.

4. Provide a description of the effluent discharge route. The discharge route must follow the flow of effluent from the point of discharge to the nearest major watercourse (from the point of discharge to a classified segment as defined in 30 TAC Chapter 307). If known, please identify the classified segment number.

5. Please provide a separate 7.5-minute USGS quadrangle map with the project boundaries plotted and a general location map showing the project area. Please highlight the discharge route from the point of discharge for a distance of one mile downstream. (This map is required in addition to the map in the administrative report).

Provide original photographs of any structures 50 years or older on the property.

Does your project involve any of the following? Check all that apply.

- ☐ Proposed access roads, utility lines, construction easements
- ☐ Visual effects that could damage or detract from a historic property's integrity
- ☐ Vibration effects during construction or as a result of project design
- ☐ Additional phases of development that are planned for the future

☐ Sealing caves, fractures, sinkholes, other karst features

☐ Disturbance of vegetation or wetlands

6. List proposed construction impact (surface acres to be impacted, depth of excavation, sealing of caves, or other karst features):

7. Describe existing disturbances, vegetation, and land use:

THE FOLLOWING ITEMS APPLY ONLY TO APPLICATIONS FOR NEW TPDES PERMITS AND MAJOR AMENDMENTS TO TPDES PERMITS

8. List construction dates of all buildings and structures on the property:

9. Provide a brief history of the property, and name of the architect/builder, if known.

WATER QUALITY PERMIT

PAYMENT SUBMITTAL FORM

Use this form to submit the Application Fee, if the mailing the payment.

- Complete items 1 through 5 below.
- Staple the check or money order in the space provided at the bottom of this document.
- **Do not mail this form with the application form.**
- Do not mail this form to the same address as the application.
- Do not submit a copy of the application with this form as it could cause duplicate permit entries.

Mail this form and the check or money order to:

BY REGULAR U.S. MAIL

Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
P.O. Box 13088
Austin, Texas 78711-3088

BY OVERNIGHT/EXPRESS MAIL

Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
12100 Park 35 Circle
Austin, Texas 78753

Fee Code: WQP **Waste Permit No: WQ0011495006**

1. Check or Money Order Number: 70139
2. Check or Money Order Amount: \$2,300 [\$2,050 (>1 MGD Major Amend) + \$250 postage fee]
3. Date of Check or Money Order: April 18, 2024
4. Name on Check or Money Order: Lakeway Municipal Utility District
5. APPLICATION INFORMATION

Name of Project or Site: New World of Tennis Wastewater Plant S5 (should be "S-5 Water Recycling Plant"; See Attachment A1)

Physical Address of Project or Site: The location is the same as in the original permit, but the address has changed to 251 Highlands Blvd., Lakeway, TX 78734 (from 123 Trophy Drive). (See Attachment A1.)

If the check is for more than one application, attach a list which includes the name of each Project or Site (RE) and Physical Address, exactly as provided on the application.

Staple Check or Money Order in This Space

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ATTACHMENT 1

INDIVIDUAL INFORMATION

Section 1. Individual Information (Instructions Page 50)

Complete this attachment if the facility applicant or co-applicant is an individual. Make additional copies of this attachment if both are individuals.

Prefix (Mr., Ms., Miss):

Full legal name (first, middle, last):

Driver's License or State Identification Number:

Date of Birth:

Mailing Address:

City, State, and Zip Code:

Phone Number: Fax Number:

E-mail Address:

CN:

For Commission Use Only:

Customer Number:

Regulated Entity Number:

Permit Number:

CHECKLIST OF COMMON DEFICIENCIES

Below is a list of common deficiencies found during the administrative review of domestic wastewater permit applications. To ensure the timely processing of this application, please review the items below and indicate by checking Yes that each item is complete and in accordance applicable rules at 30 TAC Chapters 21, 281, and 305. If an item is not required this application, indicate by checking N/A where appropriate. Please do not submit the application until the items below have been addressed.

Core Data Form (TCEQ Form No. 10400) <i>(Required for all applications types. Must be completed in its entirety and signed. Note: Form may be signed by applicant representative.)</i>	<input checked="" type="checkbox"/>		Yes
Correct and Current Industrial Wastewater Permit Application Forms <i>(TCEQ Form Nos. 10053 and 10054. Version dated 6/25/2018 or later.)</i>	<input type="checkbox"/>		Yes
Water Quality Permit Payment Submittal Form (Page 19) <i>(Original payment sent to TCEQ Revenue Section. See instructions for mailing address.)</i>	<input checked="" type="checkbox"/>		Yes
7.5 Minute USGS Quadrangle Topographic Map Attached <i>(Full-size map if seeking "New" permit. 8 ½ x 11 acceptable for Renewals and Amendments)</i>	<input checked="" type="checkbox"/>		Yes
Current/Non-Expired, Executed Lease Agreement or Easement Attached	<input checked="" type="checkbox"/>	N/A	<input type="checkbox"/> Yes
Landowners Map <i>(See instructions for landowner requirements)</i>	<input type="checkbox"/>	N/A	<input checked="" type="checkbox"/> Yes

Things to Know:

- All the items shown on the map must be labeled.
- The applicant's complete property boundaries must be delineated which includes boundaries of contiguous property owned by the applicant.
- The applicant cannot be its own adjacent landowner. You must identify the landowners immediately adjacent to their property, regardless of how far they are from the actual facility.
- If the applicant's property is adjacent to a road, creek, or stream, the landowners on the opposite side must be identified. Although the properties are not adjacent to applicant's property boundary, they are considered potentially affected landowners. If the adjacent road is a divided highway as identified on the USGS topographic map, the applicant does not have to identify the landowners on the opposite side of the highway.

Landowners Cross Reference List <i>(See instructions for landowner requirements)</i>	<input type="checkbox"/>	N/A	<input checked="" type="checkbox"/> Yes
Landowners Labels or USB Drive attached <i>(See instructions for landowner requirements)</i>	<input type="checkbox"/>	N/A	<input checked="" type="checkbox"/> Yes
Original signature per 30 TAC § 305.44 – Blue Ink Preferred <i>(If signature page is not signed by an elected official or principle executive officer, a copy of signature authority/delegation letter must be attached)</i>	<input checked="" type="checkbox"/>		Yes

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
DOMESTIC WASTEWATER PERMIT APPLICATION

DOMESTIC TECHNICAL REPORT 1.0

**The Following Is Required For All Applications
Renewal, New, And Amendment**

Section 1. Permitted or Proposed Flows (Instructions Page 51)

A. Existing/Interim I Phase

Design Flow (MGD): 0.4 MGD

2-Hr Peak Flow (MGD): 1.32 MGD

Estimated construction start date: July 2000

Estimated waste disposal start date: July 2000

B. Interim II Phase

Design Flow (MGD): 0.80 MGD

2-Hr Peak Flow (MGD): 2.64 MGD

Estimated construction start date: May 2024

Estimated waste disposal start date: September 2025

C. Final Phase

Design Flow (MGD): 1.03 MGD

2-Hr Peak Flow (MGD): 3.40 MGD

Estimated construction start date: TBD by capacity needs

Estimated waste disposal start date: TBD by capacity needs

D. Current operating phase: Existing/Interim I

Provide the startup date of the facility: 2000

Section 2. Treatment Process (Instructions Page 51)

A. Treatment process description

Provide a detailed description of the treatment process. **Include the type of**

treatment plant, mode of operation, and all treatment units. Start with the plant's head works and finish with the point of discharge. Include all sludge processing and drying units. **If more than one phase exists or is proposed in the permit, a description of *each phase* must be provided.** Process description:

See Attachment I (Treatment Process Description/Dimensions) and Attachment K (Plant Design Calculations).

Port or pipe diameter at the discharge point, in inches: N/A

B. Treatment Units

In Table 1.0(1), provide the treatment unit type, the number of units, and dimensions (length, width, depth) of each treatment unit, accounting for ***all*** phases of operation.

Table 1.0(1) - Treatment Units

Treatment Unit Type	Number of Units	Dimensions (L x W x D)
See Attachment I.		

C. Process flow diagrams

Provide flow diagrams for the existing facilities and **each** proposed phase of construction.

Attachment: See Attachment J (Flow Diagram).

Section 3. Site Drawing (Instructions Page 52)

Provide a site drawing for the facility that shows the following:

- The boundaries of the treatment facility;
- The boundaries of the area served by the treatment facility;
- If land disposal of effluent, the boundaries of the disposal site and all

storage/holding ponds; and

- If sludge disposal is authorized in the permit, the boundaries of the land application or disposal site.

Attachment: See Attachment E (Facilities Location Map) & Attachment H (S-5 WRP Site Drawing/Buffer Zone Map) & Attachment L (Service Area Map).

Provide the name and a description of the area served by the treatment facility.

The S-5 Water Recycling Plant serves the western portion of the Lakeway MUD wastewater CCN service area, in addition to providing wholesale service to Travis County MUD's 11, 12 and 13 (known as the Rough Hollow and Lakeway Highlands development areas).

Section 4. Unbuilt Phases (Instructions Page 52)

Is the application for a renewal of a permit that contains an unbuilt phase or phases?

Yes ☒

No ☐

If yes, does the existing permit contain a phase that has not been constructed within five years of being authorized by the TCEQ?

Yes ☐

No ☒

If yes, provide a detailed discussion regarding the continued need for the unbuilt phase. Failure to provide sufficient justification may result in the Executive Director recommending denial of the unbuilt phase or phases.

Section 5. Closure Plans (Instructions Page 53)

Have any treatment units been taken out of service permanently, or will any units be taken out of service in the next five years?

Yes ☐

No ☒

If **yes**, was a closure plan submitted to the TCEQ?

Yes ☐ No ☐

If **yes**, provide a brief description of the closure and the date of plan approval.

Section 6. Permit Specific Requirements (Instructions Page 53)

For applicants with an existing permit, check the *Other Requirements* or *Special Provisions* of the permit.

A. Summary transmittal

Have plans and specifications been approved for the existing facilities and each proposed phase?

Yes ☐ No ☒

If **yes**, provide the date(s) of approval for each phase:

Provide information, including dates, on any actions taken to meet a requirement or provision pertaining to the submission of a summary transmittal letter. Provide a copy of an approval letter from the TCEQ, if applicable.

NA

B. Buffer zones

Have the buffer zone requirements been met?

Yes ☒ No ☐

Provide information below, including dates, on any actions taken to meet the conditions of the buffer zone. If available, provide any new documentation relevant to maintaining the buffer zones.

See Attachment E (Facilities Location Map) and Attachment H (S-5 Water Recycling Plant Site Drawing/Buffer Zone Map).

C. Other actions required by the current permit

Does the *Other Requirements* or *Special Provisions* section in the existing permit require submission of any other information or other required actions? Examples include Notification of Completion, progress reports, soil monitoring data, etc.

Yes ☒ No ☐

If **yes**, provide information below on the status of any actions taken to meet the conditions of an *Other Requirement* or *Special Provision*.

Soil sampling – in compliance

D. Grit and grease treatment

1. Acceptance of grit and grease waste

Does the facility have a grit and/or grease processing facility onsite that treats and decants or accepts transported loads of grit and grease waste that are discharged directly to the wastewater treatment plant prior to any treatment?

Yes ☐ No ☒

If **No**, stop here and continue with Subsection E. Stormwater Management.

2. Grit and grease processing

Describe below how the grit and grease waste is treated at the facility. In your description, include how and where the grit and grease is introduced to the treatment works and how it is separated or processed. Provide a flow diagram showing how grit and grease is processed at the facility.

3. Grit disposal

Does the facility have a Municipal Solid Waste (MSW) registration or permit for grit disposal?

Yes ☐ No ☐

If No, contact the TCEQ Municipal Solid Waste team at 512-239-0000. Note: A registration or permit is required for grit disposal. Grit shall not be combined with treatment plant sludge. See the instruction booklet for additional information on grit disposal requirements and restrictions.

Describe the method of grit disposal.

4. Grease and decanted liquid disposal

Note: A registration or permit is required for grease disposal. Grease shall not be combined with treatment plant sludge. For more information, contact the TCEQ Municipal Solid Waste team at 512-239-0000.

Describe how the decant and grease are treated and disposed of after grit separation.

E. Stormwater management

1. Applicability

Does the facility have a design flow of 1.0 MGD or greater in any phase?

Yes ☒ No ☐

Does the facility have an approved pretreatment program, under 40 CFR Part 403?

Yes ☐ No ☒

If **no** to both of the above, then skip to Subsection F, Other Wastes Received.

2. MSGP coverage

Is the stormwater runoff from the WWTP and dedicated lands for sewage disposal currently permitted under the TPDES Multi-Sector General Permit (MSGP), TXR050000?

Yes ☐ No ☒

If **yes**, please provide MSGP Authorization Number and skip to Subsection F, Other Wastes Received:

TXR05 [REDACTED] or TXRNE [REDACTED]

If **no**, do you intend to seek coverage under TXR050000?

Yes ☐ No ☒

3. Conditional exclusion

Alternatively, do you intend to apply for a conditional exclusion from permitting based TXR050000 (Multi Sector General Permit) Part II B.2 or TXR050000 (Multi Sector General Permit) Part V, Sector T 3(b)?

Yes ☐ No ☒

If **yes**, please explain below then proceed to Subsection F, Other Wastes Received:

[REDACTED]

4. Existing coverage in individual permit

Is your stormwater discharge currently permitted through this individual TPDES or TLAP permit?

Yes ☐ No ☒

If **yes**, provide a description of stormwater runoff management practices at the site that are authorized in the wastewater permit then skip to Subsection F, Other Wastes Received.

5. Zero stormwater discharge

Do you intend to have no discharge of stormwater via use of evaporation or other means?

Yes ☐ No ☒

If yes, explain below then skip to Subsection F. Other Wastes Received.

Note: If there is a potential to discharge any stormwater to surface water in the state as the result of any storm event, then permit coverage is required under the MSGP or an individual discharge permit. This requirement applies to all areas of facilities with treatment plants or systems that treat, store, recycle, or reclaim domestic sewage, wastewater or sewage sludge (including dedicated lands for sewage sludge disposal located within the onsite property boundaries) that meet the applicability criteria of above. You have the option of obtaining coverage under the MSGP for direct discharges, (recommended), or obtaining coverage under this individual permit.

6. Request for coverage in individual permit

Are you requesting coverage of stormwater discharges associated with your treatment plant under this individual permit?

Yes ☐ No ☒

If yes, provide a description of stormwater runoff management practices at the site for which you are requesting authorization in this individual wastewater permit and describe whether you intend to comingle this discharge with your treated effluent or discharge it via a separate dedicated stormwater outfall. Please also indicate if you intend to divert stormwater to the treatment plant headworks and indirectly discharge it to water in the state.

Note: Direct stormwater discharges to waters in the state authorized through this individual permit will require the development and implementation of a stormwater pollution prevention plan (SWPPP) and will be subject to additional monitoring and reporting requirements. Indirect

discharges of stormwater via headworks recycling will require compliance with all individual permit requirements including 2-hour peak flow limitations. All stormwater discharge authorization requests will require additional information during the technical review of your application.

F. Discharges to the Lake Houston Watershed

Does the facility discharge in the Lake Houston watershed?

Yes ☐ No ☒

If yes, a Sewage Sludge Solids Management Plan is required. See Example 5 in the instructions.

G. Other wastes received including sludge from other WWTPs and septic waste

1. Acceptance of sludge from other WWTPs

Does the facility accept or will it accept sludge from other treatment plants at the facility site?

Yes ☐ No ☒

If yes, attach sewage sludge solids management plan. See Example 5 of the instructions.

In addition, provide the date that the plant started accepting sludge or is anticipated to start accepting sludge, an estimate of monthly sludge acceptance (gallons or millions of gallons), an estimate of the BOD₅ concentration of the sludge, and the design BOD₅ concentration of the influent from the collection system. Also note if this information has or has not changed since the last permit action.

<div></div>

Note: Permits that accept sludge from other wastewater treatment plants may be required to have influent flow and organic loading monitoring.

2. Acceptance of septic waste

Is the facility accepting or will it accept septic waste?

Yes ☐ No ☒

If yes, does the facility have a Type V processing unit?

Yes ☐ No ☐

If **yes**, does the unit have a Municipal Solid Waste permit?

Yes ☐ No ☐

If **yes to any of the above**, provide a the date that the plant started accepting septic waste, or is anticipated to start accepting septic waste, an estimate of monthly septic waste acceptance (gallons or millions of gallons), an estimate of the BOD₅ concentration of the septic waste, and the design BOD₅ concentration of the influent from the collection system. Also note if this information has or has not changed since the last permit action.

--

Note: Permits that accept sludge from other wastewater treatment plants may be required to have influent flow and organic loading monitoring.

3. Acceptance of other wastes (not including septic, grease, grit, or RCRA, CERCLA or as discharged by IUs listed in Worksheet 6)

Is the facility accepting or will it accept wastes that are not domestic in nature excluding the categories listed above?

Yes ☐ No ☒

If **yes**, provide the date that the plant started accepting the waste, an estimate how much waste is accepted on a monthly basis (gallons or millions of gallons), a description of the entities generating the waste, and any distinguishing chemical or other physical characteristic of the waste. Also note if this information has or has not changed since the last permit action.

--

Section 7. Pollutant Analysis of Treated Effluent (Instructions Page 58)

Is the facility in operation?

Yes ☒ No ☐

If **no**, this section is not applicable. Proceed to Section 8.

If **yes**, provide effluent analysis data for the listed pollutants. **Wastewater treatment facilities** complete Table 1.0(2). **Water treatment facilities**

discharging filter backwash water, complete Table 1.0(3).

Note: The sample date must be within 1 year of application submission.

Table 1.0(2) - Pollutant Analysis for Wastewater Treatment Facilities

Pollutant	Average Conc.	Max Conc.	No. of Samples	Sample Type	Sample Date/Time
CBOD ₅ , mg/l	4	-	1	Grab	3/25/24
Total Suspended Solids, mg/l	1	-	1	Grab	3/25/24
Ammonia Nitrogen, mg/l	10.9	-	1	Grab	3/20/24
Nitrate Nitrogen, mg/l	11	-	1	Grab	July 2023:11a
Total Kjeldahl Nitrogen, mg/l	2.17	-	1	Grab	July 2023:11a
Sulfate, mg/l	50.1	-	1	Grab	3/25/24
Chloride, mg/l	223	-	1	Grab	3/25/24
Total Phosphorus, mg/l	2.73	-	1	Grab	3/25/24
pH, standard units	7.6	-	1	Grab	3/25/24
Dissolved Oxygen*, mg/l	NA	NA	NA	NA	NA
Chlorine Residual, mg/l	4.82	-	1	Grab	3/25/24
<i>E.coli</i> (CFU/100ml) freshwater	<1.0	-	1	Grab	3/25/24
Enterococci (CFU/100ml) saltwater	NA	NA	NA	NA	NA
Total Dissolved Solids, mg/l	642	-	1	Grab	3/25/24
Electrical Conductivity, μ mohs/cm, †	1380	-	1	Grab	3/25/24
Oil & Grease, mg/l	<5.0	-	1	Grab	3/25/24
Alkalinity (CaCO ₃)*, mg/l	NA	NA	NA	NA	NA

*TPDES permits only

†TLAP permits only

Table 1.0(3) - Pollutant Analysis for Water Treatment Facilities

Pollutant	Average Conc.	Max Conc.	No. of Samples	Sample Type	Sample Date/Time
Total Suspended Solids, mg/l					
Total Dissolved Solids, mg/l					
pH, standard units					
Fluoride, mg/l					
Aluminum, mg/l					
Alkalinity (CaCO ₃), mg/l					

Section 8. Facility Operator (Instructions Page 60)

Facility Operator Name: Earl Foster

Facility Operator's License Classification and Level: AA W/WW

Facility Operator's License Number: #WW0016598

Section 9. Sewage Sludge Management and Disposal (Instructions Page 60)

A. Sludge disposal method

Identify the current or anticipated sludge disposal method or methods from the following list. Check all that apply.

- ☒ Permitted landfill
- ☐ Permitted or Registered land application site for beneficial use
- ☐ Land application for beneficial use authorized in the wastewater permit
- ☐ Permitted sludge processing facility
- ☐ Marketing and distribution as authorized in the wastewater permit
- ☐ Composting as authorized in the wastewater permit
- ☐ Permitted surface disposal site (sludge monofill)
- ☐ Surface disposal site (sludge monofill) authorized in the wastewater

permit

- ☐ Transported to another permitted wastewater treatment plant or permitted sludge processing facility. If you selected this method, a written statement or contractual agreement from the wastewater treatment plant or permitted sludge processing facility accepting the sludge must be included with this application.
- ☐ Other:

B. Sludge disposal site

Disposal site name: J-V Dirt + Loam Composting Facility, 3600 N Farm to Market Rd 973, Austin, TX 78725

TCEQ permit or registration number: TCEQ Reg.# 2310

County where disposal site is located: Travis

C. Sludge transportation method

Method of transportation (truck, train, pipe, other): truck

Name of the hauler: Sheridan Environmental LLC, 3600 N FM 973, Austin, TX 78725

Hauler registration number: TCEQ Hauler# 24220

Sludge is transported as a:

Liquid ☐ semi-liquid ☐ semi-solid ☒ solid ☐

Section 10. Permit Authorization for Sewage Sludge Disposal (Instructions Page 60)

A. Beneficial use authorization

Does the existing permit include authorization for land application of sewage sludge for beneficial use?

Yes ☐ No ☒

If **yes**, are you requesting to continue this authorization to land apply sewage sludge for beneficial use?

Yes ☐ No ☐

If **yes**, is the completed **Application for Permit for Beneficial Land Use of Sewage Sludge (TCEQ Form No. 10451)** attached to this permit application (see the instructions for details)?

Yes ☐ No ☐

B. Sludge processing authorization

Does the existing permit include authorization for any of the following sludge processing, storage or disposal options?

Sludge Composting	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Marketing and Distribution of sludge	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Sludge Surface Disposal or Sludge Monofill	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Temporary storage in sludge lagoons	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>

If **yes** to any of the above sludge options and the applicant is requesting to continue this authorization, is the completed **Domestic Wastewater Permit Application: Sewage Sludge Technical Report (TCEQ Form No. 10056)** attached to this permit application?

Yes ☐ No ☐

Section 11. Sewage Sludge Lagoons (Instructions Page 61)

Does this facility include sewage sludge lagoons?

Yes ☐ No ☒

If yes, complete the remainder of this section. If no, proceed to Section 12.

A. Location information

The following maps are required to be submitted as part of the application. For each map, provide the Attachment Number.

- Original General Highway (County) Map:

Attachment:

- USDA Natural Resources Conservation Service Soil Map:

Attachment:

- Federal Emergency Management Map:

Attachment:

- Site map:

Attachment:

Discuss in a description if any of the following exist within the lagoon area.
Check all that apply.

- ☐ Overlap a designated 100-year frequency flood plain
- ☐ Soils with flooding classification
- ☐ Overlap an unstable area
- ☐ Wetlands
- ☐ Located less than 60 meters from a fault
- ☐ None of the above

Attachment:

If a portion of the lagoon(s) is located within the 100-year frequency flood plain, provide the protective measures to be utilized including type and size of protective structures:

B. Temporary storage information

Provide the results for the pollutant screening of sludge lagoons. These results are in addition to pollutant results in Section 7 of Technical Report 1.0.

Nitrate Nitrogen, mg/kg:

Total Kjeldahl Nitrogen, mg/kg:

Total Nitrogen (=nitrate nitrogen + TKN), mg/kg:

Phosphorus, mg/kg:

Potassium, mg/kg:

pH, standard units:

Ammonia Nitrogen mg/kg:

Arsenic:

Cadmium:

Chromium:

Copper:

Lead:

Mercury:

Molybdenum:

Nickel:

Selenium:

Zinc:

Total PCBs:

Provide the following information:

Volume and frequency of sludge to the lagoon(s):

Total dry tons stored in the lagoons(s) per 365-day period:

Total dry tons stored in the lagoons(s) over the life of the unit:

C. Liner information

Does the active/proposed sludge lagoon(s) have a liner with a maximum hydraulic conductivity of 1×10^{-7} cm/sec?

Yes ☐ No ☐

If yes, describe the liner below. Please note that a liner is required.

D. Site development plan

Provide a detailed description of the methods used to deposit sludge in the lagoon(s):

Attach the following documents to the application.

- Plan view and cross-section of the sludge lagoon(s)

Attachment:

- Copy of the closure plan

Attachment:

- Copy of deed recordation for the site

Attachment: [\[Redacted\]](#)

- Size of the sludge lagoon(s) in surface acres and capacity in cubic feet and gallons

Attachment: [\[Redacted\]](#)

- Description of the method of controlling infiltration of groundwater and surface water from entering the site

Attachment: [\[Redacted\]](#)

- Procedures to prevent the occurrence of nuisance conditions

Attachment: [\[Redacted\]](#)

E. Groundwater monitoring

Is groundwater monitoring currently conducted at this site, or are any wells available for groundwater monitoring, or are groundwater monitoring data otherwise available for the sludge lagoon(s)?

Yes ☐ No ☐

If groundwater monitoring data are available, provide a copy. Provide a profile of soil types encountered down to the groundwater table and the depth to the shallowest groundwater as a separate attachment.

Attachment: [\[Redacted\]](#)

Section 12. Authorizations/Compliance/Enforcement (Instructions Page 63)

A. Additional authorizations

Does the permittee have additional authorizations for this facility, such as reuse authorization, sludge permit, etc?

Yes ☒ No ☐

If yes, provide the TCEQ authorization number and description of the authorization:

The TCEQ Chapter 210 authorization for Lakeway MUD's reclaimed water use is No. R11495001 and provides for community beneficial reclaimed water use including landscaping irrigation throughout the community on golf courses, parks, roadway medians, and other beneficial irrigation uses. See Attachment D2 (Chapter 210 Authorization).

B. Permittee enforcement status

Is the permittee currently under enforcement for this facility?

Yes ☐ No ☒

Is the permittee required to meet an implementation schedule for compliance or enforcement?

Yes ☐ No ☒

If **yes** to either question, provide a brief summary of the enforcement, the implementation schedule, and the current status:

Section 13. RCRA/CERCLA Wastes (Instructions Page 63)

A. RCRA hazardous wastes

Has the facility received in the past three years, does it currently receive, or will it receive RCRA hazardous waste?

Yes ☐ No ☒

B. Remediation activity wastewater

Has the facility received in the past three years, does it currently receive, or will it receive CERCLA wastewater, RCRA remediation/corrective action wastewater or other remediation activity wastewater?

Yes ☐ No ☒

C. Details about wastes received

If **yes** to either Subsection A or B above, provide detailed information concerning these wastes with the application.

Attachment:

Section 14. Laboratory Accreditation (Instructions Page 64)

All laboratory tests performed must meet the requirements of *30 TAC Chapter 25, Environmental Testing Laboratory Accreditation and Certification*, which includes the following general exemptions from National Environmental Laboratory Accreditation Program (NELAP) certification requirements:

- The laboratory is an in-house laboratory and is:
 - periodically inspected by the TCEQ; or
 - located in another state and is accredited or inspected by that state; or
 - performing work for another company with a unit located in the same site; or
 - performing pro bono work for a governmental agency or charitable organization.
- The laboratory is accredited under federal law.
- The data are needed for emergency-response activities, and a laboratory accredited under the Texas Laboratory Accreditation Program is not available.
- The laboratory supplies data for which the TCEQ does not offer accreditation.

The applicant should review *30 TAC Chapter 25* for specific requirements.


The following certification statement shall be signed and submitted with every application. See the *Signature Page* section in the Instructions, for a list of designated representatives who may sign the certification.

CERTIFICATION:

I certify that all laboratory tests submitted with this application meet the requirements of *30 TAC Chapter 25, Environmental Testing Laboratory Accreditation and Certification*.

Printed Name: Earl Foster

Title: General Manager

Signature: 

Date: 4-25-2024

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DOMESTIC TECHNICAL REPORT 1.1

The following is required for new and amendment applications

Section 1. Justification for Permit (Instructions Page 66)

A. Justification of permit need

Provide a detailed discussion regarding the need for any phase(s) not currently permitted. Failure to provide sufficient justification may result in the Executive Director recommending denial of the proposed phase(s) or permit.

See Attachment B for Basis of Permit explanation. Intention is to reflect transferred permit WQ0014534001 and alter permit interim flow to reflect the current S-5 Water Recycling Plant expansion as flows to the facility are approaching 75 percent of the current permitted flow. Construction for expansion of the facility to Interim II Phase flow (0.8 MGD) is anticipated to begin in April 2024.

B. Regionalization of facilities

Provide the following information concerning the potential for regionalization of domestic wastewater treatment facilities:

1. Municipally incorporated areas

If the applicant is a city, then Item 1 is not applicable. Proceed to Item 2 Utility CCN areas.

Is any portion of the proposed service area located in an incorporated city?

Yes ☒ No ☐ Not Applicable ☐

If yes, within the city limits of: City of Lakeway; Lakeway MUD (LMUD) provides service within LMUD's CCN (note that City of Lakeway does not provide wastewater service)

If yes, attach correspondence from the city.

Attachment:

If consent to provide service is available from the city, attach a justification for the proposed facility and a cost analysis of expenditures that includes the cost of connecting to the city versus the cost of the proposed facility or expansion attached.

Attachment: City of Lakeway does not provide wastewater service. LMUD holds the CCN for the Lakeway area.

2. Utility CCN areas

Is any portion of the proposed service area located inside another utility's CCN area?

Yes ☐ No ☒

If yes, attach a justification for the proposed facility and a cost analysis of expenditures that includes the cost of connecting to the CCN facilities versus the cost of the proposed facility or expansion.

Attachment: See Attachment L (Project Location & Service Area Map). This amendment reflects the transfer of TCMUD 12 permit (WQ0014534001) flows to this LMUD S-5 WRP facility to reflect existing LMUD wholesale service to TCMUD 11, 12, 13 areas.

3. Nearby WWTPs or collection systems

Are there any domestic permitted wastewater treatment facilities or collection systems located within a three-mile radius of the proposed facility?

Yes ☒ No ☐

If yes, attach a list of these facilities that includes the permittee's name and permit number, and an area map showing the location of these facilities.

Attachment: LMUD has another TLAP (WQ0011495001) less than 3 miles away that serves the east side of Lakeway, but insufficient capacity for the current needs at S-5 WRP.

If yes, attach copies of your certified letters to these facilities **and** their response letters concerning connection with their system.

Attachment: NA

Does a permitted domestic wastewater treatment facility or a collection system located within three (3) miles of the proposed facility currently have the capacity to accept or is willing to expand to accept the volume of wastewater proposed in this application?

Yes ☐ No ☒

If **yes**, attach an analysis of expenditures required to connect to a permitted wastewater treatment facility or collection system located within 3 miles versus the cost of the proposed facility or expansion.

Attachment:

Section 2. Organic Loading (Instructions Page 67)

Is this facility in operation?

Yes ☒ No ☐

If **no**, proceed to Item B, Proposed Organic Loading.

If **yes**, provide organic loading information in Item A, Current Organic Loading

A. Current organic loading

Facility Design Flow (flow being requested in application): 0.8 MGD (Interim II Phase)

Average Influent Organic Strength or BOD₅ Concentration in mg/l: 252 mg/L

Average Influent Loading (lbs/day = total average flow X average BOD₅ conc. X 8.34): 641 lb/day

Provide the source of the average organic strength or BOD₅ concentration.

<u>Last year average of monthly 3-part composite samples collected by LMUD and analyzed by certified laboratory staff.</u>
--

B. Proposed organic loading

This table must be completed if this application is for a facility that is not in operation or if this application is to request an increased flow that will impact organic loading.

Table 1.1(1) - Design Organic Loading

Source	Total Average Flow (MGD)	Influent BOD₅ Concentration (mg/l)
Municipality	<i>NA - Existing Plant</i>	
Subdivision		
Trailer park – transient		
Mobile home park		
School with cafeteria and showers		
School with cafeteria, no showers		
Recreational park, overnight use		
Recreational park, day use		
Office building or factory		
Motel		
Restaurant		
Hospital		
Nursing home		
Other		
TOTAL FLOW from all sources		
AVERAGE BOD ₅ from all sources		

Section 3. Proposed Effluent Quality and Disinfection

(Instructions Page 68)

A. Existing/Interim I Phase Design Effluent Quality

Biochemical Oxygen Demand (5-day), mg/l: 20

Total Suspended Solids, mg/l: 20

Ammonia Nitrogen, mg/l: NA

Total Phosphorus, mg/l: NA

Dissolved Oxygen, mg/l: NA

Other: pH greater than 6.0 and less than 9.0

B. Interim II Phase Design Effluent Quality

Biochemical Oxygen Demand (5-day), mg/l: 20

Total Suspended Solids, mg/l: 20

Ammonia Nitrogen, mg/l: NA

Total Phosphorus, mg/l: NA

Dissolved Oxygen, mg/l: NA

Other: pH greater than 6.0 and less than 9.0

C. Final Phase Design Effluent Quality

Biochemical Oxygen Demand (5-day), mg/l: 20

Total Suspended Solids, mg/l: 20

Ammonia Nitrogen, mg/l: NA

Total Phosphorus, mg/l: NA

Dissolved Oxygen, mg/l: NA

Other: pH greater than 6.0 and less than 9.0

D. Disinfection Method

Identify the proposed method of disinfection.

☒ Chlorine: 1.0 mg/l after 20 minutes detention time at peak flow

Dechlorination process:

☐ Ultraviolet Light: seconds contact time at peak

flow

☒ Other: Rechlorinate reclaimed water after storage

Section 4. Design Calculations (Instructions Page 68)

Attach design calculations and plant features for each proposed phase. Example 4 of the instructions includes sample design calculations and plant features.

Attachment: See Attachment K (Plant Design Calculations)

Section 5. Facility Site (Instructions Page 68)

A. 100-year floodplain

Will the proposed facilities be located above the 100-year frequency flood level?

Yes ☒

No ☐

If no, describe measures used to protect the facility during a flood event. Include a site map showing the location of the treatment plant within the 100-year frequency flood level. If applicable, provide the size and types of protective structures.

Provide the source(s) used to determine 100-year frequency flood plain.

FEMA Map Number(s) 48453C0385J & 48453C0405J

For a new or expansion of a facility, will a wetland or part of a wetland be filled?

Yes ☐

No ☒

If yes, has the applicant applied for a US Corps of Engineers 404 Dredge and Fill Permit?

Yes ☐

No ☐

If yes, provide the permit number:

If no, provide the approximate date you anticipate submitting your application to the Corps:

B. Wind rose

Attach a wind rose. **Attachment:** See Attachment E.

Section 6. Permit Authorization for Sewage Sludge Disposal (Instructions Page 69)

A. Beneficial use authorization

Are you requesting to include authorization to land apply sewage sludge for beneficial use on property located adjacent to the wastewater treatment facility under the wastewater permit?

Yes ☐

No ☒

If **yes**, attach the completed Application for Permit for Beneficial Land Use of Sewage Sludge (TCEQ Form No. 10451)

Attachment:

B. Sludge processing authorization

Identify the sludge processing, storage or disposal options that will be conducted at the wastewater treatment facility:

- ☐ Sludge Composting
- ☐ Marketing and Distribution of sludge
- ☐ Sludge Surface Disposal or Sludge Monofill

If **any of the above** sludge options are selected, attach a completed DOMESTIC WASTEWATER PERMIT APPLICATION: SEWAGE SLUDGE TECHNICAL REPORT (TCEQ Form No. 10056).

Attachment: Sludge hauled offsite

Section 7. Sewage Sludge Solids Management Plan (Instructions Page 69)

Attach a solids management plan to the application.

Attachment: See Attachment M (Solids Management Plan).

The sewage sludge solids management plan must contain the following information:

- Treatment units and processes dimensions and capacities
- Solids generated at 100, 75, 50, and 25 percent of design flow
- Mixed liquor suspended solids operating range at design and projected actual flow
- Quantity of solids to be removed and a schedule for solids removal
- Identification and ownership of the ultimate sludge disposal site

- For facultative lagoons, design life calculations, monitoring well locations and depths, and the ultimate disposal method for the sludge from the facultative lagoon

An example of a sewage sludge solids management plan has been included as Example 5 of the instructions.

DOMESTIC WORKSHEET 3.0

LAND DISPOSAL OF EFFLUENT

The following is required for all permit applications

Renewal, New, and Amendments

Section 1. Type of Disposal System (Instructions Page 77)

Identify the method of land disposal:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Surface application | <input type="checkbox"/> Subsurface application |
| <input checked="" type="checkbox"/> Irrigation | <input type="checkbox"/> Subsurface soils absorption |
| <input type="checkbox"/> Drip irrigation system | <input type="checkbox"/> Subsurface area drip dispersal system |
| <input type="checkbox"/> Evaporation | |
| <input type="checkbox"/> Evapotranspiration beds | |
| <input type="checkbox"/> Other (describe in detail): | |

NOTE: All applicants without authorization or proposing new/amended subsurface disposal MUST complete and submit Worksheet 7.0.

For existing authorizations, provide Registration Number:

Section 2. Land Application Site(s) (Instructions Page 77)

In table 3.0(1), provide the requested information for the land application sites. Include the agricultural or cover crop type (wheat, cotton, alfalfa, bermuda grass, native grasses, etc.), land use (golf course, hayland, pastureland, park, row crop, etc.), irrigation area, amount of effluent applied, and whether or not the public has access to the area. Specify the amount of land area and the amount of effluent that will be allotted to each agricultural or cover crop, if more than one crop will be used.

Table 3.0(1) - Land Application Site Crops

Crop Type & Land Use	Irrigation Area (acres)	Effluent Application (GPD)	Public Access? Y/N
Cedar Tree Irrigation -See Attachment N1	184	630,000	N

Crop Type & Land Use	Irrigation Area (acres)	Effluent Application (GPD)	Public Access? Y/N
Turf Grass (Live Oak Golf Course) -See Attachment N2	117	400,000	Y

Section 3. Storage and Evaporation Lagoons/Ponds (Instructions Page 77)

Table 3.0(2) - Storage and Evaporation Ponds

Pond Number	Surface Area (acres)	Storage Volume (acre-feet)	Dimensions	Liner Type
I-5 Pond (existing)	6.5	117	24.5 ft deep	Synthetic
Remaining reclaimed water storage for a total of 76 MG (Final Phase) to be ground storage tanks, per Attachment O2 (S-5 WRP RCW Storage Evaluation).				

Attach a copy of a liner certification that was prepared, signed, and sealed by a Texas licensed professional engineer for each pond.

Attachment: See Attachment O1 (I-5 Pond Liner Certification).

Section 4. Flood and Runoff Protection (Instructions Page 77)

Is the land application site within the 100-year frequency flood level?

Yes ☒ No ☐

If yes, describe how the site will be protected from inundation.

All past applications for the long-term land application permitted areas, both LMUD's and TCMUD12's, indicate the areas are NOT within the 100-year floodplain. However, there are some areas where the 100-yr floodplain intersects and/or abuts and irrigation will not occur during or after rainfall events when ground is wet. Areas provide drainage for rainfall runoff so as to exit the site as quickly as possible such that rainfall doesn't interfere with irrigation.

Provide the source used to determine the 100-year frequency flood level:

FEMA Map Number(s) 48453C0385J & 48453C0405J

Provide a description of tailwater controls and rainfall run-on controls used for the land application site.

Tailwater controls are normally used to control run-off that occurs due to flood-type irrigation systems. Since spray irrigation is utilized to apply effluent, tail water controls are not needed at the sites identified in this permit application. Instead, runoff is prevented by not operating the irrigation systems excessively or during or after significant rainfall events and by controlling irrigation rates and timing to ensure that the permeability and available water capacity of the soils is not exceeded.

Section 5. Annual Cropping Plan (Instructions Page 77)

Attach an Annual Cropping Plan which includes a discussion of each of the following items. If not applicable, provide a detailed explanation indicating why.

Attachment: See Attachment N (Crop System and Irrigation Operations).

- Soils map with crops
- Cool and warm season plant species
- Crop yield goals
- Crop growing season
- Crop nutrient requirements
- Additional fertilizer requirements
- Minimum/maximum harvest height (for grass crops)
- Supplemental watering requirements
- Crop salt tolerances
- Harvesting method/number of harvests
- Justification for not removing existing vegetation to be irrigated

Section 6. Well and Map Information (Instructions Page 78)

Attach a USGS map with the following information shown and labeled. If not applicable, provide a detailed explanation (on a separate page) indicating why.

Attachment: See Attachment P (Well Review).

- The boundaries of the land application site(s)
- Waste disposal or treatment facility site(s)
- On-site buildings
- Buffer zones
- Effluent storage and tailwater control facilities
- All water wells within 1 mile of the disposal site or property boundaries
- All springs and seeps onsite and within 500 feet of the property boundaries
- All surface waters in the state onsite and within 500 feet of the property boundaries
- All faults and sinkholes onsite and within 500 feet of the property

List and cross reference all water wells shown on the USGS map in the following table. Attach additional pages as necessary to include all of the wells.

Table 3.0(3) – Water Well Data

Well ID	Well Use	Producing? Y/N	Open, cased, capped, or plugged?	Proposed Best Management Practice
			Choose an item.	See Attachment P (Well Review).
			Choose an item.	
			Choose an item.	
			Choose an item.	
			Choose an item.	

If water quality data or well log information is available please include the information in an attachment listed by Well ID.

Attachment: See Attachment P (Well Review).

Section 7. Groundwater Quality (Instructions Page 79)

Attach a Groundwater Quality Technical Report which assesses the impact of the wastewater disposal system on groundwater. This report shall include an evaluation of the water wells (including the information in the well table provided in Item 6. above), the wastewater application rate, and pond liners. Indicate by a check mark that this report is provided.

Attachment: See Attachment P (Well Review).

Are groundwater monitoring wells available onsite? Yes ☐ No ☒

Do you plan to install ground water monitoring wells or lysimeters around the land application site? Yes ☐ No ☒ See Attachment Q (Soils Report).

If yes, then provide the proposed location of the monitoring wells or lysimeters on a site map.

Attachment: See Attachment Q (Soils Report).

Section 8. Soil Map and Soil Analyses (Instructions Page 79)

A. Soil map

Attach a USDA Soil Survey map that shows the area to be used for effluent disposal.

Attachment: See Attachment Q (USDA Soils Information).

B. Soil analyses

Attach the laboratory results sheets from the soil analyses. **Note:** for renewal applications, the current annual soil analyses required by the permit are acceptable as long as the test date is less than one year prior to the submission of the application.

Attachment: See Attachment R (Soils Analyses).

List all USDA designated soil series on the proposed land application site. Attach additional pages as necessary.

Table 3.0(4) – Soil Data

Soil Series	Depth from Surface	Permeability	Available Water Capacity	Curve Number
See Attachment Q (USDA Soils Information).				

Soil Series	Depth from Surface	Permeability	Available Water Capacity	Curve Number

Section 9. Effluent Monitoring Data (Instructions Page 80)

Is the facility in operation?

Yes ☒

No ☐

If **no**, this section is not applicable and the worksheet is complete.

If **yes**, provide the effluent monitoring data for the parameters regulated in the existing permit. If a parameter is not regulated in the existing permit, enter N/A.

Table 3.0(5) - Effluent Monitoring Data

Date	30 Day Avg Flow MGD	BOD ₅ mg/l	TSS mg/l	pH	Chlorine Residual mg/l	Acres irrigated
1/2022	.276	4.13	7.5	7.6	3.88	117
2/2022	.277	4.38	3.75	7.3	3.76	117
3/2022	.285	4.1	2	7.4	4.06	117
4/2022	.285	3.75	2.2	7.5	4.09	117
5/2022	.293	3.75	3.5	7.4	4.23	117
6/2022	.300	2.1	2.6	7.4	3.09	117
7/2022	.289	1.63	4.25	7.2	2.90	117

Date	30 Day Avg Flow MGD	BOD₅ mg/l	TSS mg/l	pH	Chlorine Residual mg/l	Acres irrigated
10/2022	0.304	1.88	1.75	6.9	2.50	117
11/2022	0.234	2.78	4.00	7.0	2.56	117
12/2022	0.292	2.22	2.25	7.4	3.18	117
1/2023	0.287	3.88	2.25	7.3	3.20	117
2/2023	0.286	3.00	2.75	7.3	2.50	117
3/2023	0.286	2.70	2.20	7.4	3.00	117
4/2023	0.306	2.70	2.00	7.5	2.80	117
5/2023	0.313	2.40	1.80	7.7	2.80	117
6/2023	0.312	2.00	1.75	7.6	3.10	117
7/2023	0.307	2.13	1.75	7.4	3.20	117
8/2023	0.294	2.30	2.40	7.5	3.60	117
9/2023	0.298	1.50	1.70	7.5	3.80	117
10/2023	0.299	1.88	1.25	7.6	1.34	117
11/2023	0.329	1.60	2.40	7.3	4.40	117
12/2023	0.328	3.00	9.00	7.4	1.70	117
1/2024	0.347	4.22	5.40	7.3	4.24	117
2/2024	0.321	4.11	2.50	7.6	4.63	117

Provide a discussion of all persistent excursions above the permitted limits and any corrective actions taken.

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DOMESTIC WORKSHEET 3.1

SURFACE LAND DISPOSAL OF EFFLUENT

The following is required for new and major amendment applications.

Renewal and minor amendments applicants may be asked for the worksheet on a case by case basis.

Section 1. Surface Disposal (Instructions Page 81)

Complete the item that applies for the method of disposal being used.

A. Irrigation

Area under irrigation, in acres: Cedar Tract (184 acres) & Turf (117 acres)

Design application frequency:

hours/day TBD **And** days/week TBD by weather and irrigation needs

Land grade (slope):

average percent (%): Cedar Tract (8%)/Turf grasses (4%)

maximum percent (%): Cedar Tract (35%)/Turf grasses (16%)

Design application rate in acre-feet/acre/year: 3.83 acft/ac/yr (both cedar & turf)

Design total nitrogen loading rate, in lbs N/acre/year: 63 lbs N/acre/yr

Soil conductivity (mmhos/cm): 8 mmhos/cm

Method of application: Spray irrigation

Attach a separate engineering report with the water balance and storage volume calculations, method of application, irrigation efficiency, and nitrogen balance.

Attachment: See Attachment S (Cedar Tract Technical Report for Irrigation Disposal) & Attachment T (Turf Grass Technical Report for Irrigation Disposal). See Attachment U (Reclaimed Water Operations & Maintenance Plan).

B. Evaporation ponds

Daily average effluent flow into ponds, in gallons per day: NA

Attach a separate engineering report with the water balance and storage

volume calculations.

Attachment: [click here to enter text](#)

C. Evapotranspiration beds

Number of beds: NA

Area of bed(s), in acres: [click here to enter text](#)

Depth of bed(s), in feet: [click here to enter text](#)

Void ratio of soil in the beds: [click here to enter text](#)

Storage volume within the beds, in acre-feet: [click here to enter text](#)

Attach a separate engineering report with the water balance and storage volume calculations, and a description of the lining.

Attachment: [click here to enter text](#)

D. Overland flow

Area used for application, in acres: NA

Slopes for application area, percent (%): [click here to enter text](#)

Design application rate, in gpm/foot of slope width: [click here to enter text](#)

Slope length, in feet: [click here to enter text](#)

Design BOD₅ loading rate, in lbs BOD₅/acre/day: [click here to enter text](#)

Design application frequency:

hours/day: [click here to enter text](#) And days/week: [click here to enter text](#)

[click here to enter text](#)

Attach a separate engineering report with the method of application and design requirements according to *30 TAC Chapter 217*.

Attachment: [click here to enter text](#)

Section 2. Edwards Aquifer (Instructions Page 82)

Is the facility subject to *30 TAC Chapter 213*, Edwards Aquifer Rules?

Yes ☐ No ☒

If yes, attach a report concerning the recharge zone.

ATTACHMENT INDEX

Attachment	Title
A	TCEQ Forms: <i>A1. Core Data Form</i> <i>A2. Public Involvement Plan Form</i>
B	Basis of Permit Amendment
C	Irrigation Area Ownership: <i>C1. Contract with Lakeway Golf Clubs, Inc. for Effluent Disposal on Live Oak Golf Course</i> <i>C2. Cedar Tract Irrigation Lease Agreement</i> <i>C3a. TCEQ Transfer Approval</i> <i>C3b. Application to Transfer a Wastewater Permit (TCEQ Form 20031)</i>
D	Effluent Transport <i>D1. Effluent Transport Description</i> <i>D2. Chapter 210 Authorization</i> <i>D3. Reclaimed Water Reuse Agreement with City of Lakeway</i>
E	Facilities Location Map with Wind Rose & USGS Quadrangles
F	Affected Landowner Map & Cross-Reference List <i>F1. Affected Land Owner Map</i> <i>F2. Affected Land Owner List</i>
G	Original Photographs with Map Key
H	S-5 Water Recycling Plant Site Drawing/Buffer Zone Map
I	Treatment Process Description/Dimensions
J	Flow Diagram
K	Plant Design Calculations
L	Project Location & Service Area Map
M	Solids Management Plan
N	Crop System and Irrigation Operations <i>N1. Cedar Tree Irrigation Cropping Plan</i> <i>N2. Turf Grass Irrigation Cropping Plan</i>
O	Pond Liner Certification & Reclaimed Water Storage <i>O1. I-5 Pond Liner Certification</i> <i>O2. S-5 Water Recycling Plant Reclaimed Water Storage Evaluation</i>
P	Well Review <i>P1. Well Location Map(s)</i> <i>P2. Well Location Cross-Reference Data Table</i> <i>P3. Water Well Reports</i>

Q	USDA Soils Information <i>Q1. Cedar Tract Area</i> <i>Q2. Live Oak Golf Course</i>
R	Soils Analyses
S	Cedar Tract Technical Report for Irrigation Disposal/Water Balance
T	Turf Grass Technical Report for Irrigation Disposal/Water Balance
U	Reclaimed Water Operation & Maintenance Plan

ATTACHMENT A

TCEQ Forms

A1. TCEQ Core Data Form

(Administrative Report 1.0, Section 3, Item C)

A2. TCEQ Public Involvement Form

(Administrative Report 1.0, Section 8, Item F)

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TCEQ Core Data Form

For detailed instructions on completing this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission (If other is checked please describe in space provided.)		
<input type="checkbox"/> New Permit, Registration or Authorization (Core Data Form should be submitted with the program application.)		
<input checked="" type="checkbox"/> Renewal (Core Data Form should be submitted with the renewal form)		<input checked="" type="checkbox"/> Other Major Amendment
2. Customer Reference Number (if issued)	Follow this link to search for CN or RN numbers in Central Registry**	3. Regulated Entity Reference Number (if issued)
CN 600634513		RN 101714996

SECTION II: Customer Information

4. General Customer Information		5. Effective Date for Customer Information Updates (mm/dd/yyyy)		1/1/2024	
<input type="checkbox"/> New Customer <input type="checkbox"/> Update to Customer Information <input type="checkbox"/> Change in Regulated Entity Ownership <input type="checkbox"/> Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)					
<i>The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).</i>					
6. Customer Legal Name (If an individual, print last name first: eg: Doe, John)				<i>If new Customer, enter previous Customer below:</i>	
Lakeway Municipal Utility District					
7. TX SOS/CPA Filing Number		8. TX State Tax ID (11 digits)		9. Federal Tax ID (9 digits) 74-6165631	10. DUNS Number (if applicable)
11. Type of Customer:		<input type="checkbox"/> Corporation		<input type="checkbox"/> Individual	Partnership: <input type="checkbox"/> General <input type="checkbox"/> Limited
Government: <input type="checkbox"/> City <input type="checkbox"/> County <input type="checkbox"/> Federal <input type="checkbox"/> Local <input type="checkbox"/> State <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Sole Proprietorship		<input type="checkbox"/> Other:	
12. Number of Employees				13. Independently Owned and Operated?	
<input type="checkbox"/> 0-20 <input checked="" type="checkbox"/> 21-100 <input type="checkbox"/> 101-250 <input type="checkbox"/> 251-500 <input type="checkbox"/> 501 and higher				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
14. Customer Role (Proposed or Actual) – as it relates to the Regulated Entity listed on this form. Please check one of the following					
<input type="checkbox"/> Owner <input type="checkbox"/> Operator <input checked="" type="checkbox"/> Owner & Operator <input type="checkbox"/> Other: <input type="checkbox"/> Occupational Licensee <input type="checkbox"/> Responsible Party <input type="checkbox"/> VCP/BSA Applicant					
15. Mailing Address:	1097 Lohmans Crossing				
	City	Lakeway	State	TX	ZIP 78734 ZIP + 4 4459
16. Country Mailing Information (if outside USA)				17. E-Mail Address (if applicable)	
				efoster@lakewaymud.org	
18. Telephone Number		19. Extension or Code		20. Fax Number (if applicable)	

SECTION III: Regulated Entity Information

21. General Regulated Entity Information (If 'New Regulated Entity' is selected, a new permit application is also required.)								
<input type="checkbox"/> New Regulated Entity <input checked="" type="checkbox"/> Update to Regulated Entity Name <input checked="" type="checkbox"/> Update to Regulated Entity Information								
<i>The Regulated Entity Name submitted may be updated, in order to meet TCEQ Core Data Standards (removal of organizational endings such as Inc, LP, or LLC).</i>								
22. Regulated Entity Name (Enter name of the site where the regulated action is taking place.)								
New World of Tennis Wastewater Plant S-5 (should be "S-5 Water Recycling Plant")								
23. Street Address of the Regulated Entity: (No PO Boxes)	123 Trophy Dr, The Hills TX 78738 (should be "251 Highlands Blvd")							
	City	Lakeway	State	TX	ZIP	78738	ZIP + 4	1226
24. County								

If no Street Address is provided, fields 25-28 are required.

25. Description to Physical Location:								
26. Nearest City						State	Nearest ZIP Code	
<i>Latitude/Longitude are required and may be added/updated to meet TCEQ Core Data Standards. (Geocoding of the Physical Address may be used to supply coordinates where none have been provided or to gain accuracy).</i>								
27. Latitude (N) In Decimal:						28. Longitude (W) In Decimal:		
Degrees	Minutes		Seconds		Degrees	Minutes		Seconds
29. Primary SIC Code (4 digits)	30. Secondary SIC Code (4 digits)		31. Primary NAICS Code (5 or 6 digits)			32. Secondary NAICS Code (5 or 6 digits)		
4952			221320					
33. What is the Primary Business of this entity? (Do not repeat the SIC or NAICS description.)								
Domestic TLAP								
34. Mailing Address:	1097 Lohmans Crossing							
	City	Lakeway	State	TX	ZIP	78734	ZIP + 4	4459
35. E-Mail Address:	efoster@lakewaymud.org							
36. Telephone Number	37. Extension or Code		38. Fax Number (if applicable)					
(512) 261-6222	140		(512) 261-6681					

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.


<input type="checkbox"/> Dam Safety	<input type="checkbox"/> Districts	<input type="checkbox"/> Edwards Aquifer	<input type="checkbox"/> Emissions Inventory Air	<input type="checkbox"/> Industrial Hazardous Waste
<input type="checkbox"/> Municipal Solid Waste	<input type="checkbox"/> New Source Review Air	<input type="checkbox"/> OSSF	<input type="checkbox"/> Petroleum Storage Tank	<input type="checkbox"/> PWS
<input type="checkbox"/> Sludge	<input type="checkbox"/> Storm Water	<input type="checkbox"/> Title V Air	<input type="checkbox"/> Tires	<input type="checkbox"/> Used Oil
<input type="checkbox"/> Voluntary Cleanup	<input checked="" type="checkbox"/> Wastewater	<input type="checkbox"/> Wastewater Agriculture	<input type="checkbox"/> Water Rights	<input type="checkbox"/> Other:
	WQ 00011495-006			

SECTION IV: Preparer Information

40. Name:	Christianne Castleberry	41. Title:	District Engineer
42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(512) 751-9272		() -	c.castleberry@castleberryengineering.com

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	Lakeway Municipal Utility District	Job Title:	Lakeway Board President
Name (In Print):	Lawrence M Christian	Phone:	(512) 261- 6222
Signature:		Date:	05/01/24

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Texas Commission on Environmental Quality

Public Involvement Plan Form for Permit and Registration Applications

The Public Involvement Plan is intended to provide applicants and the agency with information about how public outreach will be accomplished for certain types of applications in certain geographical areas of the state. It is intended to apply to new activities; major changes at existing plants, facilities, and processes; and to activities which are likely to have significant interest from the public. This preliminary screening is designed to identify applications that will benefit from an initial assessment of the need for enhanced public outreach.

All applicable sections of this form should be completed and submitted with the permit or registration application. For instructions on how to complete this form, see TCEQ-20960-inst.

Section 1. Preliminary Screening

New Permit or Registration Application

New Activity - modification, registration, amendment, facility, etc. (see instructions)

If neither of the above boxes are checked, completion of the form is not required and does not need to be submitted.

Section 2. Secondary Screening

Requires public notice,

Considered to have significant public interest, and

Located within any of the following geographical locations:

- Austin
- Dallas
- Fort Worth
- Houston
- San Antonio
- West Texas
- Texas Panhandle
- Along the Texas/Mexico Border
- Other geographical locations should be decided on a case-by-case basis

**If all the above boxes are not checked, a Public Involvement Plan is not necessary.
Stop after Section 2 and submit the form.**

Public Involvement Plan not applicable to this application. Provide **brief** explanation.

Section 3. Application Information

Type of Application (check all that apply):

Air Initial Federal Amendment Standard Permit Title V
Waste Municipal Solid Waste Industrial and Hazardous Waste Scrap Tire
Radioactive Material Licensing Underground Injection Control

Water Quality

Texas Pollutant Discharge Elimination System (TPDES)
Texas Land Application Permit (TLAP)
State Only Concentrated Animal Feeding Operation (CAFO)
Water Treatment Plant Residuals Disposal Permit
Class B Biosolids Land Application Permit
Domestic Septage Land Application Registration

Water Rights New Permit

New Appropriation of Water
New or existing reservoir

Amendment to an Existing Water Right

Add a New Appropriation of Water
Add a New or Existing Reservoir
Major Amendment that could affect other water rights or the environment

Section 4. Plain Language Summary

Provide a brief description of planned activities.

Section 5. Community and Demographic Information

Community information can be found using EPA's EJ Screen, U.S. Census Bureau information, or generally available demographic tools.

Information gathered in this section can assist with the determination of whether alternative language notice is necessary. Please provide the following information.

(City)

(County)

(Census Tract)

Please indicate which of these three is the level used for gathering the following information.

City

County

Census Tract

- (a) Percent of people over 25 years of age who at least graduated from high school
- (b) Per capita income for population near the specified location
- (c) Percent of minority population and percent of population by race within the specified location
- (d) Percent of Linguistically Isolated Households by language within the specified location
- (e) Languages commonly spoken in area by percentage
- (f) Community and/or Stakeholder Groups
- (g) Historic public interest or involvement

Section 6. Planned Public Outreach Activities

(a) Is this application subject to the public participation requirements of Title 30 Texas Administrative Code (30 TAC) Chapter 39?

Yes No

(b) If yes, do you intend at this time to provide public outreach other than what is required by rule?

Yes No

If Yes, please describe.

If you answered "yes" that this application is subject to 30 TAC Chapter 39, answering the remaining questions in Section 6 is not required.

(c) Will you provide notice of this application in alternative languages?

Yes No

Please refer to Section 5. If more than 5% of the population potentially affected by your application is Limited English Proficient, then you are required to provide notice in the alternative language.

If yes, how will you provide notice in alternative languages?

Publish in alternative language newspaper

Posted on Commissioner's Integrated Database Website

Mailed by TCEQ's Office of the Chief Clerk

Other (specify)

(d) Is there an opportunity for some type of public meeting, including after notice?

Yes No

(e) If a public meeting is held, will a translator be provided if requested?

Yes No

(f) Hard copies of the application will be available at the following (check all that apply):

TCEQ Regional Office

TCEQ Central Office

Public Place (specify)

Section 7. Voluntary Submittal

For applicants voluntarily providing this Public Involvement Plan, who are not subject to formal public participation requirements.

Will you provide notice of this application, including notice in alternative languages?

Yes No

What types of notice will be provided?

Publish in alternative language newspaper

Posted on Commissioner's Integrated Database Website

Mailed by TCEQ's Office of the Chief Clerk

Other (specify)

ATTACHMENT B

Basis of Permit Amendment

(Administrative Report 1.0, Section 2)

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ATTACHMENT B – BASIS OF PERMIT AMENDMENT (WQ0011495006)

Amendment Purpose

The purpose of the proposed current 2024 permit amendment is to reflect the complete transfer of the existing wastewater permit WQ0014534001, maintained by Travis County Municipal Utility District No. 12 (TCMUD 12; RN 104372941) to the existing permit WQ0011495006, maintained by Lakeway Municipal Utility District (LMUD; RN 101714996), via TCEQ Transfer Approval approved on May 15, 2024 (See Attachment C). An increased Interim II daily average facility flow of 0.8 MGD is requested to reflect the current S-5 Water Recycling Plant expansion given that flows to the facility are approaching 75 percent of the existing permitted flow (0.4 MGD).

The amendment proposes to combine and maintain all previously approved and permitted Final permit conditions, including treatment facility capacity, reclaimed water storage volume, irrigation application rate, and irrigation disposal sites. This merging of permits results in a total combined Final phase treatment capacity of 1.03 MGD, treated effluent storage capacity of 233 acre-feet (76 MG) and surface irrigation of 301 acres at the unchanged maximum application rate of 3.83 acre-feet per year per acre irrigated. See Table 1, below, for illustration.

Table 1. Merged Existing Permits

Entity (Permit No.)	Capacity	Storage		Irrigation Disposal	
	Total MGD	Total MG	Total AF	Total Acres	Crop
LMUD (WQ0011495006)	0.4	38.0	117	117	golf course (GC)
TCMUD 12 (WQ0014534001)	0.63	37.8	116	184	cedar tract (CT)
Combined Final Phase(s)	1.03	75.8	233	301	GC & CT

Note that MG= million gallons, MGD= million gallons per day, AF= acre-feet.

The requested permit conditions by the current amendment application include existing and interim conditions, as follows in Table 2, below.

Table 2. Requested Amendment Application Permit Conditions

Permit Phase	Capacity		Storage				Irrigation Disposal		
	Add'l MGD	Total MGD	Add'l MG	Total MG	Add'l AF	Total AF	Add'l Acres	Total Acres	Crop
Interim I (Existing)	-	0.4	-	38.0	-	117	-	117	golf course (GC)
Interim II	+0.40	0.8	+20.0	58.0	+61	178	+117	234	+cedar tract (CT)
Final	+0.23	1.03	+17.8	75.8	+55	233	+67	301	+cedar tract (CT)
Total Final Phase	-	1.03	-	75.8	-	233	-	301	GC & CT

Note that MG= million gallons, MGD= million gallons per day, AF= acre-feet.

Minor non-quantitative changes or additions to the existing LMUD Permit WQ0011495006 to be incorporated into the current amendment effort includes:

- Correction of facility name to reflect current name (S-5 Water Recycling Plant) as known by LMUD and the Lakeway community. See TCEQ Core Data Form, Attachment A1.
 - Correction of facility address. The current permit address (123 Trophy Drive) is no longer valid. See TCEQ Core Data Form, Attachment A1.
 - Removal of gravity thickener from the treatment unit list to update to actual S-5 Water Recycling Plant (WRP) processes. See Attachment I, Treatment Process Description/Dimensions.
 - Process Plant Design Calculations for the Existing/Interim I (0.4 MGD), Interim II (0.8 MGD), and Final (1.03 MGD) phases for treatment facilities located at the current S-5 WRP facility location. See Attachment K, Plant Design Calculations. Note that facility wastewater influent BOD concentration for calculations is updated to 300 mg/L (from the current permit value of 200 mg/L).
 - Permit flow increase to the Interim II capacity of 0.8 MGD as flows to the facility are approaching 75 percent of the current 0.4 MGD permitted flow. Construction for expansion of the facility to Interim II Phase flow is anticipated to begin in April 2024.
 - Provision of additional effluent storage required for permit via ground storage tanks located onsite at the S-5 WRP. See Attachment O2, Reclaimed Water Storage, for Engineering Report.
-

Proposed LMUD WQ0011495006 Permit Language

Lakeway Municipal Utility District

Nature of Business Producing Waste: Domestic wastewater treatment operation, SIC Code 4952.

General Description and Location of Waste Disposal System:

Description: The S-5 Water Recycling Plant consists of an activated sludge process plant using the conventional mode. Treatment units include bar screens, effluent filters, aeration basins, final clarifier, aerobic digester, belt filter press and a contact chamber. The facility includes for Interim I (Existing) phase a storage pond with a total surface area of 6.5 acres and total capacity of 117 acre-feet (38.0 million gallons, MG) for storage, an Interim II phase will add a 20 MG additional storage tank and the Final phase will add an additional 18 MG storage tank for a total combined storage capacity of 233 acre-feet (76.0 MG) for treated effluent prior to irrigation. The permittee is authorized to dispose of treated domestic wastewater effluent at a daily average flow not to exceed Interim I phase of 0.40 million gallons per day (MGD), Interim II phase of 0.8 MGD and Final phase of 1.03 MGD. Disposal will be via surface irrigation of Interim I phase 117 acres of Live Oak Golf Course, an Interim II phase will add 117 acres of cedar tract land and the Final phase will add 67 acres for a total combined 301 acres of surface irrigation in the Final phase. Application rates to the irrigated land shall not exceed 3.83 acre-feet per year per acre irrigated. The irrigated crops include Bermuda grass and Rye grass for Interim I phase, with addition of maintained native cedar trees on a disposal site for Interim II and Final phases.

Background Explanation

1. LMUD 2014, WQ0011495006: *(Proposed current 2024 non-quantitative changes include: 1) Correction of facility name to reflect current name known by LMUD and community. See TCEQ Core Data Form, Attachment A1, and 2) Removal of gravity thickener from treatment unit list.)*

Existing Permit Language:

- o Description: The New World of Tennis Water Recycling Wastewater Treatment Facility consists of an activated sludge process plant using the conventional mode. Treatment units include bar screens, effluent filters, aeration basins, final clarifier, aerobic digester, gravity thickener, belt filter press and a contact chamber. The permittee is authorized to dispose of treated domestic wastewater effluent at a daily average flow not to exceed 0.40 million gallons per day (MGD) via surface irrigation of 117 acres of Live Oak Golf Course. The facility includes a storage pond with a total surface area of 6.5 acres and a total capacity of 117 acre-feet (38.0 million gallons) for storage of treated effluent prior to irrigation. Application rates to the irrigated land shall not exceed 3.83 acre-feet per year per acre irrigated. The irrigated crops include Bermuda grass and Rye grass.
2. TCMUD12 2020, WQ0014534001: *(Proposed current 2024 non-quantitative changes include: 1) Maintain treatment unit list to match LMUD S-5 WRP facility, 2) Removal of non-access land stipulation given that LMUD produces better quality Type 1 effluent, and 3) Replace effluent storage provision via ground storage tanks instead of ponds.)*

Existing Permit Language:

- o Description: The Travis County Municipal Utility District No. 12 Wastewater Treatment Facility consists of an activated sludge process plant using the complete mix mode in all phases. Treatment units in all phases will include bar screen, an aeration basin, a final clarifier, an aerobic digester, and a chlorine contact chamber. The facility will include for Interim I and II phases a storage pond with a total surface area of 3.5 acres and total capacity of 58 acre-feet

for storage and the Final phase will add an additional pond with a surface area of 4.65 acres and total combined capacity of 116 acre-feet for treated effluent prior to irrigation. The permittee is authorized to dispose of treated domestic wastewater effluent at a daily average flow not to exceed Interim I phase of 0.175 million gallons per day (MGD), Interim II phase of 0.315 MGD and Final phase of 0.63 MGD. Disposal will be via surface irrigation of non-access land, and with 51.1 acres in Interim I phase, 92.0 acres in the Interim II phase, and 184 acres in the Final phase. Application rates to the irrigated land in all phases shall not exceed 3.83 acre-feet per year per acre irrigated. The permittee will maintain native cedar trees on the disposal site.

Location: The wastewater treatment facility and disposal site are located at 251 Highlands Boulevard, Lakeway, approximately 2.0 miles northwest of the intersection of Ranch Road 620 and Lohmans Crossing Road and 0.5 miles east of the intersection of Bee Creek Road and State Highway 71, in Travis County, Texas 78734.

Background Explanation

1. LMUD 2014, WQ0011495006: (Proposed current 2024 change corrects facility address. Note that address in current permit, 123 Trophy Drive, is no longer valid. See TCEQ Core Data Form, Attachment A1.)

Existing Permit Language:

- o Location: The wastewater treatment facility and disposal site are located at 123 Trophy Drive, Lakeway, approximately 2.0 miles northwest of the intersection of Ranch Road 620 and Lohmans Crossing Road, in Travis County, Texas 78734.

2. TCMUD12 2020, WQ0014534001:

Existing Permit Language:

- o Location: The wastewater treatment facility and disposal site are located approximately 0.5 mile east of the intersection of Bee Creek Road and State Highway 71, in Travis County, Texas 78734.

Drainage Area: The wastewater treatment facility and disposal site are located in the drainage basin of Lake Travis in Segment No. 1404 of the Colorado River Basin. No discharge of pollutants into water in the State is authorized by this permit.

Effluent Limitations: (*only volume changed to reflect Requested Amendment Application Permit Conditions*)

Character: Treated Domestic Sewage Effluent (*unchanged from existing*)

Volume: Interim I/Existing, daily average flow - 0.40 MGD from the treatment system

Interim II, daily average flow - 0.80 MGD from the treatment system

Final, daily average flow – 1.03 MGD from the treatment system

Quality: *unchanged from existing*

REASON FOR PROJECT PROPOSED

Lakeway Municipal Utility District has applied to the Texas Commission on Environmental Quality (TCEQ) for a major amendment of Permit No. WQ0011495006 to incorporate complete transfer of Permit No. WQ0014534001 and authorize the disposal of treated domestic wastewater at a daily average flow not to exceed Interim I (Existing) phase of 0.40 million gallons per day (MGD), Interim II phase of 0.8 MGD and Final phase of 1.03 MGD. Disposal will be via surface irrigation of Interim I (Existing) phase 117 acres of Live Oak Golf Course, an Interim II phase will add 117 acres of cedar tract land and the Final phase will add 67 acres for a total combined 301 acres of surface irrigation in the Final phase. The facility includes for Interim I (Existing) phase a storage pond with a total surface area of 6.5 acres and total capacity of 117 acre-feet (38.0 million gallons, MG) for storage, an Interim II phase will add a 20 MG additional storage tank and the Final phase will add an additional 18 MG storage tank for a total combined storage capacity of 233 acre-feet (76.0 MG) for treated effluent prior to irrigation. The existing wastewater treatment facility serves the S-5 Water Recycling Facility Service Area, in addition to wholesale service to Travis County Municipal Utility Districts 11, 12 and 13 (Rough Hollow and Lakeway highlands Subdivisions).

PROJECT DESCRIPTION AND LOCATION

The S-5 Water Recycling Plant consists of an activated sludge process plant using the conventional mode. Treatment units include bar screens, effluent filters, aeration basins, final clarifier, aerobic digester, belt filter press and a chlorine contact chamber. The facility is in operation.

The draft permit authorizes the disposal of sludge at a TCEQ authorized land application site or co-disposal landfill.

The wastewater treatment facility and disposal site are located at 251 Highlands Boulevard, Lakeway, approximately 2.0 miles northwest of the intersection of Ranch Road 620 and Lohmans Crossing Road and 0.5 miles east of the intersection of Bee Creek Road and State Highway 71 in Travis County, Texas 78734.

The wastewater treatment facility and disposal site are located in the drainage basin of Lake Travis in Segment No. 1404 of the Colorado River Basin. No discharge of pollutants into water in the State is authorized by this permit.

DRAFT PERMIT CONDITIONS

The draft permit authorizes the disposal of treated domestic wastewater effluent at a daily average flow not to exceed Interim I (Existing) phase of 0.40 million gallons per day (MGD), Interim II phase of 0.8 MGD and Final phase of 1.03 MGD. Disposal will be via surface irrigation of Interim I (Existing) phase 117 acres of Live Oak Golf Course, an Interim II phase will add 117 acres of cedar tract land and the Final phase will add 67 acres for a total combined 301 acres of surface irrigation in the Final phase. The facility includes for Interim I (Existing) phase a storage pond with a total surface area of 6.5 acres and total capacity of 117 acre-feet (38.0 million gallons, MG) for storage, an Interim II phase will add a 20 MG additional storage tank and the Final phase will add an additional 18 MG storage tank for a total combined storage capacity of 233 acre-feet (76.0 MG) for treated effluent prior to irrigation. Application

rates to the irrigated land shall not exceed 3.83 acre-feet per year per acre irrigated. The irrigated crops include Bermuda grass and Rye grass for Interim I phase, with addition of maintained native cedar trees on a disposal site for Interim II and Final phases.

The effluent limitations in the draft permit, based on a daily average, are 20 mg/l biochemical oxygen demand (BODs) and 20 mg/l total suspended solids (TSS). The effluent shall contain a chlorine residual of at least 1.0 mg/l after a detention time of at least 20 minutes based on peak flow.

The draft permit includes Sludge Provisions according to the requirements of 30 TAC Chapter 312, Sludge Use, Disposal and Transportation. The draft permit authorizes the disposal of sludge at a TCEQ authorized land application site or co-disposal landfill.

SUMMARY OF CHANGES FROM APPLICATION

No changes from the application.

SUMMARY OF CHANGES FROM EXISTING PERMIT

Effluent limitations and monitoring requirements in the draft permit remain the same as the existing permit effluent limitations and monitoring requirements. The Sludge Provisions, Special Provisions and Standard Provisions have been revised in the draft permit. Re-chlorination prior to the effluent being delivered into the irrigation system is required if the effluent is transferred to a holding pond or tank in accordance with 30 TAC §309.3(g). A trace chlorine residual shall be maintained in the effluent at the point of irrigation application.

BASIS FOR DRAFT PERMIT

The following items were considered in developing the permit draft:

1. TCEQ Transfer Approval for Permit No. WQ0014534001, dated May 15, 2024.
2. Existing TCEQ permit: Permit No. WQ0011495006 issued January 8, 2015.
3. Existing TCEQ permit: Permit No. WQ0014534001 issued January 17, 2020.
4. TCEQ Form 20031 Application to Transfer a Wastewater Permit, filed on March 22, 2024.

ATTACHMENT C

Irrigation Area Ownership

(Administrative Report 1.0, Section 9, Item E)

Contents:

C1. Contract with Lakeway Golf Clubs, Inc. for Effluent Disposal on 117 Acres of the Live Oak Golf Course

(This contract allows irrigation of up to 135 acres on the Live Oak Golf Course even though only 117 acres are irrigated under the permit.)

C2. Cedar Tract Irrigation Lease Agreement

(This agreement addresses the cedar tract transferred from the TCMUD 12 permit to Lakeway MUD, of which only 184 acres of the total is needed.)

C3. Permit Transfer

a. TCEQ Transfer Approval

b. Application to Transfer a Wastewater Permit (TCEQ Form 20031)

(This transfer approval and associated supporting application transfers the TCMUD 12 permit to Lakeway MUD.)

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157

EFFLUENT DISPOSAL AGREEMENT BETWEEN
LAKEWAY MUNICIPAL UTILITY DISTRICT
AND LAKEWAY GOLF CLUBS, INC.

FILM CODE

00005685945

THE STATE OF TEXAS

§

§

COUNTY OF TRAVIS

§

This Effluent Disposal Agreement (the "Agreement") is entered into as of the 15th day of December, 1997, by and between Lakeway Golf Clubs, Inc., a Texas corporation ("LGC"), and Lakeway Municipal Utility District, a political subdivision of the State of Texas operating under Chapters 49 and 54, Texas Water Code (the "District").

RECITALS

The District provides water and wastewater services to property within its boundaries, including the following properties owned by LGC: Yaupon Golf Course ("YGC") and Live Oak Golf Course ("LOGC"), which properties are more fully described on the attached Exhibit "A" (the "Property"). The Property together with certain undeveloped land was owned by a prior developer that was a party to a number of contracts with the District. The District and LGC want to enter into this single contract that supersedes any and all previous agreements, whether written or oral.

AGREEMENT

NOW THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the District and LGC agree as follows:

SECTION 1.

USE OF EFFLUENT FROM THE DISTRICT'S S-4 PLANT
FOR IRRIGATION OF YGC

1.01 Agreement to Supply and Use Effluent. The District and LGC agree that the approximately 150 acre YGC shall serve as the primary irrigation area for the effluent from the S-4 plant operated under TNRCC Permit No. 11495-01 under the following terms and conditions. The District will make available for YGC, and LGC, subject to the provisions of this Agreement, shall take, all of the effluent produced at the S-4 plant except for the effluent required for the City of Lakeway's (the "City") median irrigation and for management of the District's I-4 storage pond and effluent reused pursuant to paragraph 1.02 of this Agreement. When there is insufficient effluent to satisfy all needs deliveries shall be prorated based on effluent usage during the proceeding twelve (12) month period. Notwithstanding the foregoing sentence, during the months of July, August and September, when there is insufficient effluent to satisfy all needs, LGC and the City shall have priority. In the months of July, August, September, where there

REAL PROPERTY RECORDS
TRAVIS COUNTY, TEXAS

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is insufficient effluent to satisfy the needs of LGC and the City, delivery shall be prorated between LGC and the City based on effluent usage during the months of July, August and September in the previous calendar year.

1.02 Use of Effluent by Others. The District may make effluent from its S-4 plant available to others, to the extent permitted by the TNRCC reuse rules, pursuant to the following conditions:

i. The District will not make the effluent available to others when LGC is unable to divert raw lake water to the District's I-4 storage pond by reason of low lake level or other reason, unless consented to in writing by LGC.

ii. LGC will cooperate with the District in transporting the effluent through the YGC irrigation system to deliver to other persons or entities using the effluent. The connection of other irrigation systems to the YGC irrigation system shall be at no cost to LGC. LGC shall be compensated by the District for its pumping costs pursuant to Paragraph 3.04 of this Agreement.

iii. Effluent shall not be used by persons or entities other than LGC while LGC's irrigation system is in use, unless agreed to in advance by LGC's golf course superintendent.

1.03 Minimum Volumes of Effluent Use. Subject to the provisions of Section 3 of this Agreement, during each month of the year, LGC shall take and dispose of by irrigation on the YGC the volumes set forth below, when these volumes are available for delivery by the District.

<u>Month</u>	<u>Volume in Million Gallons</u>
October	14.0
November	11.5
December	8.0
January	5.0
February	5.0
March	8.0
April	7.5
May	13.5
June	13.5
July	17.5
August	15.0
September	15.0

If LGC fails to take the volume set forth above during any month, the volume not taken shall be added to the volume required to be taken during the following month, and the total of theses volumes shall be taken during that following month.

Subject to the provisions of Section 3.09 and 3.10 of this Agreement, during each calendar year, LGC shall take and dispose of by irrigation on the YGC a minimum of 133,500,000 gallons, when that volume is available for delivery by the District.

1.04 Use and Ownership of Tank and Pipeline - Point of Delivery. The District stores effluent from the S-4 plant at its I-4 storage pond and transports the stored effluent to the 400,000 gallon holding tank located on YGC (the "Yaupon Holding Tank"). The effluent is delivered to LGC and the City downstream of the Yaupon Holding Tank.

Within ten (10) days after the effective date of this Agreement, LGC shall convey the Yaupon Holding Tank, and the pipeline between the District's I-4 storage pond and the Yaupon Holding Tank, to the District, together with easements for the tank and pipeline, and access to the tank and pipeline, by documents satisfactory to the District's attorney. The easement for the tank shall include the area within a circle with a radius of 150 feet plus the radius of the tank. The center of the circle shall be the center of the tank. LGC may make such use of the easement area that does not interfere with the purpose of the easement.

After the conveyance of the Yaupon Holding Tank and the pipeline between the I-4 storage pond and the Yaupon Holding Tank, the effluent shall be delivered from the District's I-4 storage pond to the Yaupon Holding Tank, from where it may be pumped by LGC to the YGC irrigation system and to the City for irrigation of the Lakeway Boulevard median. The outlet of the Yaupon Holding Tank shall be the District's point of delivery to LGC for the YGC (the "YGC Point of Delivery"). Title to all water delivered by the District to LGC pursuant to Section 1 of this Agreement shall be in the District up to the YGC Point of Delivery, at which point title shall pass to LGC. Each of the parties hereby agrees to save and hold the other party harmless from all claims, demands, and causes of action which may be asserted by anyone on account of the transportation and delivery of said water while title remains in such party.

The District and LGC acknowledge that LGC will enter into a contract with the City pursuant to which LGC will deliver effluent from the S-4 plant to City for irrigation of the Lakeway Boulevard median, as permitted by the District's waste discharge permit for the S-4 plant.

The District shall be responsible for adequate maintenance of the I-4 storage pond and the Yaupon Holding Tank, including without limitation, algae treatment and prevention, mowing, vegetation control, and signs or safety warnings required by any authorized regulatory entity. LGC shall be responsible for adequate maintenance of the site of the Yaupon Holding Tank.

1.05 Use of I-4 Storage Pond. The volume of the I-4 storage pond shall not be reduced to a level of less than one million gallons, unless otherwise directed in writing by the District's General Manager.

LGC's raw water pump, located in the Hurst Creek arm of Lake Travis, shall be activated only by the District. During the months of June, July, August and September, when there is less than 3 million gallons of water in I-4 storage pond, the District, when requested to do so by LGC, shall activate LGC's raw water pump to bring the level of the I-4 storage pond to 3,000,000 gallons. LGC shall be solely responsible for the costs of providing, operating and maintaining the raw water pump, water meter, and electric meter, and paying the LCRA for the raw water. LGC shall be solely responsible for deciding the location of the raw water pump in Lake Travis, and for the cost of changing that location should it so decide.

Any raw lake water pumped into the I-4 storage pond pursuant to the foregoing paragraph shall be delivered to the Yaupon Holding Tank. LGC shall manage its taking of effluent and raw water, including raw water pumped pursuant to the foregoing paragraph, to reduce the volume of water in the I-4 storage pond to a level of 1,000,000 gallons on a date that is between October 1 and October 31 of each year.

The District will not charge LGC for such use of the storage pond but shall charge LGC in accordance with Section 3.04 of this Agreement for pumping and delivering such water from the I-4 storage pond to the Yaupon Holding Tank.

The District shall not divert effluent to the Cedar Tract when lake water has been added to the I-4 storage pond, except for such amounts as are required for flushing, testing, and similar requirements. If lake water is diverted to the Cedar Tract other than as stated in the foregoing sentence, the District shall reimburse LGC for the LCRA charges and for the cost of pumping the lake water from Lake Travis to the I-4 storage pond.

1.06 Rye Overseeding Payment. LGC shall oversee the tees, greens and fairways, and may oversee the roughs, of the YGC each year during the term of this Agreement, commencing in 1997. The overseeding shall begin on or about October 1 of each year. On or before June 30, 1998, and on June 30 of each year thereafter, the District will pay to LGC \$15,000 as a contribution to the cost of overseeding of YGC. In the event that LGC does not take the cumulative total amounts of effluent set forth in Paragraph 1.03 of this Agreement for the months of October, November and December, January, February, March, April and May, the District shall not be required to pay the \$15,000 that would otherwise be due on the next June 30. If LGC decides that golf course grass management practice determines that the fairways should not be overseeded in any year, there will be no overseeding contribution by the District for that year. Any decision by LGC to not oversee the fairways shall not change the volumes of water that LGC is obligated to take pursuant to Paragraph 1.03 of this Agreement. Within ten (10) days after the effective date of this Agreement, the District will pay to LGC the sum of \$15,000 as its contribution of the cost of overseeding that began in October, 1996.

SECTION 2.

USE OF EFFLUENT FROM THE DISTRICT'S S-1, S-2 and S-3 PLANTS FOR IRRIGATION OF LOGC

2.01 Agreement to Supply and Use Effluent. The District and LGC agree that the approximately 135 acre LOGC shall serve as the primary irrigation area for the effluent from the S-1 plant operated under TNRCC Permit No. 11495-02, from the S-2/3 plants operated under TNRCC Permit NO. 11495-03, currently in the process of being amended to permit separate capacity for the S-3 plant, and from the District's proposed S-5 plant. (The District's proposed S-5 plant may replace the District's S-1 and S-2/3 plants). The District will make available for LOGC, and LGC, subject to the provisions of this Agreement, shall take, all of the effluent produced at the S-1, 2/3 and 5 plants.

2.02 Use of Effluent by Others. The District may make effluent from its S-1, S-2/3 and S-5 plants available to others, to the extent permitted by the TNRCC reuse rules, pursuant to the following conditions:

i. The District will not make the effluent available to others when LGC is unable to divert raw lake water to irrigate the LOGC by reason of low lake level or other reason, unless consented to in writing by LGC.

ii. LGC will cooperate with the District in transporting the effluent through the LOGC irrigation system to deliver to other persons or entities using the effluent. The connection of other irrigation systems to the YGC irrigation system shall be at no cost to LGC. LGC shall be compensated by the District for its pumping costs pursuant to Section 4 of this Agreement.

iii. Effluent shall not be used by persons or entities other than LGC while LGC's irrigation system is in use, unless agreed to in advance by LGC's golf course superintendent.

2.03 Minimum Volumes of Effluent Use. Subject to the provisions of Section 3 of this Agreement, during each month of the year, LGC shall take and dispose of by irrigation on the LOGC the volumes set forth below, when these volumes are available for delivery by the District.

<u>Month</u>	<u>Volume in Million Gallons</u>
October	15.0
November	12.0
December	8.0
January	5.0
February	5.0
March	8.0
April	12.0

May	15.0
June	15.0
July	18.0
August	18.0
September	15.0

If LGC fails to take the volume set forth above during any month, the volume not taken shall be added to the volume required to be taken during the following month, and the volume required to be taken during that following month shall be taken.

Subject to the provisions of Sections 3.09 and 3.10 of this Agreement, during each calendar year, LGC shall take and dispose of by irrigation on the LOGC a minimum of 146,000,000 gallons, when that volume is available for delivery by the District.

2.04 Delivery of Effluent. Initially such effluent shall be delivered to LGC's I-1 pond on LOGC, which shall be the District's point of delivery to LGC for the LOGC (the "LOGC Point of Delivery"). If the District's future waste discharge permit issued by the TNRCC does not permit delivery of effluent to the I-1 pond the District will deliver the effluent to a holding tank located at a point reasonably near LGC's irrigation pump at the I-1 pond, such location to be determined in the sole discretion of the District. The outlet of this tank shall then be the LOGC Point of Delivery. LGC shall be responsible for installing facilities to transport effluent from the holding tank to LGC's irrigation pump. Title to all water delivered by the District to LGC pursuant to Section 2 of this Agreement shall be in the District up to the LOGC Point of Delivery, at which point title shall pass to LGC. Each of the parties hereby agrees to save and hold the other party harmless from all claims, demands, and causes of action which may be asserted by anyone on account of the transportation and delivery of said water while title remains in such party.

2.05 Compliance with Permit Conditions. LGC shall use its irrigation system for the LOGC in such a manner and rate which will comply with the requirements of the District's waste discharge permit numbers 11495-02 and 11495-03 which require utilization of irrigation to the maximum extent feasible to maintain the following conditions:

"in order to maintain the freeboard in the holding pond between five (5) feet and eight (8) feet below the lower edge of the concrete overflow pipes. . ." and

"There shall be no discharge from the pond into Lake Travis except a flow which results from a rainfall in excess of one inch per hour for 3 consecutive hours in the drainage area of the pond. The above noted, permitted discharges from the pond into Lake Travis following such rainfall event shall be terminated within twelve days after the rainfall event. The permittee shall use the irrigation

system to dewater the ponds to the maximum extent possible given the climatic conditions."

2.06 Delivery of Lake Water to I-1 Storage Pond. LGC may use, without charge, the District's 8-inch effluent pipeline located between the District's S-1 plant and I-1 storage pond, or the W-2 water transmission line, for the purposes of transporting raw water to LOGC at such times as the District does not require the use of those lines. If the District pumps raw lake water pursuant to this paragraph, the LGC shall pay the District for pumping the charge set forth in Section 3.04 of this Agreement.

The parties recognize that LGC uses its own pump and electricity when it uses the S-1 plant/I-1 storage pond line.

2.07 Rye Overseeding Payment. LGC shall oversee the tees, greens and fairways, and may oversee the roughs, of the LOGC each year during the term of this Agreement, commencing in 1999. The overseeding shall begin on or about October 1 of each year. On or before June 30, 2000, and on June 30 of each year thereafter, the District will pay to LGC the amounts set forth hereafter as a contribution to the cost of overseeding of LOGC. The amounts payable pursuant to the foregoing sentence shall be \$5,000 in the years 2000 through 2002, \$10,000 in the years 2003 through 2007, and \$15,000 in each year thereafter during the term of this Agreement. In the event that LGC does not take the cumulative total amounts of effluent set forth in Paragraph 2.03 of this Agreement for the months of October, November and December, January, February, March, April and May, the District shall not be required to pay the amount that would otherwise be due on the next June 30. If LGC decides that golf course grass management practice determines that the fairways should not be overseeded in any year, there will be no overseeding contribution by the District for that year. Any decision by LGC to not oversee the fairways shall not change the volumes of water that LGC is obligated to take pursuant to Paragraph 2.03 of this Agreement.

SECTION 3.

PROVISIONS APPLICABLE TO BOTH YGC AND LOGC

3.01 Effluent Charge. In any month when LGC fails to take the minimum volume scheduled in Paragraph 1.03 or 2.03, the volume not taken shall be carried over and added to the minimum volume required to be taken in the following month. If, in the following month, LGC fails to take the minimum volume scheduled in Paragraph 1.03 or 2.03, plus the volume carried over from the proceeding month, LGC shall pay the District for the volume not taken at the rate of \$.75 per 1,000 gallons, with each golf course calculated separately. If, in that second month, LGC fails to take the minimum volume scheduled in Paragraph 1.03 or 2.03, the volume not taken shall be carried over to the next month and the process shall be repeated in the same manner. The District will provide LGC with a monthly accounting of the volumes available, the volumes taken, and the amount due, pursuant to this paragraph. The cumulative amount due at the end

of the fiscal year shall be paid by LGC on or before the 30th day of the following month. The monthly accounting shall be substantially in the same format and with the same methodology as shown on Exhibit "B" attached hereto.

The District will make its records available to LGC's golf superintendent so that the superintendent can stay informed as to the sewage treatment plant outputs and the I-4 storage pond content.

3.02 Raw Water Charges. If the use of effluent by others during June, July, August or September requires LGC to use raw lake water for irrigation of the YGC, or the LOGC, the District will reimburse LGC for certain expenses as follows:

- a. The District will reimburse LGC for the amount it has to pay to the Lower Colorado River Authority ("LCRA") for the quantity of raw lake water required because of the effluent taken by others during those months.
- b. The District will reimburse LGC for the cost of pumping the raw water from Lake Travis to the I-4 pond, as provided in Section 3.04 of this Agreement.

If the District supplies raw water to LOGC, via the District W-2 raw water pump and line, pursuant to the request of LGC, other than the amounts provided for in this paragraph 3.02 above, LGC shall pay the District an amount equal to the amount that the District is charged by the LCRA for the raw water, plus the pumping charge described in paragraph 3.04 of this Agreement.

3.03 Potable Water Charge. The District may, in its sole discretion, when requested by LGC, supply potable water to the YGC or LOGC. In that event, LGC shall pay the District on the basis of the interconnect rate in effect between the District and its other water suppliers.

3.04 Pumping Charge. Whenever either party pumps water for the other party, pursuant to the provisions of this Agreement, the party pumping the water shall be paid by the other party a minimum of \$0.25 per 1,000 gallons to compensate for the cost of pumping. If the power company increases the cost of electricity for the pumping, the \$0.25 per 1,000 gallons shall be increased by the same percentage as the increase in the cost of electricity.

3.05 Billing and Payment. All charges in any one calendar month involved in Sections 1.05, 2.06, 3.02 and 3.03 of this Agreement will be billed between the 1st and 10th of the next succeeding calendar month, and the party billed will pay the bill within ten (10) day of receipt of such bill.

3.06 Meter Calibration. All meters whose readings are necessary for performance of this Agreement shall be calibrated annually to ensure accuracy at the expense of the owner of the meter, and at other times at the request of either party to this Agreement, at the expense of the party making the request.

3.07 Re-chlorination. The District shall provide, operate and maintain the necessary equipment and supplies to re-chlorinate the effluent for disposal on YGC and LOGC at the time it is withdrawn from storage ponds to be used for irrigation. The re-chlorination shall produce a chlorine residual which complies with the District's TNRCC permit for the plant in question and with all other applicable law.

3.08 Runoff Control. LGC shall diligently operate and maintain its irrigation systems on YGC and LOGC to prevent unauthorized run-off, contamination of underground or surface water, creation of a nuisance, and discharge of effluent in area streams, subject to the conditions set forth in this Agreement.

3.09 Effluent and Golf Course Quality Criteria. All effluent delivered to LGC for disposal by irrigation on the Property shall meet the criteria set forth in the permit issued by the TNRCC for the effluent. No waiver granted by the TNRCC to the District regarding the quality of effluent shall be effective for purposes of this Agreement, the intent of LGC and the District being to provide effluent for irrigation of a quality that will not harm or adversely impact the Property or cause LGC to incur costs to treat the effluent prior to using it as irrigation water so as to avoid damage or adverse impact to the Property.

Notwithstanding anything to the contrary stated herein, LGC shall not be obligated to take any effluent and use it for irrigation (i) if such effluent does not meet the criteria set by the TNRCC in the permit for such a plant, waivers thereto granted to the District by the TNRCC not being effective for the purposes of this Agreement, or (ii) if irrigation at the then-current conditions would exceed the TNRCC permitted application rate.

3.10 Force Majeure. LGC shall direct the superintendent(s) of the courses or other representative(s) of LGC on site at the courses to cooperate with the District in performing LGC's obligations hereunder, provided however, that when weather conditions or other matter of force majeure render impossible the performance or complete performance of LGC hereunder, LGC shall be excused from its obligations hereunder during the continuance of the force majeure event. Upon cessation of the force majeure event, LGC shall exercise due diligence to perform as completely as possible hereunder. Force majeure shall mean any condition or situation not within the control of LGC that renders performance or complete performance by LGC hereunder impossible, which events shall include but not be limited to weather conditions, flooding, water line and pipeline breakage, electrical failures, acts of God, and all other situations which may prevent complete performance by LGC, whether of like or different nature.

SECTION 4.

FUTURE CHANGES

LGC and the District recognize that future conditions may require changes to this Agreement. All of the District's waste discharge permits may be consolidated into a single permit. In that event the rights and obligations of the parties shall be interpreted to be the same as those contained in this Agreement, with such changes in wording as are needed to reflect consolidation of the permit.

The District may divert the sewage now treated at S-1 to its S-2/3 plant which will require use of the S-1/I-1 transfer line for raw sewage, so that the transfer line will not be available to divert lake water to I-1. The District intends to replace its S-1 and S-2/3 plants with its S-5 plant on the Thomas/Barshop tracts. In that event the District will convert to a zero discharge system which will require delivery of effluent as described in Paragraph 2.04. The parties agree that if any of these changes occur, any cost experienced by LGC as a result of the changes will be borne solely by LGC.

In the event of changes in future conditions that require an amendment to this Agreement to accomplish the purposes of this Agreement, the parties agree to negotiate in good faith to amend this Agreement in response to those changes. In the event the parties cannot agree to an amendment, they shall submit the dispute to mediation.

LGC agrees that, if requested by the District, it will cooperate with the District in designing and constructing extensions to its irrigation systems on the YGC and LOGC, at the expense of the District. LGC and the District will use good faith efforts to agree on the additional volumes of effluent that will be taken by LGC pursuant to Paragraphs 1.03 and 2.03 of this Agreement by reason of such additions to the irrigation systems.

If the District discontinues use of its W-2 water plant, the District agrees to negotiate in good faith for LGC to acquire title to, or the right to use, the W-2 facilities necessary to supply lake water to the I-1 storage pond.

The District anticipates building a new holding pond or ponds on the Thomas/Barshop tract to hold effluent from the S-5 sewage treatment plant. LGC agrees to negotiate in good faith with the District to agree on provisions similar to Paragraphs 1.03 and 1.05 applicable to the I-5 storage pond.

SECTION 5.

PERMITS AND OPERATIONS

The District will, at its sole cost, obtain all amendments to its wastewater permits, plan approvals and all other approvals required from TNRCC or other governmental authorities for any improvements or installations made by or on behalf of the District hereunder. The District is solely responsible for the operation of its facilities, including without limitation, its sewage treatment plants, lift stations, pumps, the holding ponds and tanks and the sewage collection and transportation system for producing effluent to the Points of Delivery, for disposing of effluent that is not of the quality required by its permits and for the costs of re-chlorinating the effluent at the time that the effluent is used for irrigation, which re-chlorination costs include, without limitation, the costs of the necessary equipment, maintenance and supplies.

SECTION 6.

INDEMNIFICATIONS

The District and LGC hereby agree that each indemnifies and holds the other harmless, to the full extent provided by law, from and against all damages, claims, losses, fines, penalties, demands, suits, judgments and costs, including reasonable attorney fees and expenses, arising out of or resulting from the failure of such indemnifying party to comply with and all of its obligations hereunder, provided that neither shall be responsible for indirect, special or consequential damages of the other.

SECTION 7.

REMEDIES UPON DEFAULT

7.01 Notice and Cure. If either party determines that the other party is in default under this Agreement, the party claiming default by the other party shall give written notice to the defaulting party at the address set forth herein for notice. The defaulting party shall have thirty (30) days in which to cure the default, or if such default cannot be reasonably cured within such thirty (30) day period, the defaulting party shall use reasonable efforts to undertake to cure such default within such thirty (30) day period. If the defaulting party does not cure the default within thirty (30) days, or if the default cannot be reasonably cured within such thirty (30) day period, if the defaulting party does not use reasonable efforts to undertake to cure the default within such thirty (30) day period, the party claiming default shall be entitled to the rights and remedies hereinafter set forth.

7.02 Mandamus and Specific Performance. It is not intended hereby to specify (and this Agreement shall not be considered as specifying) an exclusive remedy for any default, but all such other remedies (other than termination by rescission or by any other means) existing at law or

in equity may be availed of by any party hereto and shall be cumulative. Recognizing, however, that the District's undertaking to provide and maintain a supply of water hereunder is an obligation, failure in the performance of which cannot be adequately compensated in money damages alone, the District agrees, in the event of any default on its part, that the LGC shall have available to it the equitable remedy of mandamus and specific performance in addition to any other legal or equitable remedies (other than termination) which may also be available. Recognizing that failure in the performance of the LGC's obligations hereunder could not be adequately compensated in money damages alone, the LGC agrees in the event of any default on its part that the District shall have available to it the equitable remedy of mandamus and specific performance in addition to any other legal or equitable remedies (other than termination by rescission or by any other means) which may also be available to the District. No waiver or waivers of any breach or default (or any breaches or defaults) by any party hereto or of performance shall be deemed a waiver thereof in the future, nor shall any such waiver or waivers be deemed or construed to be waiver of subsequent breaches or defaults of any kind, character, or description, under any circumstances.

SECTION 8.

ATTORNEY'S FEES

If any legal action is brought by either of the parties hereto, it is expressly agreed that the prevailing party in such legal action shall be entitled to recovery from the other party reasonable attorney's fees, and expert witness fees, in addition to any other relief that may be awarded. For the purpose of this clause, the prevailing party is the party who obtains the net damage recovery, or the party in whose favor final judgment is entered. In the event that declaratory or injunctive relief alone is granted, the court may determine which, if either, of the parties shall be considered to be the prevailing party. The amount of reasonable attorney's fees shall be determined by the court, in the trial of such action or in a separate action brought for that purpose. Attorney's fees awarded under the provisions of this paragraph shall be in addition to any other relief that may be awarded.

SECTION 9.

NOTICE

Any notice provided for under the terms of this Agreement by either party to the other shall be in writing and may be effected by personal delivery or by registered or certified mail, return receipt requested. Notice to the District shall be sufficient if made or addressed to:

General Manager
Lakeway Municipal Utility District
1097 Lohmans Crossing
Austin, Texas 78734

With Copy to: Mike Willatt
Willatt & Flickinger
2001 North Lamar
Austin, Texas 78705

Notice to LGC shall be sufficient if made or addressed to:

Director of Operations
Lakeway Golf Clubs, Inc.
One World of Tennis Square
Austin, Texas 78738

With Copy to: Randy Addison
Addison Law Firm
14901 Quorum, Suite 650
Dallas, Texas 75240

Each party may change the address which notice may be sent to that party by giving notice of such change to the other party in accordance with the provisions of this Paragraph.

SECTION 10.

SUCCESSORS AND ASSIGNS

This Agreement shall be binding on and inure to the benefit of the successors and assigns of the respective parties to this Agreement. The obligations of LGC under this Agreement shall run with the Property and shall be binding on all parties having any right, title, or interest in the Property in whole or in part, and their heirs, successors and assigns. An original of this Agreement shall be recorded in the Real Property Records of Travis County, Texas.

SECTION 11.

TERM

Unless terminated by mutual agreement of the parties hereto or their successors and assigns, this Agreement shall continue in force and effect for a period of thirty (30) years from its effective date and may thereafter be continuously renewed by mutual agreement of the parties.

SECTION 12.

SEVERABILITY

If any provision of this Agreement is held to be invalid, illegal or unenforceable in any respect, this invalidity, illegality or unenforceability will not affect any other provision, and this Agreement will be construed as if the invalid, illegal or unenforceable provision had never been contained herein.

SECTION 13.

SOLE AGREEMENT; MODIFICATION

This Agreement represents the entire agreement between the parties relating to the subject matter and supersedes all prior oral or written agreements between the District and LGC's predecessor(s) in title to the Property. This Agreement may be modified or varied only by a written instrument executed by both the District and LGC.

SECTION 14.

APPLICABLE LAW

This Agreement will be construed and interpreted under the laws of the State of Texas.

SECTION 15.

GOOD FAITH

The parties to this Agreement are obligated to use good faith in trying to perform their obligations under this Agreement, and in making it possible for the other party to perform its obligations under this Agreement.

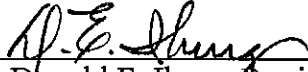
SECTION 16.

EFFECTIVE DATE

The effective date of this Agreement is the date set forth on the first page.

IN WITNESS WHEREOF, LGC and the District have executed this Agreement in multiple copies, each of equal dignity.

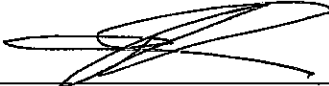
LAKEWAY MUNICIPAL UTILITY DISTRICT

By: 
Donald E. Iburg, President

ATTEST:


Secretary, Board of Directors

LAKEWAY GOLF CLUBS, INC.
a Texas Corporation

By: 
Andrew R. Crosson, Vice President

ACKNOWLEDGMENTS

THE STATE OF TEXAS

§

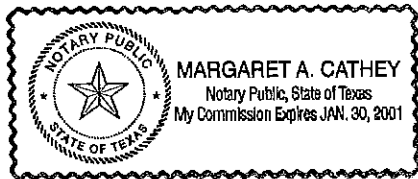
§

COUNTY OF TRAVIS

§

This instrument was acknowledged before me on December 10, 1997 by Donald E. Iburg as President of Lakeway Municipal Utility District, on behalf of said District.

[SEAL]



Margaret A. Cathey
Notary Public, State of Texas

Printed Name

My Commission Expires: _____

THE STATE OF CALIFORNIA

§

§

COUNTY OF San Diego

§

This instrument was acknowledged before me on December 17, 1997 by Andrew R. Crosson as Vice President of Lakeway Golf Clubs, Inc. a Texas corporation, on behalf of said corporation.

[SEAL]



Claudia S. Chamorro
Notary Public, State of California

CLAUDIA S. CHAMORRO

Printed Name

My Commission Expires: 12/25/1999

LIST OF EXHIBITS

- Exhibit "A" - Metes and Bounds Description of the Yaupon Golf Course and Live Oak Golf Course
- Exhibit "B" - Sample monthly accounting required by Section 3.01.

LEGAL DESCRIPTION

DESCRIBING A 25.307 ACRE TRACT OF LAND SITUATED IN THE C.E.P.I. & M. CO. SURVEYS NO. 46 AND 67 IN THE CITY OF LAKEWAY, TRAVIS COUNTY, TEXAS, AND SAME BEING A 25.307 ACRE TRACT DESCRIBED IN EXHIBIT A-6 OF A DEED FROM THE FEDERAL DEPOSIT INSURANCE CORPORATION TO HILLWOOD PROPERTY COMPANY AS RECORDED IN VOLUME 12364, PAGE 1915 OF THE TRAVIS COUNTY, TEXAS, DEED RECORDS, SAID 25.307 ACRE TRACT OF LAND DESCRIBED MORE PARTICULARLY BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at an "X" in a concrete golf cart path at a point of compound curvature on a west R.O.W. line of Lakeway Drive, a road dedicated by the Lakeway Road Dedication, a subdivision recorded in Plat Book 17, Page 75 of the Plat Records of Travis County, Texas at its intersection with the south R.O.W. line of an 80-foot wide public road dedicated by Lakeway Section Twenty, a subdivision recorded in Plat Book 58, Page 97 of the Plat Records of Travis County, Texas;

THENCE, along the southeast R.O.W. line of said 80-foot road and a boundary of Lakeway Section Twenty the following four (4) courses:

1. a distance of 24.67 feet along the arc of a non tangent curve to the left of radius 15.00 feet, central angle $84^{\circ}14'28''$, and whose chord bears $N49^{\circ}57'08''W$, a distance of 21.98 feet to an iron rod found;
2. $S83^{\circ}23'44''W$, a distance of 402.48 feet to an iron rod found;
3. a distance of 191.11 feet along the arc of a curve to the left of radius 300.00 feet, central angle $36^{\circ}30'$ and whose chord bears $S65^{\circ}08'44''W$, a distance of 187.90 feet to an iron rod found;
4. $S46^{\circ}53'44''W$, a distance of 285.84 feet to an iron rod found;

THENCE, along a calculated division line between the Live Oak Golf Course and the Lakeway Airpark, $S29^{\circ}49'05''E$, a distance of 277.19 feet to an iron rod found;

THENCE, along said division line, $S10^{\circ}24'51''E$, a distance of 989.05 feet to an iron rod found at the most westerly corner of Lakeway Section Seven, a subdivision recorded in Plat Book 32, Page 42, of the Plat Records of Travis County, Texas and in a southwest R.O.W. line of Vanguard Drive;

THENCE, across the end of Vanguard Drive, and along the north and east lines of Lots 782 and 781 of said Lakeway Section Seven the following four (4) courses:

1. $N79^{\circ}19'00''E$, a distance of 50.00 feet to an iron rod found;
2. $S78^{\circ}47'00''E$, a distance of 133.19 feet to an iron rod found;
3. $N60^{\circ}42'05''E$, a distance of 64.98 feet to an iron rod found;
4. $S50^{\circ}34'00''E$, a distance of 130.06 feet to an iron rod found;

THENCE, along the north R.O.W. line of Vanguard Drive, $N49^{\circ}25'11''E$, a distance of 20.33 feet to an iron rod found;

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 1, 25.307 ACRES

THENCE, along the southwest lot line of Lot 780 and the rear lot lines of lots 780 through 762 of said Lakeway Section Seven the following nine (9) courses:

1. N50°34'00"W, a distance of 129.95 feet to an iron rod found;
2. N01°48'09"E, a distance of 128.82 feet to an iron rod found;
3. N01°59'57"E, a distance of 510.13 feet to an iron rod found;
4. N67°30'03"E, a distance of 185.20 feet to an iron rod found;
5. S65°50'00"E, a distance of 495.00 feet to an "X" in concrete;
6. S50°52'16"E, a distance of 69.95 feet to an iron rod found;
7. S38°09'20"E, a distance of 134.90 feet to an iron rod found;
8. S23°54'45"E, a distance of 55.81 feet to an iron rod found;
9. S44°15'00"E, a distance of 503.80 feet to an iron rod found at a point in the northwest line of Zephyr Street, the northeast corner of Lot 762 and an ell corner of said Lakeway Section Seven;

THENCE, with the boundary of said Lakeway Section Seven and the northwest R.O.W. line of Zephyr Street the following three (3) courses:

1. a distance of 70.26 feet along the arc of a curve to the left of radius 342.53 feet, central angle 11°45'07" and whose chord bears N36°48'28"E, a distance of 70.13 feet to an iron rod found;
2. N30°55'54"E, a distance of 94.99 feet to an iron rod found;
3. a distance of 55.04 feet along the arc of a non-tangent curve to the left of radius 35.15 feet, central angle 89°43'17" and whose chord bears N14°20'05"W, a distance of 49.59 feet to an iron rod found in a southwest line of Lakeway Drive;

THENCE, with said southwest R.O.W. of Lakeway Drive the following five (5) courses:

1. a distance of 129.87 feet along the arc of a curve to the right of radius 204.42 feet, central angle 36°24'05" and whose chord bears N40°58'18"W, a distance of 127.70 feet to an "X" in a concrete golf cart path and a point of reverse curvature;
2. a distance of 261.13 feet along the arc of a curve to the left of radius 633.07 feet, central angle 23°38' and whose chord bears N34°35'16"W, a distance of 259.28 feet to an "X" in a concrete golf cart path;
3. N46°24'16"W, a distance of 876.71 feet to an iron rod found;
4. a distance of 381.44 feet along the arc of a curve to the right of radius 454.20 feet, central angle 48°07' and whose chord bears N22°20'46"W, a distance of 370.32 feet to an iron rod found;
5. a distance of 104.12 feet along the arc of a curve to the left of radius 1312.67 feet, central angle 04°32'41" and whose chord bears N00°33'36"W, a distance of 104.09 feet to an "X" in a concrete golf cart path and the POINT OF BEGINNING containing 25.307 acres.

The bearing basis for this survey is the south line of Lots 1346 through 1350 of Lakeway Sixteen as found monumented by iron rods at angle points in the south line of Lot 1346 and Lot 1350. The bearing for this line is S69°22'00"E.

For the original boundary survey of the hereinabove described tract of land, see the survey conducted by John Noell, R.P.L.S. No. 2433 on May 1, 1992 and updated on April 28, 1993.

Map or sketch attached.

Surveyed by
URBAN DESIGN GROUP
P.O. BOX 26912
AUSTIN, TEXAS 78755
(512) 348-2353



John Noell, R.P.L.S. #2433

Date: 2-2-95

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 2, 8.442 ACRES

LEGAL DESCRIPTION

DESCRIBING AN 8.442 ACRE TRACT OF LAND SITUATED IN THE C.E.P.I. & M. CO. SURVEY NO'S. 46 AND 67 AND THE J. H. LOHMAN SURVEY NO. 523, IN THE CITY OF LAKEWAY, TRAVIS COUNTY, TEXAS, SAME BEING A 8.442 ACRE TRACT DESCRIBED IN EXHIBIT A-6 OF A DEED FROM THE FEDERAL DEPOSIT INSURANCE CORPORATION TO HILLWOOD PROPERTY COMPANY AS RECORDED IN VOLUME 12364, PAGE 1915 OF THE TRAVIS COUNTY, TEXAS, DEED RECORDS, AND BEING A PORTION OF LAKEWAY SECTION SIXTEEN AS RECORDED IN BOOK 49, PAGE 39 OF THE PLAT RECORDS OF TRAVIS COUNTY, TEXAS, SAID 8.442 ACRES OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at an iron rod found at the most westerly corner of Lot 1338 of said Lakeway Section Sixteen in a southeast R.O.W. line of Vanguard Street and being the most northerly corner of the herein described tract;

THENCE, with the southwest lines of Lots 1338 through 1352 of said Lakeway Section Sixteen the following seven (7) courses:

1. S34°29'25"E, a distance of 146.84 feet to an iron rod found;
2. S38°55'26"E, a distance of 118.77 feet to an iron rod found;
3. S37°56'26"E, a distance of 254.33 feet to an iron rod found;
4. S42°02'51"E, a distance of 162.99 feet to an iron rod found;
5. S68°37'24"E, a distance of 314.44 feet to an iron rod found;
6. S69°22'00"E, a distance of 328.87 feet to an iron rod found;
7. S69°17'00"E, a distance of 239.35 feet to an iron rod found;

THENCE, with a southwest line of said Lot 1352, with the southwest line of Lot 1596 of Lakeway Section Sixteen-B, a subdivision recorded in Book 59, Page 65 of the Plat Records of Travis County, Texas and with the southwest line of Lot 1595-A of the Amended Plat of Lot 1594 and Lot 1595, Lakeway Section Sixteen-B, a subdivision of record in Plat Book 85, Page 140-A of the Plat Records of Travis County, Texas, the following three (3) courses:

1. S50°08'56"E, a distance of 69.19 feet to an iron rod found;
2. S23°45'45"E, a distance of 74.53 feet to an iron rod found;
3. S05°14'28"W, a distance of 100.81 feet to an iron rod found;

THENCE, along the boundary of said Lakeway Section Sixteen, S69°03'53"W, a distance of 187.12 feet to an iron rod found;

THENCE, with the northeasterly line of Lots 2780 through 2783 of Lakeway Section 16-D, a subdivision recorded in Plat Book 60, Page 57 of the Plat Records of Travis County, Texas, N64°54'41"W, a distance of 301.83 feet to an iron rod found;

THENCE, continuing with a portion of the northeasterly line of said Lot 2783, Lakeway Section 16-D, and with the northeasterly lines of Lots 1324 through 1337 of said Lakeway Section Sixteen the following eight (8) courses:

1. N68°25'46"W, a distance of 355.27 feet to an iron rod found;
2. N66°40'37"W, a distance of 174.85 feet to an iron rod found;
3. N55°27'39"W, a distance of 181.65 feet to an iron rod found;
4. N29°56'46"W, a distance of 193.91 feet to an iron rod found;
5. N21°16'23"W, a distance of 99.96 feet to an iron rod found;
6. N19°39'33"W, a distance of 256.26 feet to an iron rod found;

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 2, 8.442 ACRES

7. N27°29'12"W, a distance of 49.65 feet to an iron rod found;
8. N30°46'29"W, a distance of 118.26 feet to an iron rod found at the most northerly corner of Lot 1337 of said Lakeway Section Sixteen in the southeast R.O.W. line of Vanguard Street;

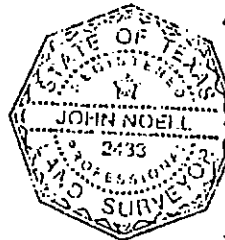
THENCE, N49°25'11"E, a distance of 67.41 feet with the southeast R.O.W. line of said Vanguard Street to an iron rod found and the POINT OF BEGINNING, containing 8.442 acres.

The bearing basis for this survey is the south line of Lots 1346 through 1350 of Lakeway Sixteen as found monumented by iron rods at angle points in the south line of Lot 1346 and Lot 1350. The bearing for this line is S69°22'00"E.

For the original boundary survey of the hereinabove described tract of land, see the survey conducted by John Noell, R.P.L.S. No. 2433 on May 1, 1992 and updated on April 28, 1993.

Map or sketch attached.

Surveyed by:
URBAN DESIGN GROUP
P.O. BOX 26912
AUSTIN, TEXAS 78755
(512) 348-2353



John Noell
John Noell, R.P.L.S. #2433

2-22-95
Date

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 3, 37.384 ACRES

LEGAL DESCRIPTION

DESCRIBING A 37.384 ACRE TRACT OF LAND SITUATED IN THE RUSK TRANSPORTATION CO. SURVEY NO. 83, THE J. H. LOHMAN SURVEY NO. 523, AND THE C.E.P.I. & M. CO. SURVEY NO. 87, IN THE CITY OF LAKEWAY, TRAVIS COUNTY, TEXAS, AND SAME BEING A 37.384 ACRE TRACT DESCRIBED IN EXHIBIT A-6 OF A DEED FROM THE FEDERAL DEPOSIT INSURANCE CORPORATION TO HILLWOOD PROPERTY COMPANY AS RECORDED IN VOLUME 12364, PAGE 1915 OF THE TRAVIS COUNTY, TEXAS, DEED RECORDS, SAID 37.384 ACRE TRACT INCLUDING A PORTION OF LOT 2, CROSS CREEK VILLAS TWO SECTION ONE, A SUBDIVISION RECORDED IN PLAT BOOK 80, PAGE 379 OF THE PLAT RECORDS OF TRAVIS COUNTY, TEXAS SAID 37.384 ACRES OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at an iron rod found at the most westerly corner of Lot 1594-A of Amended Plat of Lot 1594 and 1595 Lakeway Section Sixteen-B, a subdivision recorded in Plat Book 85, Page 140-A, of the Plat Records of Travis County, Texas;

THENCE, with the boundary of Lakeway Section Sixteen, a subdivision recorded in Plat Book 49, Page 39 of the Plat Records of Travis County, Texas, S69°03'53"W, a distance of 167.12 feet to an iron rod found in the northeasterly line of Lot 2780, Lakeway Section 16-D, a subdivision recorded in Plat Book 60, Page 57, of the Plat Records of Travis County, Texas;

THENCE, with the northeast boundary line of Lots 2780 through 2778 of said Lakeway Section 16-D the following four (4) courses:

1. S18°53'01"E, a distance of 41.82 feet to an iron rod found;
2. S41°23'05"E, a distance of 37.51 feet to an iron rod found;
3. S74°08'50"E, a distance of 158.01 feet to an iron rod found;
4. S66°18'04"E, a distance of 64.08 feet to an iron rod found at the northeast corner of Lot 2778, same being the most northerly corner of Lot 2777, of said Lakeway Section 16-D and the northwest corner of Lot 1 of Champions of Lakeway, a subdivision recorded in Plat Book 82, Page 304 and 305 of the Plat Records of Travis County, Texas;

THENCE, with the north lines of Lots 1 through 15 of said Champions of Lakeway the following three (3) courses:

1. S73°54'35"E, a distance of 379.27 feet to an iron rod found;
2. S87°34'10"E, a distance of 251.14 feet to an iron rod found;
3. N59°36'53"E, a distance of 151.99 feet to an iron rod found at the northeast corner of Lot 15 of said subdivision, same being the northwest corner of Lot 13 of the "Live Oaks" at Lakeway, a subdivision recorded in Plat Book 84, Page 70 B and 70 C of the Plat Records of Travis County, Texas;

THENCE, with the northwest lines of Lots 13 through 1 of said "Live Oaks" at Lakeway the following five (5) courses:

1. N59°37'30"E, a distance of 239.33 feet to an iron rod found;
2. N66°33'31"E, a distance of 172.57 feet to an iron rod found;
3. N22°52'19"E, a distance of 173.93 feet to an iron rod found;

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 3, 37.384 ACRES

4. N15°30'01"E, a distance of 97.60 feet to an iron rod found;
5. N21°59'38"E, a distance of 38.58 feet to an iron rod found at the northernmost corner of Lot 1 of said "Live Oaks" at Lakeway and a point on the northwest line of Stoney Creek Villas Amended recorded in Volume 4, Page 153, of the Condominium Records of Travis County, Texas;

THENCE, with the north and east boundary lines of said Stoney Creek Villas Amended and Greenway Cluster Homes, a condominium recorded in Volume 1, Page 482 of the Condominium Records of Travis County, Texas, the following seventeen (17) courses:

1. N30°06'25"W, a distance of 57.13 feet to a 60d nail found in the approximate center of a wooden bridge;
2. N59°53'35"E, a distance of 50.00 feet to an iron rod found;
3. S30°06'25"E, a distance of 19.02 feet to an iron rod found;
4. N26°22'00"E, a distance of 160.30 feet to an iron rod found;
5. N85°49'19"E, a distance of 118.89 feet to an iron rod found;
6. S84°30'28"E, a distance of 53.93 feet to an iron rod found;
7. S21°13'00"E, a distance of 70.10 feet to an iron rod found;
8. N88°07'58"E, a distance of 46.14 feet to an iron rod found;
9. N86°39'35"E, a distance of 58.64 feet to an iron rod found;
10. S00°36'30"E, a distance of 87.30 feet to an iron rod found;
11. S11°49'30"E, a distance of 59.52 feet to an iron rod found;
12. S27°16'30"E, a distance of 63.12 feet to an iron rod found;
13. S13°38'27"E, a distance of 104.47 feet to an iron rod found;
14. S63°16'20"E, a distance of 102.39 feet to a point, said point being in an inundated area;
15. S32°48'20"E, a distance of 64.00 feet to a point, said point being in an inundated area;
16. S06°40'20"E, a distance of 74.00 feet to an iron rod found;
17. S13°14'20"E, a distance of 10.85 feet to an iron rod found at the northwest R.O.W. line of Lakeway Boulevard said Lakeway Boulevard being dedicated by Lakeway Section 16-A, a subdivision recorded in Plat Book 59, Page 19 of the Plat Records of Travis County, Texas, and the most easterly corner of said Stoney Creek Villas Amended;

THENCE, with said northwest R.O.W. line of Lakeway Boulevard the following two (2) courses:

1. N46°14'58"E, a distance of 165.51 feet to a point, said point being in an inundated area;
2. a distance of 160.30 feet along the arc of a non-tangent curve to the right of radius 418.10 feet, central angle 21°58'02" and whose chord bears N57°17'05"E, a distance of 159.32 feet to an iron rod found at the southwest corner of Lake Chandon P.U.D., a subdivision recorded in Plat Book 87, Pages 163D and 164A of the Plat Records of Travis County, Texas;

THENCE, with the westerly and northerly boundary of said Lake Chandon subdivision the following six (6) courses:

1. N25°57'01"W, a distance of 100.11 feet to an iron rod found;
2. N29°55'26"W, a distance of 96.99 feet to a point, said point being in an inundated area;
3. N57°57'26"W, a distance of 40.01 feet to a point, said point being in an inundated area;
4. N19°39'46"W, a distance of 47.04 feet to an iron rod found;
5. N79°10'35"E, a distance of 248.01 feet to an iron rod found;
6. N34°54'38"E, a distance of 372.22 feet to an iron rod found;

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 3, 37.384 ACRES

THENCE, along the westerly line of Fairway Villas as recorded in Volume 8635, Page 981 of the Deed Records of Travis County, Texas, and along the westerly line of that certain tract of land described in a deed to Salvador G. Barber as recorded in Volume 8862, Page 302 of the Deed Records of Travis County, Texas, the following two (2) courses:

1. N17°18'40"E, a distance of 328.08 feet to an iron rod found;
2. N33°03'00"W, a distance of 680.06 feet to an iron rod found at the most westerly corner of the said Barber tract, same being the most southerly corner of 1201 Lakeway Drive, a subdivision recorded in Plat Book 83, Pages 177C-177D of the Plat Records of Travis County, Texas, and vacated in Volume 10963, Page 497 of the Deed Records of Travis County, Texas;

THENCE, with the southwesterly line of said vacated 1201 Lakeway Drive subdivision the following two (2) courses:

1. N33°02'38"W, a distance of 260.16 feet to an iron rod found;
2. N73°47'11"W, a distance of 486.26 feet to an iron rod found at the southwest corner of the said 1201 Lakeway Drive subdivision, same being the southeast corner of The Oaks Condominiums, as recorded in Volume 9326, Page 520 of the Deed Records of Travis County, Texas;

THENCE, with the south line of said The Oaks Condominiums the following two (2) courses:

1. N73°49'39"W, a distance of 50.62 feet to an iron rod found;
2. S65°29'52"W, a distance of 111.78 feet to an iron rod found at the southwest corner of the said The Oaks Condominiums, same being an easterly corner of Lakeway Section Eight, a subdivision recorded in Plat Book 34, Page 28 of the Plat Records of Travis County, Texas, said iron rod found being further described as being the southeast corner of Lot 932 of the said Lakeway Section Eight subdivision;

THENCE, with the south lines of Lots 932 through 914 of said Lakeway Section Eight the following eight (8) courses:

1. S65°25'29"W, a distance of 59.01 feet to an iron rod found;
2. S57°43'08"W, a distance of 282.27 feet to an iron rod found;
3. S57°06'24"W, a distance of 180.66 feet to an iron rod found;
4. S50°51'37"W, a distance of 357.84 feet to an iron rod found;
5. S51°35'17"W, a distance of 481.63 feet to an iron rod found;
6. S82°24'44"W, a distance of 168.15 feet to an iron rod found;
7. N83°49'48"W, a distance of 333.53 feet to an iron rod found;
8. S82°02'05"W, a distance of 68.06 feet to an iron rod found at the southwest corner of Lot 914 of said Lakeway Section Eight, said iron rod being a point of curvature in the southeast R.O.W. line of Zephyr Street, said street being dedicated by Lakeway Section Seven, a subdivision recorded in Plat Book 32, Page 42 of the Plat Records of Travis County, Texas;

THENCE, with the southeast R.O.W. line of said Zephyr Street a distance of 148.07 feet along the arc of a curve to the right of radius 392.53 feet, central angle 21°38'48" and whose chord bears S41°38'54"W, a distance of 147.20 feet to an iron rod found at the northwest corner of Lot 1414 of said Lakeway Section Sixteen;

THENCE, with the northwest lines of Lots 1414 through 1405 of said Lakeway Section Sixteen the following four (4) courses:

1. S40°47'33"E, a distance of 95.94 feet to an iron rod found;
2. S70°08'00"E, a distance of 109.03 feet to an iron rod found;
3. S89°26'35"E, a distance of 408.48 feet to an iron rod found;
4. N78°19'37"E, a distance of 264.91 feet to an iron rod found;

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 3, 37.384 ACRES

THENCE, with the northwest lines of Lot 1404 of said Lakeway Section Sixteen, Lots 1403A and 1402A of Resubdivision of Lots 1402-1403 of Lakeway Section Sixteen, a subdivision recorded in Plat Book 68, Page 28 of the Plat Records of Travis County, Texas, and Lot 1401 of said Lakeway Section Sixteen, N53°31'01"E, a distance of 272.51 feet to an iron rod found;

THENCE, along the northwest lines of Lots 1401 through 1399, of said Lakeway Section Sixteen, N55°07'01"E, a distance of 245.34 feet to an iron rod found;

THENCE, with the northwest lines of Lots 1399 and 1398 of said Lakeway Section Sixteen, Lot 1396-A, of a subdivision titled Resubdivide Lots 1396 and 1397 into one Lot No. 1396A Section Sixteen State of Texas, Travis County, City of Lakeway recorded in Plat Book 82, Page 319 of the Plat Records of Travis County, Texas, and Lots 1395 and 1394 of said Lakeway Section Sixteen, N34°03'02"E, a distance of 424.67 feet to an iron rod found;

THENCE, along the northwest, north and east lines of Lot 1394 through 1391 of said Lakeway Section Sixteen the following five (5) courses:

1. N48°09'17"E, a distance of 155.08 feet to an iron rod found;
2. N79°01'16"E, a distance of 91.91 feet to an iron rod found;
3. S70°01'51"E, a distance of 108.13 feet to an iron rod found;
4. S67°44'33"E, a distance of 110.05 feet to an iron rod found;
5. S21°29'18"W, a distance of 149.96 feet to an iron rod found at the southeast corner of Lot 1391 in the northeast R.O.W. line of Vanguard Street, same being a northwest corner of Lakeway Section 16-C, a subdivision recorded in Plat Book 59, Page 16 of the Plat Records of Travis County, Texas;

THENCE, with the northeast R.O.W. line of said Vanguard Street, S87°56'44"E, a distance of 19.97 feet to an iron rod found at the southwest corner of Lot 2700 of said Lakeway Section 16-C;

THENCE, with the northwest line of Lot 2700, N22°24'59"E, a distance of 150.00 feet to an iron rod found at the northwest corner of Lot 2700 of said Lakeway Section 16-C;

THENCE, with the northeast lines of Lots 2700 through 2709 of said Lakeway Section 16-C, the following five (5) courses:

1. S67°39'26"E, a distance of 349.97 feet to an iron rod found;
2. S55°15'34"E, a distance of 113.03 feet to an iron rod found;
3. S37°38'38"E, a distance of 320.10 feet to an iron rod found;
4. S62°36'52"E, a distance of 165.49 feet to an iron rod found;
5. S18°49'33"E, a distance of 36.83 feet to an iron rod found at the north R.O.W. line of Vanguard Street;

THENCE, with the present R.O.W. line of Vanguard Street, said street terminated by partial R.O.W. vacation recorded in the Travis County Commissioners Court minutes in Volume 15, Page 334, S33°44'56"W, a distance of 94.28 feet to an iron rod found;

THENCE, with the east and southeast lines of Lots 2723 through 2729 of said Lakeway Section 16-C the following six (6) courses:

1. S20°07'06"W, a distance of 202.50 feet to an iron rod found;
2. S80°23'15"W, a distance of 334.71 feet to an iron rod found;
3. S64°53'42"W, a distance of 175.00 feet to an iron rod found;
4. S86°06'00"W, a distance of 49.82 feet to an iron rod found;
5. S48°10'00"W, a distance of 169.94 feet to an iron rod found; and
6. N74°17'05"W, a distance of 70.02 feet to an iron rod found at the southwest corner of Lot 2729 of said Lakeway Section 16-C and the southeast corner of Lakeway Condominium Patio Homes, Section One, recorded in Volume 1, Page 33, of the Condominium Records of Travis County, Texas;

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 3, 37.384 ACRES

THENCE, with the south line of said Lakeway Condominium Patio Homes, Section One, the following seven (7) courses:

1. N33°15'00"W, a distance of 81.78 feet to an iron rod found;
2. N68°26'00"W, a distance of 60.41 feet to an iron rod found;
3. N78°40'29"W, a distance of 54.78 feet to an iron rod found;
4. S65°28'58"W, a distance of 47.22 feet to an iron rod found;
5. S33°33'17"W, a distance of 62.10 feet to an iron rod found;
6. S24°09'55"W, a distance of 58.84 feet to an iron rod found;
7. S19°17'08"W, a distance of 71.63 feet to an iron rod found at the most easterly corner of Lakeway Condominium Patio Homes, Section Two as recorded in Volume 1, Page 200 of the Condominium Records of Travis County, Texas;

THENCE, with the southeast line of said Lakeway Condominium Patio Homes, Section Two, the following five (5) courses:

1. S09°38'20"W, a distance of 89.73 feet to an iron rod found;
2. S19°35'49"W, a distance of 109.12 feet to an iron rod found;
3. S33°14'13"W, a distance of 132.10 feet to an iron rod found;
4. S54°09'39"W, a distance of 61.35 feet to an iron rod found;
5. S83°06'48"W, a distance of 70.46 feet to an iron rod found at the southernmost corner of said Lakeway Condominium Patio Homes, Section Two, same being the southeast corner of Lot 1374-A of Lakeway Section Sixteen-B, a subdivision recorded in Plat Book 59, Page 65 of the Plat Records of Travis County, Texas;

THENCE, with the south line of said Lot 1374-A of Lakeway Section Sixteen-B and the south lines of Lots 1373 through 1370 of said Lakeway Section Sixteen the following two (2) courses:

1. S62°58'48"W, a distance of 195.00 feet to an iron rod found;
2. S65°59'48"W, a distance of 298.02 feet to an iron rod found;

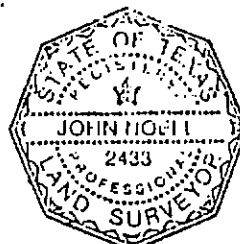
THENCE, with the south lines of Lots 1370 and 1369 of said Lakeway Section Sixteen and the south lines of Lots 1592 through 1593 of Lakeway Section Sixteen-B as recorded in Book 59, Page 65, of the Plat Records of Travis County, Texas and the south line of Lot 1594-A of Amended Plat of Lot 1594 and Lot 1595, Lakeway Section Sixteen-B, a subdivision recorded in Plat Book 85, Page 140A of the Plat Records of Travis County, Texas the following three (3) courses:

1. S89°27'05"W, a distance of 339.73 feet to an iron rod found;
2. N80°31'21"W, a distance of 165.02 feet to an iron rod found;
3. N53°10'59"W, a distance of 60.54 feet to an iron rod found at a southwest corner of Lot 1594-A of said Amended Plat of Lot 1594 and Lot 1595 Lakeway Section Sixteen-B and the POINT OF BEGINNING, containing 37.384 acres.

The bearing basis for this survey is the south line of Lots 1346 through 1350 of Lakeway Sixteen as found monumented by iron rods at angle points in the south line of Lot 1346 and Lot 1350. The bearing for this line is S69°22'00"E.

For the original boundary survey of the hereinabove described tract of land, see the survey conducted by John Noell, R.P.L.S. No. 2433 on May 1, 1992 and updated on April 28, 1993.

Map or sketch attached.



Page 5 of 5

Surveyed by:
URBAN DESIGN GROUP
P.O. BOX 26912
AUSTIN, TEXAS 78755
(512) 346-2353

John Noell, R.P.L.S. #2433

Date:

2-22-95
REAL PROPERTY RECORDS
TRAVIS COUNTY, TEXAS

13121 0341

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 4, 73.351 NET ACRES

LEGAL DESCRIPTION

DESCRIBING A 73.351 NET ACRE TRACT OF LAND OUT OF THE C.E.P.I. & M. SURVEY NO'S. 46 AND 67 IN THE CITY OF LAKEWAY, TRAVIS COUNTY, TEXAS AND BEING ALL OF THAT 73.092 ACRE TRACT DESCRIBED IN EXHIBIT A-6 OF A DEED FROM THE FEDERAL DEPOSIT INSURANCE CORPORATION TO HILLWOOD PROPERTY COMPANY AS RECORDED IN VOLUME 12364, PAGE 1915 OF THE TRAVIS COUNTY, TEXAS, DEED RECORDS, AND BEING ALL OF THAT TRACT DESCRIBED AS 0.256 OF AN ACRE, TRACT NO. 3 AS RECORDED IN VOLUME 4490, PAGE 340 OF THE TRAVIS COUNTY, TEXAS DEED RECORDS, SAID 73.351 NET ACRES INCLUDING A PORTION OF LAKEWAY SECTION EIGHT, A SUBDIVISION RECORDED IN PLAT BOOK 34, PAGE 28 OF THE PLAT RECORDS OF TRAVIS COUNTY, TEXAS, SAID 73.351 NET ACRES BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at an iron rod found at the intersection of the east R.O.W. line of Lakeway Drive and the southern boundary line of Lot 181, Lakeway Section Two, a subdivision recorded in Plat Book 17, Page 74 of the Plat Records of Travis County, Texas;

THENCE, with the south and east lines of Lots 181 through 179 of said Lakeway Section Two the following two (2) courses:

1. N88°01'36"E, a distance of 98.25 feet to an iron rod found;
2. N24°34'47"E, a distance of 321.70 feet to an iron rod found;

THENCE, with the east line of Lot 178 of said Lakeway Section Two, Lots 177A and 175A of Resubdivision of Lots 175, 176 and 177 Lakeway Section Two, a subdivision recorded in Plat Book 86, Page 27C of the Plat Records of Travis County, Texas and Lots 174 and 173 of said Lakeway Section Two the following three (3) courses:

1. N33°17'46"E, a distance of 224.89 feet to an iron rod found;
2. N39°00'31"E, a distance of 297.52 feet to an iron rod found;
3. S80°13'29"E, a distance of 109.52 feet to an iron rod found at the southeast corner of said Lot 173 and being a point of curvature in the northwest R.O.W. line of Thistle Street and a westerly corner of Lakeway Section Four, a subdivision recorded in Plat Book 25, Page 29, of the Plat Records of Travis County, Texas;

THENCE, with the westerly R.O.W. line of said Thistle Street, same being a westerly boundary line of said Lakeway Section Four, a distance of 97.59 feet along the arc of a curve to the left of radius 59.35 feet, central angle 94°12'46" and whose long chord bears S09°41'52"E, a distance of 86.96 feet to an iron rod found at a point of reverse curvature in the westerly R.O.W. line of Sunfish Street;

THENCE, with the westerly R.O.W. line of said Sunfish Street, same being the westerly boundary line of the said Lakeway Section Four and in part the westerly line of Lakeway Section Four-A, a subdivision recorded in Plat Book 28, Page 29, of the Plat Records of Travis County, Texas the following two (2) courses:

1. a distance of 58.50 feet along the arc of a non-tangent curve to the right of radius 25.51 feet, central angle 131°24'04" and whose long chord bears S12°43'51"W, a distance of 46.50 feet to an iron rod found;
2. S78°25'51"W, a distance of 123.28 feet to an iron rod found;

THENCE, S06°18'09"E, in part with a westerly R.O.W. line of said Sunfish Street and in part with the westerly line of Lot 443-A of said Lakeway Section Four A, a distance of 165.93 feet to an iron rod found at the southwest corner of said Lot 443-A;

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 4, 73.351 NET ACRES

THENCE, with the south boundary line of Lots 443A, 444A, and 445A of said Lakeway Section Four-A the following three (3) courses:

1. N72°17'51"E, a distance of 91.83 feet to a punch hole in the center of an "X" found in a rock walk;
2. N87°02'37"E, a distance of 80.37 feet to an iron rod found;
3. S88°51'16"E, a distance of 78.42 feet to a punch hole found atop a rock wall at the southern common corner of said Lot 445-A and Lot 446 of said Lakeway Section Four;

THENCE, with the south line of Lots 446 and 447 of said Lakeway Section Four, with the south line of a tract described in a deed to C.V. Helm recorded in Volume 5025, Page 238 of the Deed Records of Travis County, Texas, with the south line of a tract described in a deed to V.J. Mouton recorded in Volume 4997, Page 14 of the Deed Records of Travis County, Texas, and with the south and west line of Lots 448 through 451 of said Lakeway Section Four the following five (5) courses:

1. N82°58'48"E, a distance of 36.90 feet to an "X" in concrete;
2. S64°17'51"E, a distance of 123.05 feet to an iron rod found said point being the southwest corner of vacated roadway described in Volume 5025, Page 238, of the Travis County Deed Records;
3. S63°04'34"E, a distance of 51.22 feet to an iron rod found said point being the southeast corner of the vacated roadway described in Volume 4997, Page 14, of the Travis County Deed Records;
4. S62°59'54"E, a distance of 38.49 feet to an iron rod found;
5. S20°04'43"E, a distance of 272.18 feet to an iron rod found;

THENCE, with the westerly lines of Lots 452A and 454A of Resubdivision of Lots 452, 453, and 454 Lakeway Section Four, a subdivision recorded in Plat Book 87, Page 115D of the Plat Records of Travis County, Texas, the following two (2) courses:

1. S20°02'02"E, a distance of 16.03 feet to an iron rod found;
2. S12°59'36"E, a distance of 241.75 feet to an iron rod found;

THENCE, along the westerly line of Lot 455A, Resubdivision of Lots 445 & 456 Lakeway Section Four, a subdivision recorded in Plat Book 85, Page 88D of the Plat Records of Travis County, Texas, and along the westerly lines of Lots 457 through 460 of said Lakeway Section Four the following four (4) courses:

1. S13°01'02"E, a distance of 180.07 feet to an iron rod found;
2. S13°01'27"E, a distance of 44.07 feet to an iron rod found;
3. S05°44'00"W, a distance of 115.76 feet to an iron rod found;
4. S22°03'59"W, a distance of 169.87 feet to an iron rod found at the common westerly corner of said Lakeway Section Four and Lakeway Section Four-C, a subdivision recorded in Plat Book 38, Page 24 of the Plat Records of Travis County, Texas;

THENCE, with the northwest and southwest boundary line of said Lakeway Section Four-C the following three (3) courses:

1. S22°03'35"W, a distance of 284.55 feet to an iron rod found;
2. S88°58'37"E, a distance of 133.75 feet to an iron rod found disturbed and reset;
3. S67°57'54"E, a distance of 50.00 feet to an iron rod found;

THENCE, with the boundary line of a 0.632 acre tract described in a deed to Lamar McLennan, Jr. and wife, Zetta McLennan, recorded in Volume 5276, Page 843 of the Deed Records of Travis County, Texas, the following four (4) courses:

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 4, 73.351 NET ACRES

1. S67°57'54"E, a distance of 132.89 feet to an iron rod found;
2. N17°19'14"E, a distance of 125.86 feet to an iron rod found;
3. N10°24'20"W, a distance of 64.86 feet to an iron rod found;
4. N20°07'44"E, a distance of 68.46 feet to an iron rod found in the southerly R.O.W. of Sunfish Street, a 50 foot public road dedicated by Lakeway Section Four;

THENCE, with a southerly R.O.W. line of said Sunfish Street and a southeast boundary line of said Lakeway Section Four the following six (6) courses:

1. S70°09'16"E, a distance of 13.46 feet to an iron rod found;
2. a distance of 122.36 feet along the arc of a non-tangent curve to the left of radius 110.80 feet, central angle 63°16'19" and whose chord bears N78°47'40"E, a distance of 116.23 feet to an iron rod found at end of curve;
3. N46°41'16"E, a distance of 108.96 feet to a nail found in a boulder;
4. a distance of 81.36 feet along the arc of a non-tangent curve to the left of radius 224.96 feet, central angle 20°43'19" and whose chord bears N36°42'47"E, a distance of 80.92 feet to an iron rod found at a point of compound curvature;
5. a distance of 87.35 feet along the arc of a non-tangent curve to the left of radius 259.01 feet, central angle 19°19'24" and whose chord bears N16°50'55"E, a distance of 86.94 feet to an iron rod found at end of curve;
6. N07°31'01"E, a distance of 194.46 feet to an iron rod found at a corner of said Lakeway Section Four boundary and the southwest corner of Lot 472, Lakeway Section Four;

THENCE, with the south, east, and north lines of Lots 472 through 474 of said Lakeway Section Four the following three (3) courses:

1. S82°31'28"E, a distance of 149.36 feet to an iron rod found;
2. N12°50'16"E, a distance of 230.00 feet to an iron rod found;
3. N51°41'47"W, a distance of 141.37 feet to an iron rod found;

THENCE, along the south R.O.W. line of Sunfish Street, the south and east lines of Lot 475 of said Lakeway Section Four, the east line of Lot 476 of Lakeway Section Four B, a subdivision recorded in Plat Book 35, Page 12 of the Plat Records of Travis County, Texas, and along the east line of Lots 477 through 479 of said Lakeway Section Four the following four (4) courses:

1. N38°13'23"E, a distance of 10.00 feet along the R.O.W. line of said Sunfish Street to an "X" cut atop rock wall;
2. S51°46'37"E, a distance of 136.79 feet to an iron rod found;
3. N44°43'23"E, a distance of 360.06 feet to an iron rod found;
4. N37°05'58"E, a distance of 138.40 feet to an iron rod found;

THENCE, along the east line of Lots 480 through 482 of said Lakeway Section Four, the east line of Lot 483A, Resubdivision of Lots 483 and 484 Lakeway Section 4, a subdivision recorded in Plat Book 87, Page 88A of the Plat Records of Travis County, Texas, and along the east, south and west lines of Lots 485 through 511 of said Lakeway Section Four the following seventeen (17) courses:

1. N10°59'34"W, a distance of 674.85 feet to an iron rod found;
2. N14°12'41"E, a distance of 90.05 feet to an iron rod found;
3. N14°17'47"E, a distance of 90.05 feet to an iron rod found;
4. N17°53'41"E, a distance of 93.38 feet to an iron rod found;
5. N27°44'37"E, a distance of 85.40 feet to an iron rod found;
6. N27°57'43"E, a distance of 179.86 feet to an iron rod found;
7. N51°16'36"E, a distance of 50.83 feet to an iron rod found;
8. N65°36'03"E, a distance of 90.10 feet to an iron rod found;

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 4, 73.351 NET ACRES

9. N65°19'35"E, a distance of 70.05 feet to an Iron rod found;
10. S79°44'53"E, a distance of 68.55 feet to an Iron rod found;
11. S69°29'42"E, a distance of 80.65 feet to an Iron rod found;
12. S69°55'54"E, a distance of 84.66 feet to an Iron rod found;
13. S37°44'37"E, a distance of 206.71 feet to an Iron rod found;
14. S35°05'31"E, a distance of 609.85 feet to an Iron rod found;
15. S30°59'04"E, a distance of 181.56 feet to an Iron rod found;
16. S31°19'40"E, a distance of 150.73 feet to an Iron rod found;
17. S05°04'51"E, a distance of 81.71 feet to a concrete monument found at the southwest corner of said Lot 511, Lakeway Section Four and the northwest corner of Lot 809 of Lakeway Section Fourteen, a subdivision recorded in Plat Book 44, Page 8 of the Plat Records of Travis County, Texas;

THENCE, with the northwest lines of Lots 809 through 802, Lots 994 through 991 and Lot 981 of said Lakeway Section Fourteen, the following four (4) courses:

1. S05°04'09"E, a distance of 290.36 feet to an Iron rod found;
2. S54°18'58"W, a distance of 487.21 feet to an Iron rod found;
3. S73°02'10"W, a distance of 184.70 feet to an Iron rod found;
4. S54°27'15"W, a distance of 276.92 feet to an Iron rod found in the east R.O.W. line of Porpolse Street, dedicated by plat of Lakeway Section Ten, a subdivision recorded in Plat Book 44, Page 10 of the Plat Records of Travis County, Texas;

THENCE, with the easterly R.O.W. line of said Porpolse Street and a boundary line of said Lakeway Section Ten, the following five (5) courses:

1. N35°31'45"W, a distance of 43.56 feet to an Iron rod found;
2. a distance of 265.58 feet along the arc of a non-tangent curve to the right of radius 228.93 feet, central angle 66°28'04" and whose chord bears N02°21'25"W, a distance of 250.93 feet to an Iron rod found;
3. N30°52'35"E, a distance of 80.14 feet to an Iron rod found;
4. a distance of 64.29 feet along the arc of a non-tangent curve to the left of radius 203.49 feet, central angle 18°06'04" and whose chord bears N21°49'35"E, a distance of 64.02 feet to an Iron rod found;
5. a distance of 1.30 feet along the arc of a non-tangent curve to the left of radius 311.66 feet, central angle 00°14'17" and whose chord bears N12°42'56"E, a distance of 1.30 feet to an Iron rod found at the southwest corner of Lot 980 of said Lakeway Section Ten;

THENCE, with the boundary line of said Lakeway Section Ten subdivision and the side or rear lot lines of Lots 980 through 954 the following fifteen (15) courses:

1. S78°28'25"E, a distance of 128.43 feet to an Iron rod found;
2. N67°43'33"E, a distance of 443.31 feet to an Iron rod found;
3. N21°45'08"E, a distance of 44.34 feet to an Iron rod found;
4. N24°28'27"W, a distance of 223.52 feet to an Iron rod found;
5. N32°48'27"W, a distance of 139.75 feet to an Iron rod found;
6. N29°07'05"W, a distance of 224.05 feet to an Iron rod found;
7. N25°38'13"W, a distance of 254.63 feet to an Iron rod found;
8. N30°07'35"W, a distance of 289.18 feet to an Iron rod found;
9. S77°17'23"W, a distance of 136.33 feet to an Iron rod found;
10. S27°05'37"W, a distance of 110.21 feet to an Iron rod found;
11. S16°55'52"W, a distance of 157.09 feet to an Iron rod found;
12. S00°13'20"W, a distance of 238.02 feet to an Iron rod found;
13. S03°42'20"E, a distance of 508.12 feet to an Iron rod found;
14. S12°36'40"E, a distance of 133.61 feet to an Iron rod found;
15. S80°53'54"E, a distance of 100.24 feet to an Iron rod found at the southeast corner of said Lot 954, Lakeway Section Ten, said Iron rod being in the west R.O.W. line of said Porpolse Street;

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 4, 73.351 NET ACRES

THENCE, with the west R.O.W. of said Porpoise Street and a boundary line of said Lakeway Section Ten the following three (3) courses:

1. a distance of 48.95 feet along the arc of a curve to the right of radius 153.49 feet, central angle $18^{\circ}16'20''$ and whose chord bears $S21^{\circ}49'37''W$, a distance of 48.74 feet to an Iron rod found;
2. $S30^{\circ}52'35''W$, a distance of 80.14 feet to an Iron rod found;
3. a distance of 317.14 feet along the arc of a non-tangent curve to the left of radius 278.93 feet, central angle $65^{\circ}08'42''$ and whose chord bears $S01^{\circ}41'44''E$, a distance of 300.33 feet to an iron rod found at the northeast corner of Lot 939A, Lakeway Section 8 Resubdivision of Lot 939A, a subdivision recorded in Plat Book 83, Page 85A of the Plat Records of Travis County, Texas;

THENCE, with the north and west lines of said Lot 939A and the rear and side lines of Lots 938 through 933 and Lots 940 through 953 of Lakeway Section Eight, a subdivision recorded in Plat Book 34, Page 28 of the Plat Records of Travis County, Texas, the following sixteen (16) courses:

1. $S54^{\circ}26'40''W$, a distance of 68.48 feet to a P.K. nail found;
2. $S24^{\circ}26'40''W$, a distance of 100.01 feet to an Iron rod found;
3. $S35^{\circ}34'20''E$, a distance of 554.85 feet to an iron rod found;
4. $S54^{\circ}24'47''W$, a distance of 10.12 feet to an iron rod found;
5. $N35^{\circ}33'39''W$, a distance of 554.96 feet to an iron rod found;
6. $S54^{\circ}28'36''W$, a distance of 90.01 feet to an iron rod found;
7. $S30^{\circ}03'40''W$, a distance of 99.84 feet to an iron rod found;
8. $S21^{\circ}19'52''W$, a distance of 138.08 feet to an iron rod found;
9. $S42^{\circ}30'12''W$, a distance of 59.71 feet to an iron rod found;
10. $S33^{\circ}59'48''E$, a distance of 177.71 to an iron rod found;
11. $S79^{\circ}53'15''W$, a distance of 10.86 feet to an iron rod found;
12. $N34^{\circ}00'32''W$, a distance of 171.03 feet to an iron rod found;
13. $S54^{\circ}22'13''W$, a distance of 180.09 feet to an iron rod found;
14. $S49^{\circ}34'13''W$, a distance of 95.12 feet to an iron rod found;
15. $S42^{\circ}24'17''W$, a distance of 134.57 feet to an iron rod found;
16. $S32^{\circ}23'43''E$, a distance of 74.68 feet to an iron rod found in a northwest R.O.W. line of Lakeway Drive, dedicated by Lakeway Road Dedication, a subdivision recorded in Plat Book 17, Page 75, of the Plat Records of Travis County, Texas;

THENCE, with the northwest R.O.W. line of said Lakeway Drive the following three (3) courses:

1. $S57^{\circ}34'05''W$, a distance of 274.89 feet to an Iron rod found;
2. a distance of 198.34 feet along the arc of a non-tangent curve to the left of radius 599.72 feet, central angle $18^{\circ}56'55''$ and whose chord bears $S48^{\circ}06'15''W$, a distance of 197.44 feet to an iron rod found;
3. $S38^{\circ}37'49''W$, a distance of 359.29 feet to a nail found on the northwest R.O.W. line of said Lakeway Drive;

THENCE, continuing with a northerly R.O.W. line of said Lakeway Drive, $N50^{\circ}31'29''W$, a distance of 10.01 feet to a nail found at the most easterly corner of Lot 423-A, First Resubdivision of Section 7-A and Unplatted Land, a subdivision recorded in Plat Book 59, Page 22 of the Plat Records of Travis County, Texas;

THENCE, with the rear line of Lots 423-A through 433-A of said First Resubdivision of Section 7-A and Unplatted Land, and the north and east lines of Lot 434-A, Resubdivision of Lot 434-A Lakeway Section 7-A, a subdivision recorded in Plat Book 71, Page 26 of the Plat Records of Travis County, Texas, the following eleven (11) courses:

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 4, 73.351 NET ACRES

1. N50°44'45"W, a distance of 233.60 feet to an iron rod found;
2. S11°25'12"W, a distance of 232.31 feet to an iron rod found;
3. N75°41'25"W, a distance of 42.24 feet to an iron rod found;
4. N08°29'15"W, a distance of 112.18 feet to an iron rod found;
5. N01°57'25"W, a distance of 245.55 feet to an iron rod found;
6. N73°53'58"W, a distance of 248.44 feet to an iron rod found;
7. N87°29'11"W, a distance of 102.95 feet to an iron rod found;
8. N48°00'27"W, a distance of 122.40 feet to an iron rod found;
9. N02°11'29"E, a distance of 136.24 feet to an iron rod found;
10. N54°03'30"W, a distance of 546.81 feet to an iron rod found;
11. S58°42'06"W, a distance of 113.22 feet to an iron rod found in the easterly R.O.W. line of said Lakeway Drive;

THENCE, with the easterly R.O.W. line of said Lakeway Drive as dedicated on said resubdivision of Lot 434-A Lakeway Section 7-A, a distance of 155.34 feet along the arc of a curve to the right of radius 299.46 feet, central angle 28°43'18" and whose chord bears N13°12'25"W, a distance of 153.61 feet to an iron rod found at a point of reverse curvature;

THENCE, with the easterly R.O.W. line of said Lakeway Drive a distance of 127.77 feet along the arc of a non-tangent curve to the left of radius 1372.67 feet, central angle 05°19'59" whose chord bears N00°57'15"W, a distance of 127.72 feet to a masonry nail found in asphalt at a point of reverse curvature on the boundary of Lakeway Townhouses, a subdivision recorded in Plat Book 43, Page 7 of the Plat Records of Travis County, Texas;

THENCE, a distance of 25.96 feet along the arc of a curve to the right of radius 16.97 feet, central angle 87°39'33" and whose chord bears N40°12'32"E, a distance of 23.50 feet to a masonry nail found in asphalt at a point of tangency on the southwest R.O.W. line of Seawind Street;

THENCE, with the southwest R.O.W. line of said Seawind Street, N84°02'18"E, a distance of 147.71 feet to a masonry nail found in asphalt;

THENCE, with the south R.O.W. line of said Seawind Street a distance of 168.56 feet along the arc of a curve to the left of radius 256.14 feet, central angle 37°42'18" and whose chord bears N65°11'09"E, a distance of 165.54 feet to an iron rod found at a northwest corner of Lot 3281-A, Amended Plat of Lot 3281, Seawind III, a subdivision recorded in Book 87, Page 129C of the Plat Records of Travis County, Texas.

THENCE, with the boundary line of said Lot 3281-A the following four (4) courses:

1. S46°19'22"W, a distance of 72.54 feet to an iron rod found;
2. S54°19'10"W, a distance of 90.21 feet to an iron rod found;
3. S57°43'39"E, a distance of 150.03 feet to an iron rod found;
4. N25°43'22"E, a distance of 15.10 feet to an iron rod found at the southwest corner of Lot 3282 of Seawind III, a subdivision recorded in Book 71, Page 15 of the Plat Records of Travis County, Texas;

THENCE, with the southerly line of said Lot 3282 and said Seawind III, S57°45'07"E, a distance of 179.95 feet to an iron rod found at the southeast corner of said Lot 3282 of said Seawind III and the most westerly southwest corner of the Amended Plat of Lakeway Townhouses Section Two, a subdivision recorded in Plat Book 74, Page 74 of the Plat Records of Travis County, Texas;

THENCE, with the south and east boundary lines of said Amended Plat of Lakeway Townhouses Section Two the following nine (9) courses:

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 4, 73.351 NET ACRES

1. S53°52'25"E, a distance of 142.88 feet to an iron rod found;
2. S42°39'33"E, a distance of 98.05 feet to an iron rod found;
3. N86°24'39"E, a distance of 144.03 feet to an iron rod found;
4. N10°41'40"E, a distance of 188.92 feet to an iron rod found;
5. N29°30'44"E, a distance of 168.93 feet to an iron rod found;
6. N18°42'13"E, a distance of 90.38 feet to an iron rod found;
7. N07°47'02"E, a distance of 140.38 feet to an iron rod found;
8. N04°02'16"W, a distance of 113.48 feet to an iron rod found;
9. N11°15'49"W, a distance of 27.64 feet to an iron rod found at the north corner of said Amended Plat of Lakeway Townhouses Section Two and the most easterly southeast corner of the Amended Plat of Lakeway Townhouses, a subdivision recorded in Book 72, Page 92 of the Plat Records of Travis County, Texas;

THENCE, with the east boundary line of said Amended Plat of Lakeway Townhouses the following five (5) courses:

1. N11°50'21"W, a distance of 70.35 feet to an iron rod found;
2. N12°44'13"W, a distance of 78.97 feet to an iron rod found;
3. N17°03'44"W, a distance of 136.58 feet to an iron rod found;
4. N43°14'54"W, a distance of 122.08 feet to an iron rod found;
5. N59°43'10"W, a distance of 39.98 feet to an iron rod found at the north corner of said Amended Plat of Lakeway Townhouses and the northeast corner of Lot 3280 of said Seawind III;

THENCE, with the north and west boundary lines of said Seawind III the following eight (8) courses:

1. S83°37'21"W, a distance of 120.35 feet to an iron rod found;
2. S86°10'53"W, a distance of 130.74 feet to an iron rod found;
3. S61°55'36"W, a distance of 125.01 feet to an iron rod found;
4. S31°06'01"W, a distance of 89.97 feet to an iron rod found;
5. S36°00'05"W, a distance of 58.61 feet to an iron rod found;
6. S56°19'49"W, a distance of 94.19 feet to an iron rod found;
7. S40°10'23"W, a distance of 34.22 feet to an iron rod found;
8. S49°54'16"E, a distance of 186.89 feet to an iron rod found in a northwest R.O.W. line of said Seawind Street, same also being the south corner of Lot 3278 of said Seawind III;

THENCE, with the north R.O.W. line of said Seawind Street and the boundary line of said Lakeway Townhouses the following four (4) courses:

1. S11°18'08"W, a distance of 122.25 feet to a masonry nail found in an asphalt roadway;
2. a distance of 261.44 feet along the arc of a non-tangent curve to the right of radius 206.14 feet, central angle 72°40'00" and whose chord bears S47°42'18"W, a distance of 244.27 feet to a masonry nail found in asphalt;
3. S84°02'18"W, a distance of 147.71 feet to a masonry nail found in asphalt;
4. a distance of 25.20 feet along the arc of a non-tangent curve to the right of radius 16.58 feet, central angle 87°04'36" and whose chord bears N51°09'36"W, a distance of 22.84 feet to an iron rod found at a point on the east R.O.W. line of said Lakeway Drive;

THENCE, with the east R.O.W. line of said Lakeway Drive the following four (4) courses:

1. N06°20'39"W, a distance of 151.75 feet to an iron rod found;
2. a distance of 199.89 feet along the arc of a non-tangent curve to the right of radius 1485.96 feet, central angle 07°42'26" and whose chord bears N02°55'03"W, a distance of 199.74 feet to an iron rod found;
3. N01°11'33"E, a distance of 75.00 feet to an iron rod found;
4. N01°11'34"E, a distance of 80.41 feet to the POINT OF BEGINNING;

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 4, 73.351 NET ACRES

SAVE AND EXCEPT a 1.110 acre tract described as Tract No. 2 in Volume 4490, Page 340 of the Travis County, Texas, Deed Records and more particularly described by metes and bounds as follows:

COMMENCING for reference at a 60-d nail found in the northerly R.O.W. line of said Lakeway Drive at the most easterly corner of Lot 423-A of the First Resubdivision of Section 7-A and Unplatted Land, a resubdivision recorded in Book 59, Page 22 of the Plat Records of Travis County, Texas.

THENCE, along the northerly R.O.W. line of said Lakeway Drive, S50°31'29"E, a distance of 10.01 feet, and N38°37'49"E, a distance of 271.88 feet to a point.

THENCE, N54°45'24"W, a distance of 162.66 feet, N42°34'58"W 57.48 feet and N03°56'52"W 37.13 feet to an iron rod found in the south line of the said 1.110 acre tract and the POINT OF BEGINNING of the herein described 1.110 acre tract.

THENCE, with the boundary of the Lakeway Water Treatment Plant No. 2 described as Tract No. 2 in Volume 4490, Page 340 of the Travis County, Texas, Deed Records, the following six (6) courses:

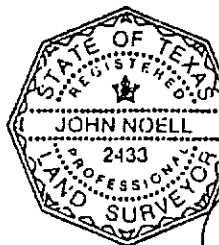
1. N56°40'37"E, a distance of 88.93 feet to a found 1/2" PVC pipe in concrete;
2. N06°18'17"E, a distance of 183.07 feet to a concrete monument found;
3. N89°03'10"W, a distance of 242.23 feet to a concrete monument found;
4. S66°51'55"W, a distance of 77.69 feet to a concrete monument found at the northwest corner of said Water Treatment Plant No. 2;
5. S42°36'09"E, a distance of 295.01 feet to an iron rod found;
6. N56°39'12"E, a distance of 23.38 feet to the POINT OF BEGINNING.

Pages 1 of 8 through 7 of 8 describe 74.461 acres gross area, and Page 8 of 8 (this page) describes the "save and except" tract containing 1.110 acres for a net acreage described herein of 73.351 acres of land.

The bearing basis for this survey is the south line of Lots 1346 through 1350 of Lakeway Sixteen as found monumented by iron rods at angle points in the south line of Lot 1348 and Lot 1350. The bearing for this line is S69°22'00"E.

For the original boundary survey of the hereinabove described tract of land, see the survey conducted by John Noell, R.P.L.S. No. 2433 on May 1, 1992 and updated on April 28, 1993.

Map or sketch attached.



Surveyed by
URBAN DESIGN GROUP
P.O. BOX 26912
AUSTIN, TEXAS 78755
(512) 346-2353

John Noell, R.P.L.S. #2433

Date: 2-22-95

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 5, 6.178 ACRES

LEGAL DESCRIPTION

DESCRIBING A 6.178 ACRE TRACT OF LAND SITUATED IN THE WILLIAM DAVENPORT SURVEY NO. 445 AND THE C.E.P.I. & M. SURVEY NO. 46, IN THE CITY OF LAKEWAY, TRAVIS COUNTY, TEXAS AND SAME BEING A 6.178 ACRE TRACT DESCRIBED IN EXHIBIT A-6 OF A DEED FROM THE FEDERAL DEPOSIT INSURANCE CORPORATION TO HILLWOOD PROPERTY COMPANY AS RECORDED IN VOLUME 12364, PAGE 1915 OF THE TRAVIS COUNTY, TEXAS, DEED RECORDS AND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at an iron rod found at the southwest corner of Lot 289, Lakeway Section Two, a subdivision recorded in Plat Book 17, Page 74 of the Plat Records of Travis County, Texas, said iron rod being the southeast corner of Lot 290, Lakeway Section Three, a subdivision recorded in Plat Book 22, Page 20 of the Plat Records of Travis County, Texas;

THENCE, with the south line of Lots 289 through 286 of said Lakeway Section Two, S87°52'35"E, a distance of 349.12 feet to an iron rod found at the southeast corner of Lot 286 of said Lakeway Section Two, said rod being a point of tangency in the westerly line of Lakeway Drive, a 60-foot wide public road dedicated by Plat of Lakeway Section Two, a subdivision recorded in Plat Book 17, Page 74 of the Plat Records of Travis County, Texas;

THENCE, with the apparent westerly R.O.W. line of Lakeway Drive, not formally dedicated, S01°11'38"W, a distance of 79.85 feet to an iron rod found in the westerly line of Lakeway Drive, a 60-foot wide public road dedicated in part by the Lakeway Road dedication, a subdivision recorded in Plat Book 17, Page 75 of the Plat Records of Travis County, Texas;

THENCE, with the apparent westerly R.O.W. line of Lakeway Drive, the following three (3) courses:

1. S01°11'38"W, a distance of 74.97 feet to an iron rod found at a point of curvature;
2. A distance of 207.78 feet along the arc of a non-tangent curve to the left of radius 1545.98 feet, central angle 07°42'03", and whose chord bears S02°54'16"E, a distance of 207.63 feet to an "X" cut in a concrete golf cart path at the point of tangency;
3. S06°20'39"E, a distance of 138.30 feet to a P.K. nail found in asphalt at a point in the westerly R.O.W. line of Lakeway Drive;

THENCE, leaving the said westerly R.O.W. line of Lakeway Drive and with the north R.O.W. line of an 80-foot wide public road dedicated by Lakeway Section Twenty, a subdivision recorded in Plat Book 58, Page 97 of the Plat Records of Travis County, Texas, the following three (3) courses:

1. a distance of 23.63 feet along the arc of a non-tangent curve to the right of radius 15.0 feet, central angle 90°15'37", and whose chord bears S38°31'32"W, a distance of 21.26 feet to an iron rod found;
2. S83°23'44"W, a distance of 405.22 feet to an iron rod found;
3. a distance of 40.83 feet along the arc of a curve to the right of radius 28.55 feet, central angle 81°56'00", and whose chord bears N55°38'16"W, a distance of 37.44 feet to an iron rod found;

THENCE, along the easterly R.O.W. line of Flamingo Drive as dedicated by said Lakeway Section Twenty, N14°49'08"W, a distance of 148.58 feet to an iron rod found at a point of tangency in the easterly R.O.W. line of Flamingo Drive, a 50-foot wide public street dedicated by plat of Lakeway Section Eleven as recorded in Plat Book 41, Page 41 of the Plat Records of Travis County, Texas;

REAL PROPERTY RECORDS
TRAVIS COUNTY, TEXAS

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 5, 6.178 ACRES

THENCE, with the said easterly R.O.W. line of Flamingo Drive dedicated by Lakeway Section Eleven, a subdivision recorded in Plat Book 41, Page 41 of the Plat Records of Travis County, Texas, the following three (3) courses:

1. A distance of 108.49 feet along the arc of a curve to the left of radius 1033.49 feet, central angle $06^{\circ}00'52''$, and whose chord bears $N17^{\circ}38'23''W$, a distance of 108.44 feet to an iron rod found at a point of tangency;
2. $N20^{\circ}37'27''W$, a distance of 100.06 feet to an iron rod found at a point of curvature; and
3. A distance of 134.49 feet along the arc of a non-tangent curve to the right of radius 545.66 feet, central angle $14^{\circ}06'59''$, and whose chord bears $N13^{\circ}34'58''W$, a distance of 134.15 feet, to an iron rod found at the southwest corner of Lot 291A of said Lakeway Section Eleven;

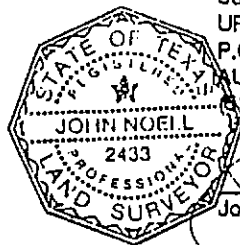
THENCE, with the south line of said Lot 291A, Lakeway Section Eleven, $S82^{\circ}58'23''E$, a distance of 22.42 feet to an iron rod found at an angle point in the south line of said Lot 291A;

THENCE, with the south line of said Lot 291A, Lakeway Section Eleven and the south line of Lot 290, Lakeway Section Three, a subdivision recorded in Plat Book 22, Page 20 of the Plat Records of Travis County, Texas, $N65^{\circ}37'19''E$, a distance of 209.23 feet to an iron rod found at the POINT OF BEGINNING and containing 6.178 acres of land.

The bearing basis for this survey is the south line of Lots 1348 through 1350 of Lakeway Sixteen as found monumented by iron rods at angle points in the south line of Lot 1348 and Lot 1350. The bearing for this line is $S69^{\circ}22'00''E$.

For the original boundary survey of the hereinabove described tract of land, see the survey conducted by John Noell, R.P.L.S. No. 2433 on May 1, 1992 and updated on April 28, 1993.

Map or sketch attached.



Surveyed by
URBAN DESIGN GROUP
P.O. BOX 26912
AUSTIN, TEXAS 78765
(512) 346-2353

John Noell
John Noell, R.P.L.S. #2433

Date: 2-22-95

LIVE OAK GOLF COURSE
LAKEWAY SUBDIVISION
TRACT 6, 0.110 ACRES

LEGAL DESCRIPTION

DESCRIBING A 0.110 ACRE TRACT OF LAND SITUATED IN THE C.E.P.I. & M. SURVEY NO. 48 AND THE WILLIAM DAVENPORT SURVEY NO. 445, IN THE CITY OF LAKEWAY, TRAVIS COUNTY, TEXAS AND SAME BEING A 0.110 ACRE TRACT DESCRIBED IN EXHIBIT A-6 OF A DEED FROM THE FEDERAL DEPOSIT INSURANCE CORPORATION TO HILLWOOD PROPERTY COMPANY AS RECORDED IN VOLUME 12384, PAGE 1915 OF THE TRAVIS COUNTY, TEXAS, DEED RECORDS, SAID 0.110 ACRE TRACT BEING AN APPARENT GAP BETWEEN THE FORMALLY DEDICATED PORTIONS OF LAKEWAY DRIVE SHOWN IN LAKEWAY ROAD DEDICATION, RECORDED IN BOOK 17, PAGE 75 OF THE PLAT RECORDS OF TRAVIS COUNTY, TEXAS AND LAKEWAY SECTION TWO, A SUBDIVISION RECORDED IN PLAT BOOK 17, PAGE 74 OF THE PLAT RECORDS OF TRAVIS COUNTY, TEXAS, SAID 0.110 ACRE TRACT BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at an Iron rod found at the southeast corner of Lot 286, Lakeway Section Two, a subdivision recorded in Plat Book 17, Page 74 of the Plat Records of Travis County, Texas, said iron rod being in the westerly R.O.W. line of Lakeway Drive;

THENCE, with the apparent west R.O.W. line of said Lakeway Drive, S01°11'38"W, a distance of 79.85 feet to an iron rod found;

THENCE, crossing Lakeway Drive, S88°50'05"E, a distance of 60.00 feet to an iron rod found;

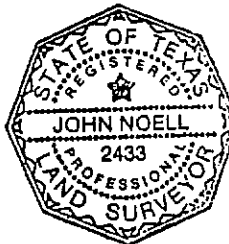
THENCE, with the apparent easterly R.O.W. line of said Lakeway Drive, N01°11'34"E, a distance of 80.41 feet to an iron rod found at the southwest corner of Lot 181, of said Lakeway Section Two;

THENCE, crossing Lakeway Drive, N89°22'18"W, a distance of 60.00 feet to the POINT OF BEGINNING and containing 0.110 acres of land.

The bearing basis for this survey is the south line of Lots 1346 through 1350 of Lakeway Sixteen as found monumented by iron rods at angle points in the south line of Lot 1346 and Lot 1350. The bearing for this line is S69°22'00"E.

For the original boundary survey of the hereinabove described tract of land, see the survey conducted by John Noell, R.P.L.S. No. 2433 on May 1, 1992 and updated on April 28, 1993.

Map or sketch attached.



Surveyed by
URBAN DESIGN GROUP
P.O. BOX 26912
AUSTIN, TEXAS 78755
(512) 348-2353

John Noell, R.P.L.S. #2433

Date: 2-22-95

YAUPON GOLF COURSE
TRACT 1

ALL THAT CERTAIN PARCEL OR TRACT OF LAND OUT OF THE RUSK TRANSPORTATION COMPANY SURVEY NO. 83, CITY OF LAKEWAY, TRAVIS COUNTY, TEXAS; AND BEING ALL OF LOT 3427, LAKEWAY, SECTION 26-B, A SUBDIVISION AS RECORDED IN BOOK 76, PAGE 9 OF THE PLAT RECORDS OF TRAVIS COUNTY, TEXAS; AND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a 1/2" iron rod found on the east right-of-way line of Duck Lake Drive at the northwest corner of Lot 2714, Lakeway Section Twenty-Six, a subdivision as recorded in Book 65, Page 49 of the Plat Records of Travis County, Texas, said iron rod found also being the most westerly corner of the above described Lot 3427, for the most westerly corner and POINT OF BEGINNING of the herein described tract;

THENCE, with the east right-of-way line of Duck Lake Drive, N18°59'11"E a distance of 132.71 feet to a 1/2" iron rod found at the most southerly corner of Lot 2741, said Lakeway Section Twenty-Six;

THENCE, with the southeast lines of Lots 2741 and 2743-2754, said Lakeway Section Twenty-Six, N59°49'00"E a distance of 1576.56 feet to a 1/2" iron rod found on the west right-of-way line of El Rio Drive for the most northerly corner of this tract;

THENCE, with the west right-of-way line of El Rio Drive, the following two (2) courses:

- 1) Along a curve to the right an arc distance of 43.92 feet, having a radius of 772.56 feet and a chord which bears S27°25'43"E a distance of 43.92 feet to a 1/2" iron rod found at a point of nontangent reverse curvature; and
- 2) Along a curve to the left an arc distance of 56.28 feet, having a radius of 1484.39 feet and a chord which bears S26°22'22"E a distance of 56.28 feet to a 1/2" iron rod found at the most northerly corner of Lot 2852, said Lakeway Section Twenty-Six;

THENCE, with the northwest lines of Lots 2852 and 2853, said Lakeway Section Twenty-Six, S59°50'47"W a distance of 210.03 feet to a 1/2" iron rod found;

THENCE, with the southwest line of said Lot 2853, S32°59'43"E a distance of 191.62 feet to a 1/2" iron rod found on the northwest right-of-way line of North El Dorado;

THENCE, with the southwest line of North El Dorado, S63°53'06"E a distance of 50.26 feet to a 1/2" iron rod found on the southeast right-of-way line of North El Dorado at a point of nontangent curvature of a curve to the left;

THENCE, with the southeast right-of-way line of North El Dorado, the following four (4) courses:

- 1) Along said curve to the left an arc distance of 120.80 feet, having a radius of 50.00 feet and a chord which bears N46°41'48"E a distance of 93.49 feet to a 1/2" iron rod found at a point of nontangent reverse curvature;

- 2) Along a curve to the right an arc distance of 37.86 feet, having a radius of 30.00 feet and a chord which bears N13°46'38"E a distance of 35.40 feet to a 1/2" iron rod found at a point of nontangent reverse curvature;
- 3) Along a curve to the left an arc distance of 43.42 feet, having a radius of 302.71 feet and a chord which bears N53°52'03"E a distance of 43.38 feet to a 1/2" iron rod found at a point of nontangent reverse curvature; and
- 4) Along a curve to the right an arc distance of 23.62 feet, having a radius of 15.00 feet and a chord which bears S76°51'05"E a distance of 21.25 feet to a 1/2" iron rod found at the intersection with the west right-of-way line of El Rio Drive at a point of nontangency;

THENCE, with the west right-of-way lines of El Rio Drive and Fenway Court, the following three (3) courses:

- 1) S31°56'59"E a distance of 76.25 feet to a 1/2" iron rod found at a point of curvature of a curve to the right;
- 2) Along said curve to the right an arc distance of 181.97 feet, having a radius of 417.05 feet and a chord which bears S19°27'00"E a distance of 180.53 feet to a 1/2" iron rod set at a point of nontangent compound curvature; and
- 3) Along a curve to the right an arc distance of 129.13 feet, having a radius of 931.80 feet and a chord which bears S03°01'58"E a distance of 129.03 feet to a 1/2" iron rod set at the northeast corner of Lot 2864, said Lakeway Section Twenty-Six;

THENCE, with the north line of said Lot 2864, N89°33'32"W a distance of 76.33 feet to a 1/2" iron rod found;

THENCE, with the west lines of Lots 2864 and 2863, said Lakeway Section Twenty-Six, S30°28'28"W a distance of 260.08 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the south lines of Lots 2863 and 2862, said Lakeway Section Twenty-Six, S60°43'38"E a distance of 309.49 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the east lines of Lots 2862-2859, said Lakeway Section Twenty-Six, N29°18'44"E a distance of 434.51 feet to a 1/2" iron rod set for an outside corner of this tract;

THENCE, with the southwest line of Lot 2865, said Lakeway Section Twenty Six, S48°18'20"E a distance of 25.98 feet to a 1/2" iron rod set for an outside corner of this tract;

THENCE, with the northwest line of Lot 2689, Lakeway Section Twenty-Two, a subdivision as recorded in Book 59, Page 26 of the Plat Records of Travis County, Texas, S44°37'44"W a distance of 20.00 feet to a 1/2" iron rod set;

THENCE, with the west lines of Lots 2539-2544, said Lakeway Section Twenty-Two, S29°18'44"W a distance of 617.65 feet to a 1/2" iron rod found for an outside corner of this tract;

THENCE, with the north line of Lot 2545, said Lakeway Section Twenty-Two, N60°48'15"W a distance of 19.98 feet to a 1/2" iron rod found for an outside corner of this tract;

THENCE, with the east line of Lot 2546, said Lakeway Section Twenty-Two, N29°15'58"E a distance of 187.96 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the north lines of Lot 2547 and 2548, said Lakeway Section Twenty-Two, N60°42'59"W a distance of 309.85 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the west lines of Lots 2548-2554, said Lakeway Section Twenty-Two, the following three (3) courses:

- 1) S30°32'58"W a distance of 253.21 feet to a 1/2" iron rod found at an angle point;
- 2) S23°55'12"W a distance of 350.02 feet to a 1/2" iron rod found at an angle point; and
- 3) S11°08'48"E a distance of 174.80 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the south line of said Lot 2554, N78°54'48"E a distance of 159.76 feet to a 1/2" iron rod found on the west right-of-way line of Royal Oak Lane for an outside corner of this tract;

THENCE, with the west right-of-way line of Royal Oak Lane, S11°13'17"E a distance of 49.74 feet to a 1/2" iron rod found at the northeast corner of Lot 2555, said Lakeway Section Twenty-Two, for the southeast corner of this tract;

THENCE, with the north lines of Lots 2555-2561, said Lakeway Section Twenty-Two, the following (2) courses:

- 1) S78°56'07"W a distance of 371.61 feet to a 1/2" iron rod found at an angle point; and
- 2) N71°44'32"W a distance of 179.39 feet to a 1/2" iron rod found at an angle point;

THENCE, with the northeast lines of Lots 2706 and 2707, said Lakeway Section Twenty-Six, the following two (2) courses:

- 1) N24°10'10"W a distance of 117.34 feet to a 1/2" iron rod found at an angle point; and
- 2) N41°15'14"W a distance of 155.90 feet to a 1/2" iron rod found on the curving east right-of-way line of South El Dorado at the most northerly corner of Lot 2707, said Lakeway Section Twenty-Six;

THENCE, with the east right-of-way line of South El Dorado, the following two (2) courses:

- 1) Along a curve to the left an arc distance of 56.88 feet, having a radius of 292.64 feet and a chord which bears N29°32'58"E a distance of 56.79 feet to a 1/2" iron rod found at a nontangent point of reverse curvature; and
- 2) Along a curve to the right an arc distance of 122.93 feet, having a radius of 620.52 feet and a chord which bears N29°42'05"E a distance of 122.73 feet to a 1/2" iron rod found at the most westerly corner of Lot 3374, the above described Lakeway, Section 26-B.

THENCE, with the southwest line of said Lot 3374, S55°28'05"E a distance of 119.85 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the southeast lines of Lots 3374-3387, said Lakeway, Section 26-B, the following two (2) courses:

- 1) N33°09'02"E a distance of 321.87 feet to a 5/8" iron rod found at an angle point; and
- 2) N37°22'52"E a distance of 391.00 feet to a 5/8" iron rod found in concrete at an angle point;

THENCE, with the east lines of Lots 3387-3389, said Lakeway, Section 26-B, the following (2) courses:

- 1) N00°03'38"W a distance of 101.94 feet to a 5/8" iron rod found at an angle point; and
- 2) N29°20'03"W a distance of 102.29 feet to a 5/8" iron rod found in concrete at an angle point;

THENCE, with the north lines of Lots 3389-3391, 3414, and 3404-3406, said Lakeway Section 26-B, the following two (2) courses:

- 1) N79°22'52"W a distance of 119.88 feet to a 5/8" iron rod found in concrete at an angle point; and
- 2) S66°44'01"W a distance of 729.83 feet to a 5/8" iron rod found in concrete at an angle point;

THENCE, with the west lines of Lots 3406 and 3407, said Lakeway, Section 26-B, the following two (2) courses:

- 1) S18°20'51"W a distance of 106.10 feet to a 1/2" iron rod found in concrete at an angle point; and
- 2) S21°30'46"E a distance of 95.07 feet to a 5/8" iron rod found in concrete at an angle point;

THENCE, with the southwest lines of Lots 3408-3413, said Lakeway, Section 26-B, the following two (2) courses:

- 1) S49°03'32"E a distance of 194.32 feet to a 1/2" iron rod set at an angle point; and
- 2) S55°22'24"E a distance of 164.74 feet to a 1/2" iron rod set on the curving west right-of-way line of South El Dorado at the most southerly corner of Lot 3413, said Lakeway, Section 26-B;

THENCE, with the west right-of-way line of South El Dorado, along a curve to the left an arc distance of 130.07 feet, having a radius of 670.52 feet and a chord which bears S29°23'58"W a distance of 129.87 feet to a 1/2" iron rod found at the most easterly corner of Lot 2708, said Lakeway Section Twenty-Six;

THENCE, with the northeast line of said Lot 2708, N60°03'29"W a distance of 141.41 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the northwest line of said Lot 2708, S32°21'31"W a distance of 139.36 feet to a 1/2" iron rod set on the curving northeast right-of-way line of Lakeway Boulevard for an outside corner of this tract;

THENCE, with the northeast right-of-way line of Lakeway Boulevard, along a curve to the left an arc distance of 49.96 feet, having a radius of 321.97 feet and a chord which bears N57°35'51"W a distance of 49.91 feet to a 1/2" iron rod set at the most southerly corner of Lot 2709, said Lakeway Section Twenty-Six;

THENCE, with the southeast line of said Lot 2709, N32°21'31"E a distance of 137.25 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the northeast lines of Lots 2709 and 2710, said Lakeway Section Twenty-Six, N59°56'54"W a distance of 289.88 feet to a 1/2" iron rod found at an angle point;

THENCE, with the northeast line of Lot 2711, said Lakeway Section Twenty-Six, N58°30'12"W a distance of 94.86 feet to a 5/8" iron rod found for an inside corner of this tract;


THENCE, with the west line of said Lot 2711, S24°35'00"W a distance of 216.14 feet to a 1/2" iron rod found at an angle point;

THENCE, with the east line of Lot 2712, said Lakeway Section Twenty-Six, N08°18'13"W a distance of 37.07 feet to a 1/2" iron rod found at an angle point;

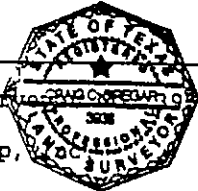
THENCE, with the east lines of Lots 2713 and 2714, said Lakeway Section Twenty-Six, N24°34'46"E a distance of 187.46 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the northeast line of said Lot 2714, N58°33'38"W a distance of 177.57 feet to the POINT OF BEGINNING, and containing 22.282 acres of land, more or less.

I HEREBY CERTIFY that these notes were prepared by Terra Firma from a survey made on the ground on March 26, 1990 by MESA Surveying, Inc. and updates made on the ground on March 31, 1993 and February 28, 1995 by Terra Firma, both under my supervision, and are true and correct to the best of my knowledge.



Craig C. Cregar
Registered Professional Land Surveyor



2/26/95
Date

Client: Cobblestone Golf Group,
Date: February 28, 1995
WO No.: 0079-02-03
FB No.: 23
Disk: TR2.010

BASIS OF BEARINGS:

The bearing, N59°49'00"E, being an inverse between a 1/2" iron rod found at the most southerly corner of Lot 2741 and a 1/2" iron rod found on the west right-of-way line of El Rio Drive at the most easterly corner of Lot 2754, as shown on the subdivision plat of Lakeway Section Twenty-Six, as recorded in Book 65, Page 49 of the Plat Records of Travis County, Texas, was taken as the Basis of Bearings.

FIELD NOTES
YAUPON GOLF COURSE
TRACT 2

ALL THAT CERTAIN PARCEL OR TRACT OF LAND OUT OF THE RUSK TRANSPORTATION COMPANY SURVEY NO. 83 AND THE J.P. WARNOCK SURVEY NO. 57, CITY OF LAKEWAY, TRAVIS COUNTY, TEXAS; AND BEING ALL OF LOT 3428, LAKEWAY, SECTION 26-C, A SUBDIVISION AS RECORDED IN BOOK 77, PAGE 59 OF THE PLAT RECORDS OF TRAVIS COUNTY, TEXAS, AND A PORTION OF LAKEWAY SECTION TWENTY-SIX, A SUBDIVISION AS RECORDED IN BOOK 65, PAGE 49 OF THE PLAT RECORDS OF TRAVIS COUNTY, TEXAS; AND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a 1/2" iron rod found on the curving south right-of-way line of Lakeway Boulevard at the northwest corner of Lot 2705, Lakeway Section Twenty-Six, a subdivision as recorded in Book 65, Page 49 of the Plat Records of Travis County, Texas, said iron rod found also being the most northerly northeast corner of the above described Lot 3428, for the most northerly northeast corner and POINT OF BEGINNING of the herein described tract;

THENCE, with the west line of said Lot 2705, S17°42'44"W a distance of 108.60 feet to a 1/2" iron rod found at an angle point;

THENCE, with the southwest lines of Lots 2705-2703, said Lakeway Section Twenty-Six, S24°54'46"E a distance of 304.85 feet to a 1/2" iron rod found at an angle point;

THENCE, with the southwest and south lines of Lots 2345-2356, Lakeway Section Twenty-Two, a subdivision as recorded in Book 59, Page 25 of the Plat Records of Travis County, Texas, the following four (4) courses;

- 1) S46°30'42"E a distance of 223.50 feet to a 1/2" iron rod found at an angle point;
- 2) S68°39'20"E a distance of 291.74 feet to a 1/2" iron rod found at an angle point;
- 3) N79°54'46"E a distance of 610.49 feet to a 1/2" iron rod found at an angle point; and
- 4) S89°15'14"E a distance of 80.94 feet to a 1/2" iron rod found on the curving northwest right-of-way line of Rogue's Roost Drive at the southeast corner of Lot 2356, Lakeway Section Twenty-Two, a subdivision as recorded in Book 59, Page 25 of the Plat Records of Travis County, Texas, for the most easterly northeast corner of this tract;

THENCE, with the northwest right-of-way line of Rogue's Roost Drive, the following three (3) courses:

- 1) Along a curve to the right an arc distance of 164.35 feet, having a radius of 163.67 feet and a chord which bears S41°00'46"W a distance of 157.69 feet to a 1/2" iron rod found at a point of nontangency;
- 2) S69°16'45"W a distance of 24.46 feet to a 1/2" iron rod found at a nontangent point of curvature of a curve to the left; and
- 3) Along said curve to the left an arc distance of 109.67 feet, having a radius of 298.88 feet and a chord which bears S38°45'33"W a distance of 109.06 feet to a 1/2" iron rod found at the most easterly corner of Lot 2344, said Lakeway Section Twenty-Two;

THENCE, with the north lines of Lots 2344 and 2343, said Lakeway Section Twenty-Two, S71°22'25"W a distance of 341.28 feet to a 1/2" iron rod found at an angle point;

THENCE, with the north line of Lot 2702, said Lakeway Section Twenty-Six, S83°38'04"W a distance of 144.33 feet to a 1/2" iron rod found at an angle point;

THENCE, with the north lines of Lots 2701 and 2700, said Lakeway Section Twenty-Six, S83°23'57"W a distance of 201.96 feet to a 1/2" iron rod found at an angle point;

THENCE, with the northeast lines of Lots 2699 and 2698, said Lakeway Section Twenty Six, N55°50'57"W a distance of 214.25 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the northwest line of said Lot 2698, S31°57'20"W a distance of 144.87 feet to a P-K nail set in rock on the northeast right-of-way line of Rolling Green Drive for an outside corner of this tract;

THENCE, with the northeast right-of-way line of Rolling Green Drive, N57°51'40"W a distance of 20.04 feet to a 1/2" iron rod found at the most southerly corner of Lot 2697, said Lakeway Section Twenty-Six;


THENCE, with the southeast line of said Lot 2697, N31°57'20"E a distance of 145.58 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the northeast and east lines of said Lot 3428, the following five (5) courses:

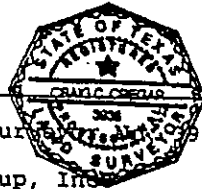
- 1) N55°52'37"W a distance of 306.10 feet to a 1/2" iron rod found at an angle point;
- 2) N46°02'27"W a distance of 101.99 feet to a 1/2" iron rod found at an angle point;
- 3) N27°54'36"W a distance of 156.94 feet to a railroad spike found at an angle point;
- 4) N00°57'54"W a distance of 285.09 feet to a 5/8" iron rod found at an angle point; and
- 5) N09°02'55"W a distance of 137.58 feet to a 1/2" iron rod found on the curving south right-of-way line of Lakeway Boulevard at the northeast corner of Lot 3429, said Lakeway, Section 26-C, for the northwest corner of this tract;

THENCE, with the south right-of-way line of Lakeway Boulevard, along a curve to the right an arc distance of 311.10 feet, having a radius of 417.47 feet and a chord which bears S77°14'22"E a distance of 303.95 feet to the POINT OF BEGINNING, and containing 9.976 acres of land, more or less.

I HEREBY CERTIFY that these notes were prepared by Terra Firma from a survey made on the ground on March 26, 1990 by MESA Surveying, Inc. and updates made on the ground on March 31, 1993 and February 28, 1995 by Terra Firma, both under my supervision, and are true and correct to the best of my knowledge.



Craig Cregar
Registered Professional Land Surveyor 3336



2/28/95
Date

Client: Cobblestone Golf Group, Inc.
Date: February 28, 1995
WO No.: 0079-02-03
FB No.: 23
Disk: TR2.010

BASIS OF BEARINGS:

The bearing, N59°49'00"E, being an inverse between a 1/2" iron rod found at the most southerly corner of Lot 2741 and a 1/2" iron rod found on the west right-of-way line of El Rio Drive at the most easterly corner of Lot 2754, as shown on the subdivision plat of Lakeway Section Twenty-Six, as recorded in Book 65, Page 49 of the Plat Records of Travis County, Texas, was taken as the Basis of Bearings.

FIELD NOTES
YAUPON GOLF COURSE
TRACT 3

ALL THAT CERTAIN PARCEL OR TRACT OF LAND OUT OF THE J.P. WARNOCK SURVEY NO. 57 AND THE B.K. STEWART SURVEY NO. 84, CITY OF LAKEWAY, TRAVIS COUNTY, TEXAS; AND BEING ALL OF A 34.575-ACRE TRACT (YAUPON GOLF COURSE TRACT 3) (EXHIBIT A-9) AS CONVEYED TO HILLWOOD PROPERTY CO. BY DEED RECORDED IN VOLUME 12364, PAGE 1915 OF THE REAL PROPERTY RECORDS OF TRAVIS COUNTY, TEXAS; AND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a 1/2" iron rod found on the southeast right-of-way line of Rogue's Roost Drive at the most northerly corner of Lot 2341, said Lakeway Section Twenty-Two, for the most westerly corner and POINT OF BEGINNING of the herein described tract;

THENCE, with the southeast right-of-way line of Rogue's Roost Drive, the following two (2) courses:

- 1) N36°02'35"E a distance of 211.27 feet to a 1" iron pipe found at a nontangent point of curvature of a curve to the right; and
- 2) Along said curve to the right an arc distance of 85.38 feet, having a radius of 248.88 feet and a chord which bears N45°42'43"E a distance of 84.96 feet to a 1" iron pipe found at the most westerly corner of Lot 2357, said Lakeway Section Twenty-Two;

THENCE, with the southwest line of said Lot 2357, S50°32'17"E a distance of 175.00 feet to a 1/2" iron rod found at a nontangent point of curvature of a curve to the left;

THENCE, with the south lines of Lots 2358 and 2359, said Lakeway Section Twenty-Two, along said curve to the left an arc distance of 287.12 feet, having a radius of 129.22 feet and a chord which bears N65°51'49"E a distance of 231.60 feet to a 1/2" iron rod found at a point of nontangency;

THENCE, with the east lines of Lots 2359-2362, said Lakeway Section Twenty-Two, the following two (2) courses:

- 1) N02°24'52"E a distance of 311.16 feet to a 1/2" iron rod set at an angle point; and
- 2) N33°07'52"E a distance of 17.29 feet to a 1/2" iron rod found at an angle point;

THENCE, with the west lines of Lots 2363-2366, said Lakeway Section Twenty-Two, the following two (2) courses:

- 1) S31°36'18"E a distance of 17.89 feet to a 1/2" iron rod found at an angle point; and
- 2) S02°24'52"W a distance of 355.19 feet to a 1/2" iron rod set at an angle point;

THENCE, with the south line of said Lot 2366, N73°29'29"E a distance of 181.38 feet to a 1/2" iron rod set on the curving west right-of-way line of Top O' The Lake Drive for an outside corner of this tract;

THENCE, with the west right-of-way line of Top O' The Lake Drive, along a curve to the left an arc distance of 149.17 feet, having a radius of 564.76 feet and a chord which bears S24°45'31"E a distance 148.74 feet to a 1/2" iron rod set at the intersection with the northwest right-of-way line of Lone Cedar Court at a nontangent point of reverse curvature;

THENCE, with the northwest right-of-way line of Lone Cedar Court, the following five (5) courses:

- 1) Along a curve to the right an arc distance of 22.67 feet, having a radius of 15.10 feet and a chord which bears S10°42'21"W a distance of 20.60 feet to a 1/2" iron rod set at a point of reverse curvature;
- 2) Along a curve to the left an arc distance of 60.92 feet, having a radius of 280.00 feet and a chord which bears S47°29'21"W a distance of 60.80 feet to a 1/2" iron rod set at a point of tangency;
- 3) S41°15'21"W a distance of 24.04 feet to a P-K nail set in a boulder at a point of curvature of a curve to the right;
- 4) Along said curve to the right an arc distance of 17.26 feet, having a radius of 30.00 feet and a chord which bears S57°43'21"W a distance of 17.02 feet to a 1/2" iron rod set at a point of reverse curvature; and
- 5) Along a curve to the left an arc distance of 42.68 feet, having a radius of 50.00 feet and a chord which bears S49°44'22"W a distance of 41.40 feet to a P-K nail set in a boulder at the northeast corner of Lot 2369, said Lakeway Section Twenty-Two;

THENCE, with the north line of said Lot 2369, N70°17'39"W a distance of 108.02 feet to a point for an inside corner of this tract;

THENCE, with the west line of said Lot 2369, the following two (2) courses:

- 1) S17°16'21"W a distance of 95.00 feet to a 1/2" iron rod set at a point of curvature of a curve to the left; and
- 2) Along said curve to the left an arc distance of 86.16 feet, having a radius of 67.78 feet and a chord which bears S19°08'39"E a distance of 80.48 feet to a 1/2" iron rod found at the most westerly corner of Lot 2370, said Lakeway Section Twenty-Two, at a point of tangency;

THENCE, with the southwest, south and southeast lines of Lots 2370-2372, said Lakeway Section Twenty-Two, the following six (6) courses:

- 1) S55°33'39"E a distance of 140.97 feet to a 1/2" iron rod found at a point of curvature of a curve to the left;
- 2) Along a curve to the left an arc distance of 100.67 feet, having a radius of 100.60 feet and a chord which bears S84°13'39"E a distance of 96.52 feet to a 1/2" iron rod set at a point of compound curvature;

- 3) Along a curve to the left an arc distance of 93.61 feet, having a radius of 107.63 feet and a chord which bears N42°11'21"E a distance of 90.69 feet to a 1/2" iron rod set at a point of nontangency;
- 4) N17°43'09"E a distance of 30.00 feet to a 1/2" iron rod found at an angle point;
- 5) N36°19'50"E a distance of 68.46 feet to a 1/2" iron rod found at an angle point; and
- 6) N69°33'28"E a distance of 18.03 feet to a nail found in rock at an angle point;

THENCE, with the northwest line of Lot 2373, said Lakeway Section Twenty-Two, the following three (3) courses:

- 1) S02°13'01"W a distance of 18.03 feet to a 1/2" iron rod found at an angle point;
- 2) S36°20'36"W a distance of 54.90 feet to a 1/2" iron rod found at an angle point; and
- 3) S11°48'33"W a distance of 54.67 feet to a 1/2" iron rod found at an angle point;

THENCE, with the southwest lines of Lots 2373-2382, Lakeway Section Twenty-Two and extension thereof, the following three (3) courses:

- 1) S38°14'36"E a distance of 559.54 feet to a 1/2" iron rod found at an angle point;
- 2) S35°51'00"E a distance of 177.98 feet to a 1/2" iron rod found at an angle point; and
- 3) S52°54'00"E a distance of 212.00 feet to a 1/2" iron rod set at the most southerly corner of a 0.052-acre tract as conveyed to J.O. and Martha Callam by deed recorded in Volume 5159, Page 282 of the Deed Records of Travis County, Texas for an inside corner of this tract;

THENCE, with the southeast line of said Callam 0.052-acre tract, N37°10'14"E a distance of 149.66 feet to a 1/2" iron rod found on the southwest right-of-way line of Top O' The Lake Drive for an outside corner of this tract;

THENCE, with the southwest right-of-way line of Top O' The Lake Drive, S32°59'35"E a distance of 209.82 feet to a P-K nail set in a boulder at the northwest corner of Lot 2877, Lakeway Section 22-B, a subdivision as recorded in Book 64, Page 35 of the Plat Records of Travis County, Texas;

THENCE, with the west line of said Lot 2877, S19°00'00"W a distance of 155.00 feet to a 1/2" iron rod set at an angle point;

THENCE, with the southwest line of said Lot 2877 and the west line of Lot 2878, said Lakeway Section 22-B, the following two (2) courses:

- 1) S31°01'00"E a distance of 66.61 feet to a 1/2" iron rod set at an angle point; and
- 2) S24°55'35"E a distance of 77.49 feet to a 1/2" iron rod found at the northwest corner of Lot 2879-A, Resubdivision of a Portion of Lakeway Section 22-B, as recorded in Book 73, Page 25 of the Plat Records of Travis County, Texas;

THENCE, with the west, south and east lines of said Lot 2879-A, the following four (4) courses:

- 1) S18°14'21"E a distance of 107.44 feet to a 1/2" iron rod found at an angle point;
- 2) N85°48'21"E a distance of 115.70 feet to a 1/2" iron rod found at an angle point;
- 3) N30°17'42"E a distance of 21.11 feet to a 1/2" iron rod found at a point of curvature of a curve to the left; and
- 4) Along said curve to the left an arc distance of 59.56 feet, having a radius of 183.77 feet and a chord which bears N21°10'30"E a distance of 59.30 feet to a 1/2" iron rod found on the curving east right-of-way line of Top O' The Lake Drive;

THENCE, with the east right-of-way line of Top O' The Lake Drive, the following three (3) courses:

- 1) Along a curve to the left an arc distance of 181.10 feet, - having a radius of 50.00 feet and a chord which bears N23°18'15"E a distance of 97.13 feet to a 1/2" iron rod found at a nontangent point of reverse curvature;
- 2) Along a curve to the right an arc distance of 22.91 feet, having a radius of 17.25 feet and a chord which bears N42°14'08"W a distance of 21.26 feet to a P-K nail set in rock at a point of reverse curvature; and
- 3) Along a curve to the left an arc distance of 27.62 feet, having a radius of 202.50 feet and a chord which bears N09°01'15"W a distance of 27.60 feet to a 1/2" iron rod found at the southwest corner of Lot 2845, said Lakeway Section 22-B;

THENCE, with the south line of said Lot 2845, N78°27'45"E a distance of 65.21 feet to a 1/2" iron rod found at an angle point;

THENCE, with the southeast lines of Lots 2845-2842, said Lakeway Section 22-B, the following two (2) courses:

- 1) N25°30'51"E a distance of 97.09 feet to a 1/2" iron rod found at an angle point; and
- 2) N45°39'42"E a distance of 349.81 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the northeast, north and west lines of Lots 2842-2840, said Lakeway Section 22-B, the following three (3) courses:

- 1) N45°07'04"W a distance of 295.20 feet to a 1/2" iron rod set at an angle point;
- 2) S83°12'27"W a distance of 215.00 feet to a 1/2" iron rod found at an angle point; and
- 3) S29°58'14"W a distance of 44.94 feet to a concrete nail found in rock at the most easterly corner of Lot 2402, said Lakeway Section Twenty-Two;

THENCE, with the northeast line of said Lot 2402, N60°01'30"W a distance of 130.01 feet to a 1/2" iron rod set on the east right-of-way line of Cold Water Lane;

THENCE, with the east right-of-way line of Cold Water Lane, along a curve to the left an arc distance of 63.97 feet, having a radius of 229.98 feet and a chord which bears N24°32'23"E a distance of 63.77 feet to a 1/2" iron rod set at the southwest corner of Lot 2404, said Lakeway Section Twenty-Two;

THENCE, with the south line of said Lot 2404, N79°55'49"E a distance of 170.00 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the east lines of Lots 2404-2414, said Lakeway Section Twenty-Two, the following three (3) courses:

- 1) N01°30'11"W a distance of 78.98 feet to a 1/2" iron rod found at an angle point;
- 2) N18°30'30"W a distance of 60.04 feet to a concrete nail found in rock at an angle point; and
- 3) N27°04'28"W a distance of 874.93 feet to a 1/2" iron rod set on the south right-of-way line of Lakeway Boulevard for an outside corner of this tract;

THENCE, with the south right-of-way line of Lakeway Boulevard, N67°06'57"E a distance of 63.66 feet to a 1/2" iron rod found at the most westerly corner of Lot 2415, said Lakeway Section Twenty-Two;

THENCE, with the southwest, south and southeast lines of Lots 2415-2419, said Lakeway Section Twenty-Two, the following four (4) courses:

- 1) S22°53'03"E a distance of 99.81 feet to a 1/2" iron rod found at an angle point;
- 2) S46°16'58"E a distance of 215.43 feet to a cotton spindale set at a point of curvature of a curve to the left;
- 3) Along said curve to the left an arc distance of 157.08 feet, having a radius of 100.00 feet and a chord which bears N88°43'02"E a distance of 141.42 feet to a 1/2" iron rod found at a point of tangency; and
- 4) N43°43'02"E a distance of 240.36 feet to a 1/2" iron rod set for an inside corner of this tract;

THENCE, with the northeast lines of Lots 2419 and 2420, said Lakeway Section Twenty-Two, N46°19'11"W a distance of 210.23 feet to a 1/2" iron rod found at an angle point;

THENCE, with the east line of Lot 2421, said Lakeway Section Twenty-Two, N01°51'24"E a distance of 26.88 feet to a 1/2" iron rod found at an angle point;

THENCE, with the southwest lines of Lots 2422 and 2423, said Lakeway Section Twenty-Two, S46°19'11"E a distance of 223.52 feet to a 1/2" iron rod found at an angle point;

THENCE, with the south lines of Lots 2423 and 2424, said Lakeway Section Twenty-Two, the following two (2) courses:

- 1) N69°26'56"E a distance of 175.47 feet to a 1/2" iron rod found at an angle point; and
- 2) S79°08'37"E a distance of 17.38 feet to a 1/2" iron rod found at an angle point;

THENCE, with the north, northwest and west lines of Lots 2425-2429, said Lakeway Section Twenty-Two, the following four (4) courses:

- 1) S33°24'08"W a distance of 18.36 feet to a 1/2" iron rod found at an angle point;

- 2) S69°31'33"W a distance of 155.17 feet to a 1/2" iron rod found at an angle point;
- 3) S43°43'02"W a distance of 273.42 feet to a 1/2" iron rod found at a nontangent point of curvature of a curve to the left; and
- 4) Along said curve to the left an arc distance of 149.55 feet, having a radius of 95.00 feet and a chord which bears S01°14'53"E a distance of 134.58 feet to a 1/2" iron rod found at a point of nontangency;

THENCE, with the southwest line of Lot 2430, said Lakeway Section Twenty-Two, S47°35'30"E a distance of 132.67 feet to a 1/2" iron rod found at a point of nontangent curvature of a curve to the left;

THENCE, with the south and southeast lines of Lots 2430-2434, said Lakeway Section Twenty-Two, the following (4) courses:

- 1) Along said curve to the left an arc distance of 129.09 feet, having a radius of 82.61 feet and a chord which bears N88°32'31"E a distance of 116.35 feet to a 1/2" iron rod set at a point of nontangency;
- 2) N42°11'05"E a distance of 171.86 feet to a 1/2" iron rod found at an angle point;
- 3) N49°56'05"E a distance of 110.44 feet to a 1/2" iron rod found at an angle point; and
- 4) S82°48'32"E a distance of 18.96 feet to a 1/2" iron rod found at an angle point;

THENCE, with the west and northwest lines of Lots 2435-2438, said Lakeway Section Twenty-Two, the following four (4) courses:

- 1) S28°28'28"W a distance of 13.22 feet to a 1/2" iron rod set at an angle point;
- 2) S49°27'57"W a distance of 109.04 feet to a 1/2" iron rod set at an angle point;
- 3) S42°11'05"W a distance of 175.00 feet to a 1/2" iron rod set at a point of curvature of a curve to the left; and
- 4) Along said curve to the left an arc distance of 125.66 feet, having a radius of 80.00 feet and a chord which bears S02°48'29"E a distance of 113.14 feet to a 1/2" iron rod found at a point of tangency;

THENCE, with the southwest lines of Lots 2438 and 2439, said Lakeway Section Twenty-Two, S47°48'29"E a distance of 177.83 feet to a 1/2" iron rod set at a nontangent point of curvature of a curve to the left;

THENCE, with the south and southeast lines of Lots 2439-2441, said Lakeway Section Twenty-Two, the following three (3) courses:

- 1) Along said curve to the left an arc distance of 173.50 feet, having a radius of 97.81 feet and a chord which bears N80°56'10"E a distance of 151.63 feet to a 1/2" iron rod set at a point of nontangency;
- 2) N30°18'41"E a distance of 160.00 feet to a 1/2" iron rod found at an angle point; and
- 3) N73°32'05"E a distance of 19.31 feet to a 1/2" iron rod found at an angle point;

THENCE, with the west lines of Lots 2442-2445, said Lakeway Section Twenty-Two, the following three (3) courses:

- 1) S03°54'02"W a distance of 15.48 feet to a 1/2" iron rod found at an angle point;
- 2) S30°18'41"W a distance of 209.19 feet to a 1/2" iron rod found at a point of nontangent curvature of a curve to the left; and
- 3) Along said curve to the left an arc distance of 127.86 feet, having a radius of 92.01 feet and a chord which bears S07°17'34"E a distance of 117.82 feet to a 1/2" iron rod found at a point of nontangency;

THENCE, with the southwest line of said Lot 2445, S49°54'31"E a distance of 94.32 feet to a 1/2" iron rod found at a nontangent point of curvature of a curve to the left;

THENCE, with the south and southeast lines of Lots 2445-2448, said Lakeway Section Twenty-Two, the following four (4) courses:

- 1) Along said curve to the left an arc distance of 80.55 feet, having a radius of 72.48 feet and a chord which bears S79°49'12"E a distance of 76.60 feet to a 1/2" iron rod found at a point of nontangency;
- 2) N68°22'19"E a distance of 135.13 feet to a 1/2" iron rod set at an angle point;
- 3) N30°22'41"E a distance of 170.00 feet to a 1/2" iron rod found at an angle point; and
- 4) N62°46'10"E a distance of 18.18 feet to a 1/2" iron rod found at an angle point;

THENCE, with the northwest lines of Lots 2292-2297, said Lakeway Section Twenty-Two, the following two (2) courses:

- 1) S03°27'02"E a distance of 18.26 feet to a 1/2" iron rod found at an angle point; and
- 2) S30°20'41"W a distance of 614.55 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the southwest line of said Lot 2297, S59°36'41"E a distance of 145.07 feet to a 1/2" iron rod found on the northwest right-of-way line of Crest View Drive for an outside corner of this tract;

THENCE, with the northwest right-of-way line of Crest View Drive, S30°22'44"W a distance of 20.03 feet to a 1/2" iron rod found at the most easterly corner of Lot 2298, said Lakeway Section Twenty-Two;

THENCE, with the northeast line of said Lot 2298, N59°36'19"W a distance of 145.10 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the northwest lines of Lots 2298-2308, said Lakeway Section Twenty-Two, S30°21'43"W a distance of 1030.14 feet to a 60D nail found on the northeast right-of-way line of Rolling Green Drive for the most southerly corner of this tract;

THENCE, with the northeast right-of-way line of Rolling Green Drive, N59°34'46"W a distance of 9.98 feet to a 60D nail found at the most southerly corner of Lot 2880-A, said Resubdivision of a Portion of Lakeway Section 22-B;

THENCE, with the southeast line of said Lot 2880-A, N30°22'39"E a distance of 145.16 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the northeast line of said Lot 2880-A, N59°36'24"W a distance of 176.57 feet to a 1/2" iron rod found at an angle point;

THENCE, with the northwest line of said Lot 2880-A, the following two (2) courses:

- 1) Along a curve to the right an arc distance of 118.51 feet, having a radius of 160.83 feet and a chord which bears S09°19'50"W a distance of 115.85 feet to a 1/2" iron rod found at a point of nontangency; and
- 2) S30°29'15"W a distance of 36.76 feet to a 1/2" iron rod found on the northeast right-of-way line of Rolling Green Drive for an outside corner of this tract;

THENCE, with the northeast right-of-way line of Rolling Green Drive, N59°33'33"W a distance of 295.38 feet to a 1/2" iron rod set at the most southerly corner of Lot 2318, said Lakeway Section Twenty-Two;

THENCE, with the southeast line of said Lot 2318, N30°22'53"E a distance of 145.00 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the northeast lines of Lots 2318-2326, said Lakeway Section Twenty-Two, N59°37'07"W a distance of 809.64 feet to a 1/2" iron rod found at the most southerly corner of a 0.02-acre tract as conveyed to Frances and Donald Cody by deed recorded in Volume 8271, Page 301 of the Deed Records of Travis County, Texas;

THENCE N28°41'34"E a distance of 8.00 feet to a 1/2" iron rod set at the most easterly corner of said Cody 0.02-acre tract for an inside corner of this tract;

THENCE N59°37'07"W a distance of 89.98 feet to a 1/2" iron rod set at the most northerly corner of said Cody 0.02-acre tract for an outside corner of this tract;

THENCE S30°22'53"W a distance of 8.00 feet to a 1/2" iron rod found at the most easterly corner of Lot 2328, said Lakeway Section Twenty-Two for an inside corner of this tract;

THENCE, with the northeast lines of Lots 2328-2337, said Lakeway Section Twenty-Two, the following three (3) courses:

- 1) N59°37'07"W a distance of 299.96 feet to a 1/2" iron rod found at an angle point;
- 2) N53°55'23"W a distance of 100.57 feet to a 1/2" iron rod found at an angle point; and
- 3) N59°42'01"W a distance of 539.44 feet to a 1/2" iron rod set for an inside corner of this tract;

THENCE, with the northwest line of said Lot 2337, S30°32'35"W a distance of 155.00 feet to a P-K nail set in a boulder on the northeast right-of-way line of Rolling Green Drive for an outside corner of this tract;

THENCE, with the northeast right-of-way line of Rolling Green Drive, the following two (2) courses:

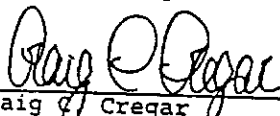
- 1) N59°27'25"W a distance of 67.46 feet to a 1/2" iron rod set at a point of curvature of a curve to the right; and

2) Along said curve to the right an arc distance of 13.78 feet, having a radius of 740.10 feet and a chord which bears N58°55'25"W a distance of 13.78 feet to a 1/2" iron rod set at the most southerly corner of Lot 2339, said Lakeway Section Twenty-Two;

THENCE, with the southeast line of said Lot 2339, N31°07'35"E a distance of 154.88 feet to a 1/2" iron rod set for an inside corner of this tract;

THENCE, with the northeast lines of Lots 2339-2341, said Lakeway Section Twenty-Two, N49°27'25"W a distance of 284.88 feet to the POINT OF BEGINNING, and containing 34.575 acres of land, more or less.

I HEREBY CERTIFY that these notes were prepared by Terra Firma from a survey made on the ground on March 26, 1990 by MESA Surveying, Inc. and updates made on the ground on March 31, 1993 and February 28, 1995 by Terra Firma, both under my supervision, and are true and correct to the best of my knowledge.


Craig C. Cregar
Registered Professional Land Surveyor No. 36

2/28/95
Date

Client: Cobblestone Golf Group, Inc.
Date: February 28, 1995
WO No.: 0079-02-03
FB No.: 23
Disk: TR2.010



BASIS OF BEARINGS:

The bearing, N59°49'00"E, being an inverse between a 1/2" iron rod found at the most southerly corner of Lot 2741 and a 1/2" iron rod found on the west right-of-way line of El Rio Drive at the most easterly corner of Lot 2754, as shown on the subdivision plat of Lakeway Section Twenty-Six, as recorded in Book 65, Page 49 of the Plat Records of Travis County, Texas, was taken as the Basis of Bearings.

FIELD NOTES
YAUPON GOLF COURSE
TRACT 4

ALL THAT CERTAIN PARCEL OR TRACT OF LAND OUT OF THE RUSK TRANSPORTATION COMPANY SURVEY NO. 83, THE J.P. WARNOCK SURVEY NO. 57 AND THE B.K. STEWART SURVEY NO. 84, CITY OF LAKEWAY, TRAVIS COUNTY, TEXAS; AND BEING ALL OF A 13.574-ACRE TRACT (YAUPON GOLF COURSE TRACT 4) (EXHIBIT A-9) AS CONVEYED TO HILLWOOD PROPERTY CO. BY DEED RECORDED IN VOLUME 12364, PAGE 1915 OF THE REAL PROPERTY RECORDS OF TRAVIS COUNTY, TEXAS; AND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a 1/2" iron rod found on the east right-of-way line of Royal Oak Lane at the northwest corner of Lot 2485, Lakeway Section Twenty-Two, a subdivision as recorded in Book 59, Page 25 of the Plat Records of Travis County, Texas, for the southwest corner and POINT OF BEGINNING of the herein described tract;

THENCE, with the east right-of-way line of Royal Oak Lane, N11°07'50"W a distance of 85.18 feet to a 1/2" iron rod found at the southwest corner of Lot 2486, said Lakeway Section Twenty-Two, for the northwest corner of this tract;

THENCE, with the south, southeast and east lines of Lots 2486-2498, said Lakeway Section Twenty-Two, the following five (5) courses:

- 1) N72°27'02"E a distance of 466.63 feet to a 1/2" iron rod set at a point of nontangent curvature of a curve to the left;
- 2) Along said curve to the left an arc distance of 162.05 feet, having a radius of 214.87 feet and a chord which bears N50°54'22"E a distance of 158.24 feet to a 1/2" iron rod found at a point of nontangency;
- 3) N27°07'11"E a distance of 4.81 feet to a 1/2" iron rod found at an angle point;
- 4) N29°14'06"E a distance of 590.16 feet to a 1/2" iron rod set at an angle point; and
- 5) N64°52'48"E a distance of 18.03 feet to a 1/2" iron rod set at an angle point;

REAL PROPERTY RECORDS
TRAVIS COUNTY, TEXAS

13121 0370

THENCE, with the west and southwest lines of Lots 2499-2505, said Lakeway Section Twenty-Two, the following three (3) courses:

- 1) S04°24'26"E a distance of 18.03 feet to a 1/2" iron rod found at an angle point;
- 2) S29°14'06"W a distance of 598.59 feet to a 1/2" iron rod found at a point of nontangent curvature of a curve to the left; and
- 3) Along said curve to the left an arc distance of 59.55 feet, having a radius of 25.88 feet and a chord which bears S36°41'21"E a distance of 47.25 feet to a 1/2" iron rod set at a point of nontangency;

THENCE, with the south, southwest and east lines of Lot 2505, 2506 and 2508-2510, said Lakeway Section Twenty-Two, the following four (4) courses:

- 1) N75°56'01"E a distance of 189.83 feet to a 1/2" iron rod found at an angle point;
- 2) N88°43'01"E a distance of 332.48 feet to a 1/2" iron rod found at a point of nontangent curvature of a curve to the left;
- 3) Along said curve to the left an arc distance of 91.80 feet, having a radius of 66.13 feet and a chord which bears N48°46'58"E a distance of 84.61 feet to a 1/2" iron rod set at a point of nontangency; and
- 4) N09°16'01"E a distance of 158.02 feet to a 1/2" iron rod found at an angle point;

THENCE with the northeast lines of Lots 2510 and 2511, said Lakeway Section Twenty-Two, the following two (2) courses:

- 1) N60°42'59"W a distance of 142.43 feet to a 1/2" iron rod found at an angle point; and
- 2) N26°07'49"W a distance of 17.88 feet to a 1/2" iron rod found at an angle point;

THENCE, with the south and east lines of Lot 2512, said Lakeway Section Twenty-Two, the following two (2) courses:

- 1) S82°21'54"E a distance of 27.35 feet to a 1/2" iron rod found at an angle point; and
- 2) N24°49'58"E a distance of 131.99 feet to a 1/2" iron rod found in the curving south right-of-way line of Duck Lake Drive for an outside corner of this tract;

THENCE, with the south right-of-way line of Duck Lake Drive, the following two (2) courses:

- 1) Along a curve to the left an arc distance of 59.62 feet, having a radius of 506.15 feet and a chord which bears S68°33'55"E a distance of 59.59 feet to a 1/2" iron rod set at a point of nontangency; and
- 2) S71°56'56"E a distance of 50.00 feet to a 1/2" iron rod set at the northwest corner of Lot 2514, said Lakeway Section Twenty-Two;

THENCE, with the west, southwest and south lines of Lots 2514-2518, said Lakeway Section Twenty-Two, the following five (5) courses:

- 1) S18°39'49"W a distance of 50.30 feet to a 1/2" iron rod found at an angle point;
- 2) S17°07'55"E a distance of 16.60 feet to a 1/2" iron rod found at an angle point;
- 3) S09°53'41"W a distance of 215.41 feet to a 1/2" iron rod set at a nontangent point of curvature of curve to the left;
- 4) Along said curve to the left an arc distance of 128.34 feet, having a radius of 63.71 feet and a chord which bears S47°33'32"E a distance of 107.72 feet to a 1/2" iron rod found at a point of nontangency; and
- 5) N74°52'47"E a distance of 331.84 feet to a 1/2" iron rod found at an angle point;

THENCE, with the east lines of Lots 2518 and 2519, said Lakeway Section Twenty-Two, the following two (2) courses:

- 1) N18°03'11"E a distance of 75.03 feet to a 1/2" iron rod found at an angle point; and
- 2) N51°15'41"E a distance of 18.17 feet to a 1/2" iron rod found at an angle point;

THENCE, with the west, south and east lines of Lot 2520, said Lakeway Section Twenty-Two, the following three (3) courses:

- 1) S15°42'19"E a distance of 18.06 feet to a 1/2" iron rod found at an angle point;
- 2) S18°26'31"W a distance of 75.84 feet to a 1/2" iron rod found for an inside corner of this tract; and
- 3) S72°38'59"E a distance of 90.61 feet to a 1/2" iron rod found at the southwest corner of a 0.17-acre tract as conveyed to Joe M. Dealey, Sr. by deed recorded in Volume 8233, Page 735 of the Deed Records of Travis County, Texas at an angle point;

THENCE, with the southeast line of said Dealey 0.17-acre tract, N58°20'47"E a distance of 144.83 feet to a point on the curving west right-of-way line of Duck Lake Drive, from which a 1/2" iron rod found bears N58°20'47"E a distance of 0.54 feet, for an outside corner of this tract;

THENCE, with the southeast right-of-way line of Duck Lake Drive, along a curve to the right an arc distance of 27.97 feet, having a radius of 108.43 feet and a chord which bears S21°47'08"E a distance of 27.89 feet to a 1/2" iron rod found at a point of nontangency;

THENCE, with the west right-of-way line of Clubhouse Drive, the following two (2) courses:

- 1) S14°05'51"E a distance of 336.05 feet to a 1/2" iron rod found at a point of nontangent curvature of curve to the right; and

- 2) Along said curve to the right an arc distance of 35.58 feet, having a radius of 25.00 feet and a chord which bears S26°37'41"W a distance of 32.65 feet to a 1/2" iron rod found at the intersection with the north right-of-way line of Lakeway Boulevard at a point of nontangency;

THENCE, with the north right-of-way line of Lakeway Boulevard, S68°07'17"W a distance of 20.06 feet to a 1/2" iron rod set at the southeast corner of Lot 2465, said Lakeway Section Twenty-Two;

THENCE, with the east line of said Lot 2465, N22°35'23"W a distance of 140.00 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the north lines of Lots 2465-2468, said Lakeway Section Twenty-Two, S67°27'41"W a distance of 359.65 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the west line of said Lot 2468, S22°24'17"E a distance of 140.06 feet to a 1/2" iron rod found on the north right-of-way line of Lakeway Boulevard for an outside corner of this tract;

THENCE, with the north right-of-way line of Lakeway Boulevard, S66°40'02"W a distance of 29.91 feet to a 1/2" iron rod found at the southeast corner of Lot 2469, said Lakeway Section Twenty-Two;

THENCE, with the east line of said Lot 2469, N22°21'03"W a distance of 139.93 feet to a 60-D nail found for an inside corner of this tract;

THENCE, with the north lines of Lots 2469-2472, said Lakeway Section Twenty-Two, the following two (2) courses:

- 1) S67°32'08"W a distance of 91.74 feet to a 1/2" iron rod found at an angle point; and
- 2) S83°14'06"W a distance of 241.07 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the west line of said Lot 2472, S02°55'54"E a distance of 164.38 feet to a 1/2" iron rod set on the curving north right-of-way line of Lakeway Boulevard for an outside corner of this tract;

THENCE, with the north right-of-way line of Lakeway Boulevard, the following two (2) courses:

- 1) Along a curve to the right an arc distance of 84.05 feet, having a radius of 894.93 feet and a chord which bears S89°17'24"W a distance of 84.02 feet to a 1/2" iron rod set at a point of nontangency; and
- 2) N87°45'04"W a distance of 245.00 feet to a P-K nail set in rock at the southeast corner of Lot 2477, said Lakeway Section Twenty-Two;


THENCE, with the east line of said Lot 2477, N02°14'56"E a distance of 155.00 feet to a 1/4" iron rod found for an inside corner of this tract;

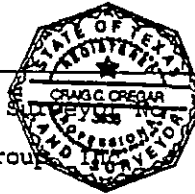
THENCE, with the north lines of Lots 2477-2485, said Lakeway Section Twenty-Two, the following three (3) courses:

- 1) N87°45'04"W a distance of 450.17 feet to a 1/4" iron rod found at an angle point;

- 2) S88°34'06"W a distance of 289.00 feet to a 1/2" iron rod found at an angle point; and
- 3) S78°43'01"W a distance of 104.58 feet to the POINT OF BEGINNING, and containing 13.574 acres of land, more or less.

I HEREBY CERTIFY that these notes were prepared by Terra Firma from a survey made on the ground on March 26, 1990 by MESA Surveying, Inc. and updates made on the ground on March 31, 1993 and February 28, 1995 by Terra Firma, both under my supervision, and are true and correct to the best of my knowledge.


 Craig Cregar
 Registered Professional Land Surveyor No. 2936



2/28/95
 Date

Client: Cobblestone Golf Group
 Date: February 28, 1995
 WO No.: 0079-02-03
 FB No.: 23
 Disk: TR2.010

BASIS OF BEARINGS:

The bearing, N59°49'00"E, being an inverse between a 1/2" iron rod found at the most southerly corner of Lot 2741 and a 1/2" iron rod found on the west right-of-way line of El Rio Drive at the most easterly corner of Lot 2754, as shown on the subdivision plat of Lakeway Section Twenty-Six, as recorded in Book 65, Page 49 of the Plat Records of Travis County, Texas, was taken as the Basis of Bearings.

FIELD NOTES
YAUPON GOLF COURSE
TRACT 5

ALL THAT CERTAIN PARCEL OR TRACT OF LAND OUT OF THE B.K. STEWART SURVEY NO. 84, CITY OF LAKEWAY, TRAVIS COUNTY, TEXAS; AND BEING ALL OF LOT 3719, LAKEWAY SECTION CLUSTERS 28-I, A SUBDIVISION AS RECORDED IN BOOK 78, PAGES 291 AND 292 OF THE PLAT RECORDS OF TRAVIS COUNTY, TEXAS, AND LOT 3872, LAKEWAY SECTION, CLUSTER 28 IV, A SUBDIVISION AS RECORDED IN BOOK 79, PAGES 291-293 OF THE PLAT RECORDS OF TRAVIS COUNTY, TEXAS; AND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a 1/2" iron rod found on the curving southeast right-of-way line of Clubhouse Drive at the northwest corner of Lot 3175, Lakeway Section 28, a subdivision as recorded in Book 68, Page 1 of the Plat Records of Travis County, Texas, said iron rod found also being the northwest corner of the above described Lot 3872, for the northwest corner and POINT OF BEGINNING of the herein described tract;

THENCE, with the southeast right-of-way line of Clubhouse Drive, the following four (4) courses:

- 1) Along a curve to the right an arc distance of 150.05 feet, having a radius of 371.19 feet and a chord which bears N39°31'52"E a distance of 149.04 feet to a 1/2" iron rod found at a point of nontangency;
- 2) N51°00'32"E a distance of 410.25 feet to a 1/2" iron rod found at a nontangent point of curvature of a curve to the left;
- 3) Along said curve to the left an arc distance of 284.70 feet, having a radius of 652.05 feet and a chord which bears N38°38'27"E a distance of 282.44 feet to a 1/2" iron rod set at a point of nontangency; and
- 4) N26°02'33"E a distance of 75.13 feet to a 1/2" iron rod found at the intersection with the southwest right-of-way line of Golf Crest Lane at a nontangent point of curvature of a curve to the right;

THENCE, with the southwest right-of-way line of Golf Crest Lane, the following two (2) courses:

- 1) Along said curve to the right an arc distance of 27.25 feet, having a radius of 17.54 feet and a chord which bears N70°31'33"E a distance of 24.59 feet to a 1/2" iron rod set at a nontangent point of compound curvature; and
- 2) Along a curve to the right an arc distance of 361.72 feet, having a radius of 305.39 feet and a chord which bears S31°03'05"E a distance of 340.94 feet to a 1/2" iron rod found at the northeast corner of Lot 3176, said Lakeway Section 28;

THENCE, with the north, west and south lines of Lots 3176-3187, said Lakeway Section 28, the following six (6) courses:

- 1) N87°02'34"W a distance of 90.02 feet to a 1/2" iron rod found at an angle point;

- 2) S52°21'00"W a distance of 72.20 feet to a 1/2" iron rod found at an angle point;
- 3) S10°35'13"W a distance of 915.25 feet to a 1/2" iron rod found at an angle point;
- 4) S02°14'56"W a distance of 129.95 feet to a 1/2" iron rod found at an angle point;
- 5) S13°28'26"E a distance of 220.01 feet to a 1/2" iron rod found for an inside corner of this tract; and
- 6) N76°32'34"E a distance of 140.00 feet to a 1/2" iron rod set on the west right-of-way line of Golf Crest Lane for an outside corner of this tract;

THENCE, with the west right-of-way line of Golf Crest Lane, S13°28'26"E a distance of 20.00 feet to a 1/2" iron rod set at the northeast corner of Lot 3833, said Lakeway Section, Clusters 28 IV;

THENCE, with the north, northwest and southwest lines of Lots 3833-3828, said Lakeway Section, Clusters 28 IV, the following four (4) courses:

- 1) S76°32'27"W a distance of 140.01 feet to a 1/2" iron rod set at an angle point;
- 2) S85°20'32"W a distance of 145.28 feet to a 1/2" iron rod set at an angle point;
- 3) S22°43'14"W a distance of 146.24 feet to a 1/2" iron rod found at an angle point; and
- 4) S55°53'32"E a distance of 112.84 feet to a 1/2" iron rod found on the curving northwest right-of-way line of Hazeltine Drive for an outside corner of this tract;

THENCE, with the northwest right-of-way line of Hazeltine Drive, along a curve to the left an arc distance of 15.01 feet, having a radius of 250.00 feet and a chord which bears S32°23'28"W a distance of 15.01 feet to a 1/2" iron rod set at the most easterly corner of Lot 3827, said Lakeway Section, Clusters 28 IV;

THENCE, with the northeast, northwest and southwest lines of Lots 3827-3824, said Lakeway Section, Clusters 28 IV, the following five (5) courses:

- 1) N55°53'32"W a distance of 110.27 feet to a 1/2" iron rod found at an angle point;
- 2) S22°43'14"W a distance of 71.93 feet to a 1/2" iron rod found at an angle point;
- 3) S32°06'23"W a distance of 150.57 feet to a 1/2" iron rod found at an angle point;
- 4) S28°52'34"W a distance of 20.34 feet to a 1/2" iron rod found for an inside corner of this tract; and
- 5) S64°24'18"E a distance of 122.46 feet to a 1/2" iron rod found on the curving northwest right-of-way line of Hazeltine Drive for an outside corner of this tract;

THENCE, with the northwest right-of-way line of Hazeltine Drive, along a curve to the right an arc distance of 14.96 feet, having a radius of 950.00 feet and a chord which bears S27°20'51"W a distance of 14.96 feet to a 1/2" iron rod found at the most easterly corner of Lot 3823, said Lakeway Section, Clusters 28 IV;

THENCE, with the northeast, northwest and southwest lines of Lots 3823-3813, said Lakeway Section, Clusters 28 IV, the following six courses:

- 1) N64°26'07"W a distance of 122.80 feet to a 1/2" iron rod found for an inside corner of this tract;
- 2) S26°10'49"W a distance of 359.90 feet to a 1/2" iron rod found at an angle point;
- 3) S02°38'44"E a distance of 120.91 feet to a 1/2" iron rod found at an angle point;
- 4) S25°54'01"E a distance of 173.75 feet to a 1/2" iron rod found at an angle point;
- 5) S61°34'30"E a distance of 100.35 feet to a 1/2" iron rod found for an inside corner of this tract; and
- 6) N28°44'30"E a distance of 115.77 feet to a 1/2" iron rod set on the north right-of-way line of Hazeltine Drive for an outside corner of this tract;

THENCE, with the north right-of-way line of Hazeltine Drive, S61°15'30"E a distance of 15.10 feet to a 1/2" iron rod set at the northwest corner of Lot 3812, said Lakeway Section, Clusters 28 IV;

THENCE, with the west, south, and northeast lines of Lots 3812-3806, said Lakeway Section, Clusters 28 IV, the following six (6) courses:

- 1) S28°44'30"W a distance of 115.91 feet to a 1/2" iron rod found for an inside corner of this tract;
- 2) S61°40'06"E a distance of 115.37 feet to a 1/2" iron rod found at an angle point;
- 3) S86°01'44"E a distance of 231.43 feet to a 1/2" iron rod found at an angle point;
- 4) N72°39'58"E a distance of 73.48 feet to a 1/2" iron rod found at an angle point;
- 5) N55°41'32"E a distance of 69.86 feet to a 1/2" iron rod found for an inside corner of this tract; and
- 6) N35°07'28"W a distance of 116.45 feet to a P-K nail set in a rock wall on the curving northwest right-of-way line of Hazeltine Drive for an outside corner of this tract;

THENCE, with the northwest right-of-way line of Hazeltine Drive, along a curve to the left an arc distance of 10.01 feet, having a radius of 200.00 feet and a chord which bears N53°26'31"E a distance of 10.01 feet to a 1/2" iron rod set at the most westerly corner of Lot 3805, said Lakeway Section, Clusters 28 IV;

THENCE, with the southwest, southeast, and south lines of Lots 3805-3802, said Lakeway Section, Clusters 28 IV, the following five (5) courses:

- 1) S38°00'21"E a distance of 117.07 feet to a 1/2" iron rod found for an inside corner of this tract;
- 2) N55°41'32"E a distance of 33.42 feet to a 1/2" iron rod set at an angle point;
- 3) N32°14'31"E a distance of 112.59 feet to a 1/2" iron rod found an an angle point;
- 4) N19°16'38"E a distance of 53.52 feet to a 1/2" iron rod found at an angle point; and

- 5) S87°34'17"E a distance of 32.06 feet to a 1/2" iron rod found on the west right-of-way line of Golf Crest Lane for an outside corner of this tract;

THENCE, with the west right-of-way line of Golf Crest Lane, the following two (2) courses:

- 1) S01°59'28"W a distance of 18.64 feet to a concrete monument found at a nontangent point of curvature of a curve to the left; and
- 2) Along said curve to the left an arc distance of 66.19 feet, having a radius of 360.00 feet and a chord which bears S02°54'27"E a distance of 66.10 feet to a 1/2" iron rod found at the northeast corner of Lot 3782, Lakeway Section, Clusters 28 V, a subdivision as recorded in Book 79, Pages 289 and 290 of the Plat Records of Travis County, Texas;

THENCE, with the north, northwest and west lines of Lots 3782-3780, and 3774 said Lakeway Section, Clusters 28 V, the following four (4) courses:

- 1) S81°49'32"W a distance of 70.00 feet to a 1/2" iron rod set at an angle point;
- 2) S32°09'32"W a distance of 65.31 feet to a 1/2" iron rod set at an angle point;
- 3) S21°58'28"E a distance of 159.14 feet to a 1/2" iron rod set at an angle point; and
- 4) S05°59'20"W a distance of 551.80 feet to a 1/2" iron rod set at the northwest corner of Lot 3733, said Lakeway Section Clusters 28 I;

THENCE, with the west and south lines of Lots 3733-3722, said Lakeway Section Clusters 28 I, the following six (6) courses:

- 1) S14°41'15"W a distance of 95.76 feet to a 1/2" iron rod found at an angle point;
- 2) S10°28'45"E a distance of 71.92 feet to a 1/2" iron rod found at an angle point;
- 3) S04°29'25"W a distance of 140.37 feet to a 1/2" iron rod found at an angle point;
- 4) S27°54'02"E a distance of 210.65 feet to a 1/2" iron rod found at an angle point;
- 5) S62°41'31"E a distance of 74.94 feet to a 1/2" iron rod set at an angle point; and
- 6) S73°55'03"E a distance of 294.94 feet to a P-K nail set in concrete on the west right-of-way line of Golf Crest Lane at an angle point;

THENCE, with the west and northwest right-of-way lines of Golf Crest Lane, the following four (4) courses:

- 1) S05°58'57"W a distance of 29.02 feet to a 1/2" rod set at a nontangent point of curvature of a curve to the right;
- 2) Along said curve to the right an arc distance of 210.39 feet, having a radius of 243.00 feet and a chord which bears S30°48'34"W a distance of 203.88 feet to a 1/2" iron rod found at a point of nontangency;
- 3) S55°28'12"W a distance of 51.63 feet to a 1/2" iron rod found at a point of nontangent curvature of a curve to the left; and

REAL PROPERTY RECORDS
TRAVIS COUNTY, TEXAS

- 4) Along said curve to the left an arc distance of 14.02 feet, having a radius of 325.12 feet and a chord which bears S53°48'15"W a distance of 14.02 feet to a 1/2" iron rod found at the most easterly corner of Lot 3721, said Lakeway Section Clusters 28 I for the southeast corner of this tract;

THENCE, with the northeast and east lines of Lots 3721 and 3720, said Lakeway Section Clusters 28 I and Lots 2449-2454, Lakeway Section 22, a subdivision as recorded in Book 59, Page 25 of the Plat Records of Travis County, Texas, the following four (4) courses:

- 1) N62°55'22"W a distance of 129.76 feet to a 1/2" iron rod found at an angle point;
- 2) N48°39'04"W a distance of 101.94 feet to a 1/2" iron rod set at an angle point;
- 3) N59°35'22"W a distance of 373.13 feet to a 3/8" iron rod found at an angle point; and
- 4) N20°37'45"W a distance of 125.65 feet to a 1/2" iron rod found on the south right-of-way line of Golf Crest Lane at an angle point;

THENCE, with the south, east and north right-of-way lines of Golf Crest Lane, the following three (3) courses:

- 1) Along a curve to the right an arc distance of 18.73 feet, having a radius of 25.00 feet and a chord which bears S89°10'39"E a distance of 18.30 feet to a 1/2" iron rod found at a nontangent point of reverse curvature;
- 2) Along a curve to the left an arc distance of 231.82 feet, having a radius of 50.00 feet and a chord which bears N20°38'39"W a distance of 73.34 feet to a 1/2" iron rod found at a nontangent point of reverse curvature; and
- 3) Along a curve to the right an arc distance of 18.69 feet, having a radius of 25.00 feet and a chord which bears S47°50'10"W a distance of 18.26 feet to a 1/2" iron rod found at the southeast corner of Lot 2455-A, Lakeway Section 22-A, a subdivision as recorded in Book 64, Page 55 of the Plat Records of Travis County, Texas;

THENCE, with the east and northeast lines of Lots 2455-A-2459-A, said Lakeway Section 22A, the following two (2) courses:

- 1) N20°35'43"W a distance of 371.53 feet to a 1/2" iron rod found at a point of curvature of a curve to the left; and
- 2) Along said curve to the left an arc distance of 194.96 feet, having a radius of 207.94 feet and a chord which bears N47°28'56"W a distance of 187.90 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the northwest line of said Lot 2459-A, S35°49'22"W a distance of 154.29 feet to a 1/2" iron rod set on the curving north right-of-way line of Lakeway Boulevard at an angle point;

THENCE, with the north right-of-way line of Lakeway Boulevard, along a curve to the left an arc distance of 327.58 feet, having a radius of 441.97 feet and a chord which bears N75°17'45"W a distance of 320.13 feet to a 1/2" iron rod set at the intersection with the east right-of-way line of Clubhouse Drive;

THENCE, with the east right-of-way line of Clubhouse Drive, the following four (4) courses:

REAL PROPERTY RECORDS
TRAVIS COUNTY, TEXAS

- 1) Along a curve to the right an arc distance of 36.39 feet, having a radius of 25.27 feet and a chord which bears N55°21'47"W a distance of 33.32 feet to a 1/2" iron rod set at a point of tangency;
- 2) N14°06'47"W a distance of 377.90 feet to a 1/2" iron rod found at a point of curvature of a curve to the right;
- 3) Along said curve to the right an arc distance of 139.49 feet, having a radius of 653.22 feet and a chord which bears N07°59'47"W a distance of 139.22 feet to a 1/2" iron rod found at a point of tangency; and
- 4) N01°52'47"W a distance of 145.14 feet to a 1/2" iron rod set at the southwest corner of Lot 3437, Lakeway Section 28-A, a subdivision as recorded in Book 76, Page 45 of the Plat Records of Travis County, Texas;

THENCE, with the south, east and north lines of Lots 3437-3439, said Lakeway Section 28-A, the following three (3) courses:

- 1) N88°00'13"E a distance of 149.75 feet to a P-K nail set on a rock column for an inside corner of this tract;
- 2) N01°56'42"W a distance of 284.41 feet to a 1/2" iron rod found for an inside corner of this tract; and
- 3) N84°37'57"W a distance of 34.32 feet to a 1/2" iron rod found at an angle point;

THENCE, with the southeast, east and north lines of Lots 3162-3170, said Lakeway Section 28, the following four (4) courses:

- 1) N26°04'16"E a distance of 246.56 feet to a 1/2" iron rod found at an angle point;
- 2) N32°36'00"E a distance of 500.20 feet to a 1/2" iron rod found at an angle point;
- 3) N17°05'36"E a distance of 205.12 feet to a 1/2" iron rod found for an inside corner of this tract; and
- 4) N82°39'11"W a distance of 139.94 feet to a 1/2" iron rod found on the curving east right-of-way line of Clubhouse Drive for an outside corner of this tract;

THENCE, with the east right-of-way line of Clubhouse Drive, along a curve to the left an arc distance of 110.62 feet, having a radius of 330.09 feet and a chord which bears N02°15'10"W a distance of 110.10 feet to a 1/2" iron rod set at the southwest corner of Lot 3171, said Lakeway Section 28;

THENCE, with the south, northeast and north lines of Lots 3171 and 3172, said Lakeway Section 28, the following three (3) courses:

- 1) N78°08'49"E a distance of 180.00 feet to a 1/2" iron rod set at an angle point;
- 2) N32°08'42"W a distance of 263.62 feet to a 3/8" iron rod found at an angle point; and
- 3) S75°57'51"W a distance of 140.31 feet to a 1/2" iron rod found on the curving east right-of-way line of Clubhouse Drive for an outside corner of this tract;


THENCE, with the east right-of-way line of Clubhouse Drive, along a curve to the right an arc distance of 20.05 feet, having a radius of 317.50 feet and a chord which bears N12°14'09"W a distance of 20.04 feet to a 1/2" iron rod set at the southwest corner of Lot 3173, said Lakeway Section 28;

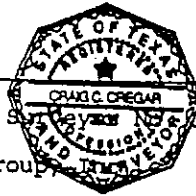
RECORDED IN BOOK 76, PAGE 45 OF THE PLAT RECORDS OF TRAVIS COUNTY, TEXAS.

THENCE, with the south, east and north lines of Lots 3173-3175, said Lakeway Section 28, the following three (3) courses:

- 1) N75°57'51"E a distance of 131.32 feet to a 1/2" iron rod set at an angle point;
- 2) N10°05'15"E a distance of 315.97 feet to a 1/2" iron rod set at an angle point;
- 3) N62°03'08"W a distance of 128.33 feet to the POINT OF BEGINNING, and containing 45.887 acres of land, more or less.

I HEREBY CERTIFY that these notes were prepared by Terra Firma from a survey made on the ground on March 26, 1990 by MESA Surveying, Inc. and updates made on the ground on March 31, 1993 and February 28, 1995 by Terra Firma, both under my supervision, and are true and correct to the best of my knowledge.


Craig C. Cregar
Registered Professional Land Surveyor No. 3936



2/28/95
Date

Client: Cobblestone Golf Group
Date: February 28, 1995
WO No.: 0079-02-03
FB No.: 23
Disk: TR2.010

BASIS OF BEARINGS:

The bearing, N59°49'00"E, being an inverse between a 1/2" iron rod found at the most southerly corner of Lot 2741 and a 1/2" iron rod found on the west right-of-way line of El Rio Drive at the most easterly corner of Lot 2754, as shown on the subdivision plat of Lakeway, Section Twenty-Six, as recorded in Book 65, Page 49 of the Plat Records of Travis County, Texas, was taken as the Basis of Bearings.

FIELD NOTES
YAUPON GOLF COURSE
TRACT 6

ALL THAT CERTAIN PARCEL OR TRACT OF LAND OUT OF THE B.K. STEWART SURVEY NO. 84 AND THE E.L. HARRISON SURVEY NO. 521, CITY OF LAKEWAY, TRAVIS COUNTY, TEXAS; AND BEING ALL OF LOT 3900, LAKEWAY SECTION CLUSTERS 28 II, A SUBDIVISION AS RECORDED IN BOOK 82, PAGES 203 AND 204 OF THE PLAT RECORDS OF TRAVIS COUNTY, TEXAS; AND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a 1/2" iron rod found on the north right-of-way line of Hazeltine Drive at the southeast corner of Lot 3201, Lakeway Section 28, a subdivision as recorded in Book 68, Page 1 of the Plat Records of Travis County, Texas, said iron rod found also being the southwest corner of the above described Lot 3900, for the southwest corner and POINT OF BEGINNING of the herein described tract;

THENCE, with the east line of Lots 3201-3188, said Lakeway Section 28, the following four (4) courses:

- 1) N13°28'36"W a distance of 835.32 feet to a 5/8" iron rod found at an angle point;
- 2) N06°57'13"W a distance of 100.98 feet to a 3/8" iron rod found at an angle point;
- 3) N08°54'41"E a distance of 106.55 feet to a 1/2" iron rod found at an angle point; and
- 4) N10°21'00"E a distance of 442.43 feet to a 1/2" iron rod set for an inside corner of this tract;

THENCE, with the north line of said Lot 3188, N79°25'21"W a distance of 130.07 feet to a 5/8" iron rod found on the east right-of-way line of Golf Crest Lane for an outside corner of this tract;

THENCE, with the east right-of-way line of Golf Crest Lane, N10°55'27"E a distance of 85.60 feet to a 1/2" iron rod found at the southwest corner of Lot 3873, said Lakeway Section Clusters 28 II;

THENCE, with the south and east lines of Lots 3873-3882, said Lakeway Section Clusters 28 II, the following seven (7) courses;

- 1) S79°25'21"E a distance of 113.85 feet to a 1/2" iron rod found at an angle point;
- 2) N69°33'07"E a distance of 219.79 feet to a 5/8" iron rod found at an angle point;
- 3) N62°05'33"E a distance of 177.57 feet to a 1/2" iron rod found at an angle point;
- 4) N27°48'50"E a distance of 155.76 feet to a 1/2" iron rod found at an angle point;
- 5) N20°34'51"E a distance of 122.47 feet to a 1/2" iron rod found at an angle point;
- 6) N07°02'22"E a distance of 132.93 feet to a 1/2" iron rod found at an angle point; and

- 7) N00°32'00"W a distance of 92.25 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the north line of said Lot 3882, S89°28'00"W a distance of 115.00 feet to a 1/2" iron rod set on the east right-of-way line of Spellbrook Lane for an outside corner of this tract;

THENCE, with the east right-of-way line of Spellbrook Lane, N00°32'00"W a distance of 10.01 feet to a 1/2" iron rod set at the southwest corner of Lot 3883, said Lakeway Section Clusters 28 II;

THENCE, with the south line of said Lot 3883, N89°28'00"E a distance of 115.00 feet to a bolt found in a stone wall for an inside corner of this tract;

THENCE, with the east and northwest lines of Lots 3883 and 3884, said Lakeway Section Clusters 28 II, the following (3) courses:

- 1) N00°32'00"W a distance of 145.00 feet to a 1/2" iron rod found at an angle point;
- 2) N14°56'13"W a distance of 104.56 feet to a 1/2" iron rod set at an angle point; and
- 3) S59°49'28"W a distance of 125.30 feet to a 1/2" iron rod found on the curving northwest line of Spellbrook Lane at an angle point;

THENCE, with the northwest line of Spellbrook Lane along a curve to the left an arc distance of 61.81 feet, having a radius of 50.00 feet and a chord which bears S60°08'46"W a distance of 57.95 feet to a 1/2" iron rod found at the most northerly corner of Lot 3885, said Lakeway Section Clusters 28 II;

THENCE, with the northwest lines of Lots 3885-3889, said Lakeway Section Clusters 28 II, S59°49'28"W a distance of 467.07 feet to a 1/2" iron rod found on the curving northeast right-of-way line of Golf Crest Lane for an outside corner of this tract;

THENCE, with the northeast right-of-way line of Golf Crest Lane, along a curve to the left an arc distance of 122.67 feet, having a radius of 365.39 feet and a chord which bears N38°47'35"W a distance of 122.09 feet to a 1" iron pipe found at the southeast corner of Lot 3441, Lakeway Section 28-C, a subdivision as recorded in Book 76, Page 46 of the Plat Records of Travis County, Texas;

THENCE, with the east and northeast lines of Lots 3441-3444, said Lakeway Section 28-C, the following two (2) courses:

- 1) N26°04'09"E a distance of 361.83 feet to a 3/4" iron pipe found at an angle point; and
- 2) N49°45'39"W a distance of 20.58 feet to a 3/8" iron rod found for the northwest corner of this tract;

THENCE, with the south and southeast lines of Lots 3250-3242, said Lakeway Section 28, the following three (3) courses;

- 1) N72°30'02"E a distance of 328.50 feet to a 1/2" iron rod found at an angle point;
- 2) N83°59'23"E a distance of 436.38 feet to a 1/2" iron rod found at an angle point; and
- 3) N60°04'26"E a distance of 174.76 feet to a 1/2" iron rod found on the west right-of-way line of Long Wood Avenue for the northeast corner of this tract;

THENCE, with the west right-of-way line of Long Wood Avenue, the following two (2) courses;

- 1) S24°29'34"E a distance of 32.17 feet to a 1/2" iron rod set at a nontangent point of curvature of a curve to the right; and
- 2) Along said curve to the right an arc distance of 68.63 feet, having a radius of 441.85 feet and a chord which bears S20°13'30"E a distance of 68.56 feet to a 3/8" iron rod found at the most northerly corner of Lot 3241, said Lakeway Section 28;

THENCE, with the northwest and west lines of Lots 3241-3222, said Lakeway Section 28, the following eight (8) courses:

- 1) S59°49'11"W a distance of 140.76 feet to a 3/8" iron rod found at an angle point;
- 2) S01°48'09"W a distance of 810.87 feet to a 3/8" iron rod found at an angle point;
- 3) S23°23'07"W a distance of 86.70 feet to a 1/2" iron rod found at an angle point;
- 4) S31°20'42"W a distance of 628.68 feet to a 3/8" iron rod found at an angle point;
- 5) S00°30'03"E a distance of 144.96 feet to a 3/8" iron rod found at an angle point;
- 6) S66°00'07"W a distance of 210.08 feet to a 3/8" iron rod found at an angle point;
- 7) S02°27'28"W a distance of 95.53 feet to a 1/2" iron rod found at an angle point; and
- 8) S01°25'42"E a distance of 250.17 feet to a 1/2" iron rod found for an inside corner of this tract;

THENCE, with the south lines of Lots 3221 and 3220, said Lakeway Section 28, N82°01'34"E a distance of 344.99 feet to a 3/8" iron rod found at an angle point;

THENCE, with the west lines of Lots 3218 and 3217, said lakeway Section 28, the following two (2) courses;

- 1) S24°15'53"E a distance of 19.82 feet to a 3/8" iron rod found at an angle point; and
- 2) S11°44'13"E a distance of 24.92 feet to a 3/8" iron rod found at an angle point;

THENCE, with the north, west and northwest lines of Lots 3209-3205, 3203 and 3202, said Lakeway Section 28, the following five (5) courses;

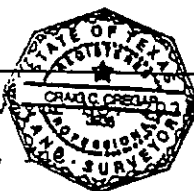
- 1) N50°39'39"W a distance of 32.93 feet to a 3/4" iron rod found at an angle point;
- 2) S82°00'19"W a distance of 332.15 feet to a 1/2" iron rod found for an inside corner of this tract;
- 3) S01°27'23"E a distance of 379.97 feet to a 1/2" iron rod found for the most easterly southeast corner of this tract;
- 4) S59°31'58"W a distance of 139.08 feet to a 1/2" iron rod found at an angle point; and
- 5) S13°32'46"E a distance of 130.03 feet to a 1/2" iron rod found on the north right-of-way line of Hazeltine Drive for the most southerly southeast corner of this tract;

THENCE, with the north right-of-way line of Hazeltine Drive, S69°11'45"W a distance of 20.10 feet to the POINT OF BEGINNING, and containing 24.408 acres of land, more or less.

I HEREBY CERTIFY that these notes were prepared by Terra Firma from a survey made on the ground on March 26, 1990 by MBSA Surveying, Inc. and updates made on the ground on March 31, 1993 and February 28, 1995 by Terra Firma, both under my supervision, and are true and correct to the best of my knowledge.


Craig C. Cregar

Registered Professional Land Surveyor



2/28/95
Date

Client: Cobblestone Golf Group,
Date: February 28, 1995
WO No.: 0079-02-03
FB No.: 23
Disk: TR2.010

BASIS OF BEARINGS:

The bearing, N59°49'00"E, being an inverse between a 1/2" iron rod found at the most southerly corner of Lot 2741 and a 1/2" iron rod found on the west right-of-way line of El Rio Drive at the most easterly corner of Lot 2754, as shown on the subdivision plat of Lakeway, Section Twenty-Six, as recorded in Book 65, Page 49 of the Plat Records of Travis County, Texas, was taken as the Basis of Bearings.

REAL PROPERTY RECORDS
TRAVIS COUNTY, TEXAS

FIELD NOTES
YAUPON GOLF COURSE
TRACT 7

ALL THAT CERTAIN PARCEL OR TRACT OF LAND OUT OF THE B.K. STEWART SURVEY NO. 84 AND THE FEDELE SEEHOLZER SURVEY NO. 24, TRAVIS COUNTY, TEXAS; AND BEING ALL OF LOT 3801, LAKEWAY SECTION, CLUSTERS 28 V, A SUBDIVISION AS RECORDED IN BOOK 79, PAGES 289 AND 290 OF THE PLAT RECORDS OF TRAVIS COUNTY, TEXAS AND ALL OF A 20.391-ACRE TRACT (YAUPON GOLF COURSE TRACT 7) (EXHIBIT A-9) AS CONVEYED TO HILLWOOD PROPERTY CO. BY DEED RECORDED IN VOLUME 12364, PAGE 1915 OF THE REAL PROPERTY RECORDS OF TRAVIS COUNTY, TEXAS; AND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a 1/2" iron rod found on the south right-of-way line of Hazeltine Drive at the northwest corner of Lot 3271, Lakeway Section 28, a subdivision as recorded in Book 68, Page 1 of the Plat Records of Travis County, Texas, said iron rod found also being the most northerly corner of the above described Lot 3801, for the most northerly corner and POINT OF BEGINNING at the herein described tract;

THENCE, with the west, southwest and south lines of Lots 3271-3269, 3266-3263 and 3272, the following six (6) courses:

- 1) S20°59'23"E a distance of 97.62 feet to a 1/2" iron rod set at an angle point;
- 2) S62°01'34"E a distance of 63.31 feet to a 1/2" iron rod found at an angle point;
- 3) S83°24'26"E a distance of 180.00 feet to a 1/2" iron rod found for an outside corner of this tract;
- 4) S01°29'10"W a distance of 100.30 feet to a 1/2" iron rod found at an angle point;
- 5) S33°56'48"E a distance of 220.00 feet to a 1/2" iron rod found at an angle point; and
- 6) S88°27'26"E a distance of 309.74 feet to a 1/2" iron rod set on the west line of Lot 12, Round Mountain Acres, Section One, a subdivision as recorded in Book 84, Pages 39A-39B of the Plat Records of Travis County, Texas, for an outside corner of this tract;

THENCE, with the west lines of Lots 12 and 13, said Round Mountain Acres, Section One, S01°31'58"W a distance of 293.05 feet to a 1/2" iron rod found at an angle point;

THENCE, with the southwest lines of Lots 13-15 and 19, said Round Mountain Acres, Section One, S60°42'11"E a distance of 688.62 feet to a 1/2" iron rod set on the curving northwest right-of-way line of RM Highway 620 for the most easterly corner of this tract;

THENCE, with the northwest right-of-way line of RM Highway 620, the following two (2) courses:

REAL PROPERTY RECORDS
TRAVIS COUNTY, TEXAS

- 1) Along a curve to the left an arc distance of 233.37 feet, having a radius of 1230.92 feet and a chord which bears S46°35'11"W a distance of 233.02 feet to a concrete right-of-way monument with brass disk found at a point of tangency; and
- 2) S41°09'19"W a distance of 385.39 feet to a 1/2" iron rod found on the approximate Village of Lakeway Limit Line for an outside corner of this tract;

THENCE, with the approximate Village of Lakeway Limit Line, the following four (4) courses:

- 1) N53°38'06"W a distance of 243.48 feet to a 1/2" iron rod found at an angle point;
- 2) S68°49'45"W a distance of 211.14 feet to a 1/2" iron rod found at an angle point;
- 3) S57°25'04"W a distance of 119.36 feet to a 1/2" iron rod found at an angle point; and
- 4) S81°31'00"W a distance of 81.36 feet to a 1/2" iron rod found at an angle point;

THENCE S52°53'48"W a distance of 91.53 feet to a 1/2" iron rod found on the northeast line of a 0.599-acre tract as conveyed to Lakeway M.U.D. No. 1 by deed recorded in Volume 7433, Page 351 of the Deed Records of Travis County, Texas at an angle point;

THENCE, with the northeast and northwest lines of said Lakeway M.U.D. No. 1 0.599-acre tract, the following three (3) courses:

- 1) N59°12'43"W a distance of 31.10 feet to a 1/2" iron rod set for an inside corner of this tract;
- 2) S30°43'04"W a distance of 156.18 feet to a 1/2" iron rod set at an angle point; and
- 3) N81°39'36"W a distance of 37.89 feet to a 1/2" iron rod found on the east right-of-way line of Golf Crest Lane for an outside corner of this tract,

THENCE, with the east right-of-way line of Golf Crest Lane, along a curve to the right an arc distance of 117.80 feet, having a radius of 273.65 feet and a chord which bears N18°23'20"E a distance of 116.90 feet to a 1/2" iron rod found at a point of tangency;

THENCE, continuing with the east right-of-way line of Golf Crest Lane and the east line of Lot 3800, said Lakeway Section, Clusters 28 V, N30°43'04"E a distance of 513.91 feet to a 1/2" iron rod found at an angle point;

THENCE, with the south and east lines of Lot 3799, said Lakeway Section, Clusters 28 V, the following two (2) courses:

- 1) N88°12'35"E a distance of 23.77 feet to a 1/2" iron rod found at an angle point; and
- 2) N30°42'41"E a distance of 50.04 feet to a 1/2" iron rod found at an angle point;

THENCE, with the east, northeast and north lines of Lots 3799-3783, said Lakeway Section, Clusters 28 V, the following five (5) courses:

- 1) N14°24'18"W a distance of 164.27 feet to a 1/2" iron rod found at an angle point;

- 2) N33°40'35"W a distance of 400.91 feet to a 1/2" iron rod found at an angle point;
- 3) N50°55'36"W a distance of 286.90 feet to a 1/2" iron rod found at an angle point;
- 4) N34°26'30"W a distance of 122.05 feet to a 1/2" iron rod found at an angle point; and
- 5) S79°55'29"W a distance of 121.00 feet to a 1/2" iron rod found on the curving east right-of-way line of Golf Crest Lane for an outside corner of this tract;

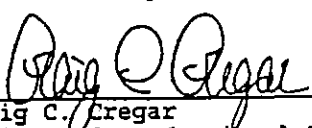
THENCE, with the east right-of-way line of Golf Crest Lane, the following three (3) courses:

- 1) Along a curve to the right an arc distance of 65.10 feet, having a radius of 300.00 feet and a chord which bears N03°51'31"W a distance of 64.97 feet to a 1/2" iron rod set at a point of nontangency;
- 2) N02°16'45"E a distance of 106.47 feet to a 1/2" iron rod found at a nontangent point of curvature of a curve to the left; and
- 3) Along said curve to the left an arc distance at 58.74 feet, having a radius of 749.12 feet and a chord which bears N00°09'29"E a distance of 58.72 feet to a 1/2" iron rod set at the intersection with the south right-of-way line of Hazeltine Drive;

THENCE, with the south right-of-way line of Hazeltine Drive, the following two (2) courses:

- 1) Along a curve to the right an arc distance of 25.28 feet, having a radius of 20.36 feet and a chord which bears N33°24'38"E a distance of 23.69 feet to a 1/2" iron rod found at a point of tangency; and
- 2) N68°59'37"E a distance of 250.54 feet to the POINT OF BEGINNING, and containing 20.391 acres of land, more or

I HEREBY CERTIFY that these notes were prepared by Terra Firma from a survey made on the ground on March 26, 1990 by MESA Surveying, Inc. and updates made on the ground on March 31, 1993 and February 28, 1995 by Terra Firma, both under my supervision, and are true and correct to the best of my knowledge.


 Craig C. Cregar
 Registered Professional Land Surveyor No. 36



2/28/95
 Date

Client: Cobblestone Golf Group, Inc.
 Date: February 28, 1995
 WO No.: 0079-02-03
 FB No.: 23
 Disk: TR2.010

BASIS OF BEARINGS:

The bearing, N59°49'00"E, being an inverse between a 1/2" iron rod found at the most southerly corner of Lot 2741 and a 1/2" iron rod found on the west right-of-way line of El Rio Drive at the most easterly corner of Lot 2754, as shown on the subdivision plat of Lakeway, Section Twenty-Six, as recorded in Book 65, Page 49 of the Plat Records of Travis County, Texas, was taken as the Basis of Bearings.

REAL PROPERTY RECORDS
 TRAVIS COUNTY, TEXAS

13121 0388

Sample Monthly Accounting Required by Section 3.01

		Golf Course											
Fiscal Year		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Volume Available		Volumes in Thousands											
1	L-4 Storage, Beginning of Month												
2	S-4 Production for Month												
3	COL and 310 Use												
4	Net Volume Available												
LGC Requirement													
5	Current Month												
6	Carryover												
7	Total												
LGC Volume Taken													
Less 310 use by District													
8	Net LGC Volume Taken												
a)	In month one, no penalty												
b)	In month two, line 4 must exceed line 7												
If b is positive, penalty is assessed on line 8 less line 7 if negative													
Volumes to be carried over													
9a)	line 4 must exceed line 7												
b)	line 8 minus line 7												
c) if b is negative, this amount is carryover													
if b is positive, no carryover													
d)	after month two, carryover volumes exclude volumes on which penalty is paid												
Penalty Volume													
10	9a) & b)												
If b is negative, this is the penalty volume													
If positive, no penalty													
11	Penalty Amount (at \$.75/1000gal)	\$											
12	Cumulative Penalty	\$											

FILED

98 FEB 17 AM 10:53

**DANA DEBEAUVOR
COUNTY CLERK
TRAVIS COUNTY, TEXAS**

AFTER RECORDING RETURN TO:

**Mike Willatt
2001 North Lamar
Austin, TX 78705**

RECORDERS MEMORANDUM-At the time of recordation this instrument was found to be inadequate for the best photographic reproduction, because of illegibility, carbon or photo copy, discolored paper, etc. All blockouts, additions and changes were present at the time the instrument was filed and recorded.

STATE OF TEXAS **COUNTY OF TRAVIS**
I hereby certify that this instrument was **FILED** on the date and at the time stamped hereon by me; and was duly **RECORDED**, in the Volume and Page of the named **RECORDS** of Travis County, Texas, on

FEB 17 1998



Dana Debeauvoir
**COUNTY CLERK
TRAVIS COUNTY, TEXAS**

**REAL PROPERTY RECORDS
TRAVIS COUNTY, TEXAS**

13121 0390

RECEIVED: 000000002 TRANS: 15863 DEPT: REGULAR RECORD \$157.00
CASHIER: WHTLE FILE DATE: 2/17/98 TRANS DATE: 2/17/98
PAID BY: CHECK# 8750

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THE STATE OF TEXAS §
 §
COUNTY OF TRAVIS §

LEASE AGREEMENT

This Lease Agreement (the "Lease") is entered into effective 5/22/2013, 2013 (the "Effective Date") between **LAS VENTANAS LAND PARTNERS, LTD.**, a Texas limited partnership, as Lessor, and **TRAVIS COUNTY MUNICIPAL UTILITY DISTRICT NO. 12**, a political subdivision of the State of Texas, as Lessee, and is as follows:

RECITALS

WHEREAS, Lessor is the owner of the real property in Travis County, Texas, more particularly described on:

Exhibit "A", attached hereto and incorporated herein by reference for all purposes (the "Plant Site & Pond Site");

Exhibit "B", attached hereto and incorporated herein by reference for all purposes (the "Irrigation Land"); and

WHEREAS, Lessor has joined in a "Wastewater Facilities Acquisition and Construction Agreement" between Rough Hollow Development, Ltd. (the "Developer") and Lessee (the "Agreement") and has agreed, pursuant to the Agreement, to transfer TPDES Permit No. WQ0014534001 (as it may be transferred, amended, renewed or reissued, the "Permit") issued by the Texas Commission on Environmental Quality (the "Commission") to Lessee; and

WHEREAS, the Agreement provides for the Developer's construction of certain wastewater treatment and disposal facilities to serve Lessee, Travis County Municipal Utility District No. 11 and Travis County Municipal Utility District No. 13 (collectively, the "Participating Districts") in accordance with the Permit; and

WHEREAS, Lessor is an affiliate of the Developer and the owner of land located within the Participating Districts and will benefit, directly and indirectly, from the construction of the proposed wastewater treatment and disposal facilities; and

WHEREAS, Lessor has agreed, pursuant to the Agreement, to lease the Plant Site, the Pond Site and the Irrigation Land (collectively, the "Property") to Lessee for the proposed wastewater treatment and disposal facilities;

NOW, THEREFORE, for and in consideration of the premises, the benefits to be received under the Agreement and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Lessor and Lessee (collectively the "Parties"), agree as follows:

I. TITLE - QUIET POSSESSION

Lessor confirms that it is the fee simple owner of the Property and has full power to lease the Property and any improvements thereon (collectively, the "Leased Premises") to Lessee. Lessor covenants that Lessee will peaceably hold and enjoy the Leased Premises during the term of this Lease, without interruption by Lessor or any person claiming by, through, or under it. Lessor agrees that it will not, during the term of this Lease, grant any liens or easements or place any restrictions or encumbrances of any kind upon any portion of the Leased Premises which are not subordinate to the this Lease unless such liens, easements, restrictions or encumbrances are approved by Lessee in

writing. Lessor further covenants that the only lienholder on the Property is IBC Bank, and that such lienholder has consented to this Lease as evidenced by the Lienholder's Consent attached hereto as Exhibit "C".

II. TERM; TERMINATION

Lessor hereby leases the Leased Premises to Lessee for the purposes set forth herein. This Lease will begin on the Effective Date and remain in effect for 99 years (the "Term"); provided, however, that this Lease will automatically terminate as to portions of the Property upon their conveyance by Lessor to Lessee in accordance with the terms of the Agreement. Further, at such time as all of the land to be provided with wastewater service under the Permit has been developed and fully built-out and is being provided with wastewater service, and all Irrigation Land required under the Permit and the related irrigation facilities have been conveyed to Lessee, this Lease will terminate as to any remaining Irrigation Land that is not required for effluent disposal. Lessee agrees to execute a written termination of this Lease as to that remaining, unused Irrigation Land at that time.

III. USE

Lessor agrees that Lessee may use and improve the Leased Premises for the construction, operation, replacement and maintenance of wastewater collection, treatment, and disposal facilities; for the storage, transmission and spray irrigation of wastewater effluent, and any other lawful use related thereto.

IV. MISCELLANEOUS

1. Notice. Any notice or other communication ("Notice") given under this Agreement must be in writing. Notice may be given or served: (i) by depositing it in the United States Mail, postage paid, certified with return receipt requested, and addressed to the party to be notified; or (ii) by personally delivering it to the party to be notified. Notice deposited in the mail will be effective three days after such deposit. Notice given in any other manner will be effective only if and when received by the party to be notified. For the purposes of notice, the addresses of the parties will be, until changed as provided below, as follows:

District: Travis County Municipal Utility District No. 12
c/o Armbrust & Brown, PLLC
100 Congress Avenue, Suite 1300
Austin, Texas 78701
Fax: (512) 435-2360

Developer: Las Ventanas Land Partners, Ltd.
2101 Lakeway Blvd.
Suite 205
Austin, TX 78734
Fax: (512) 306-1620
Attn: Haythem Dawlett

The parties may change their respective addresses for purposes of notice by giving at least five days written notice of the new address to the other party. If any date or any period provided in this Agreement ends on a Saturday, Sunday, or legal holiday, the applicable period will be extended to the next business day.

2. Severability. If any provision of this Lease is held to be illegal, invalid or unenforceable under present or future laws, the legality, validity and enforceability of the remaining provisions will not be affected and, in lieu of such illegal, invalid or unenforceable provision, a provision that is legal, valid and enforceable and is as similar in terms to such illegal, invalid or unenforceable provision as is possible will be added to this Lease.

3. Construction. The parties each acknowledge that they and their respective counsel have reviewed and revised this Lease and that the normal rule of construction that any ambiguities are to be resolved and construed against the drafting party will not be employed in the interpretation of this Lease.

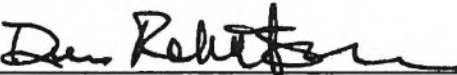
4. Counterparts. This Lease may be executed in one or more counterparts, each of which will be an original and all of which, taken together, will constitute a single document binding and effective as to all parties hereto. An electronic copy or telecopy of an executed counterpart will be considered to have the same binding legal effect as an original.

5. Venue; Attorney's Fees. This Lease is made and entered into in Travis County, Texas, where venue will lie for any proceedings relating to this Lease. If either party retains an attorney to enforce this Lease, the party who prevails at the time of trial is entitled to recover reasonable attorney's fees.

6. Amendment. This Lease may only be amended by a written instrument, signed by both Lessor and Lessee.

IN WITNESS WHEREOF, the Parties have caused this Lease to be executed as of the Effective Date.

TRAVIS COUNTY MUNICIPAL UTILITY DISTRICT NO. 12

By: 
Dan Robertson, President
Board of Directors

Date: May 28, 2013

LAS VENTANAS LAND PARTNERS, LTD., a
Texas limited partnership

By: JHLV GP, INC., a Texas corporation, its
General Partner

By: 
Haythem Dawlett, Vice President

Date: 5/22/2013

EXHIBIT A
POND SITE & PLANT SITE

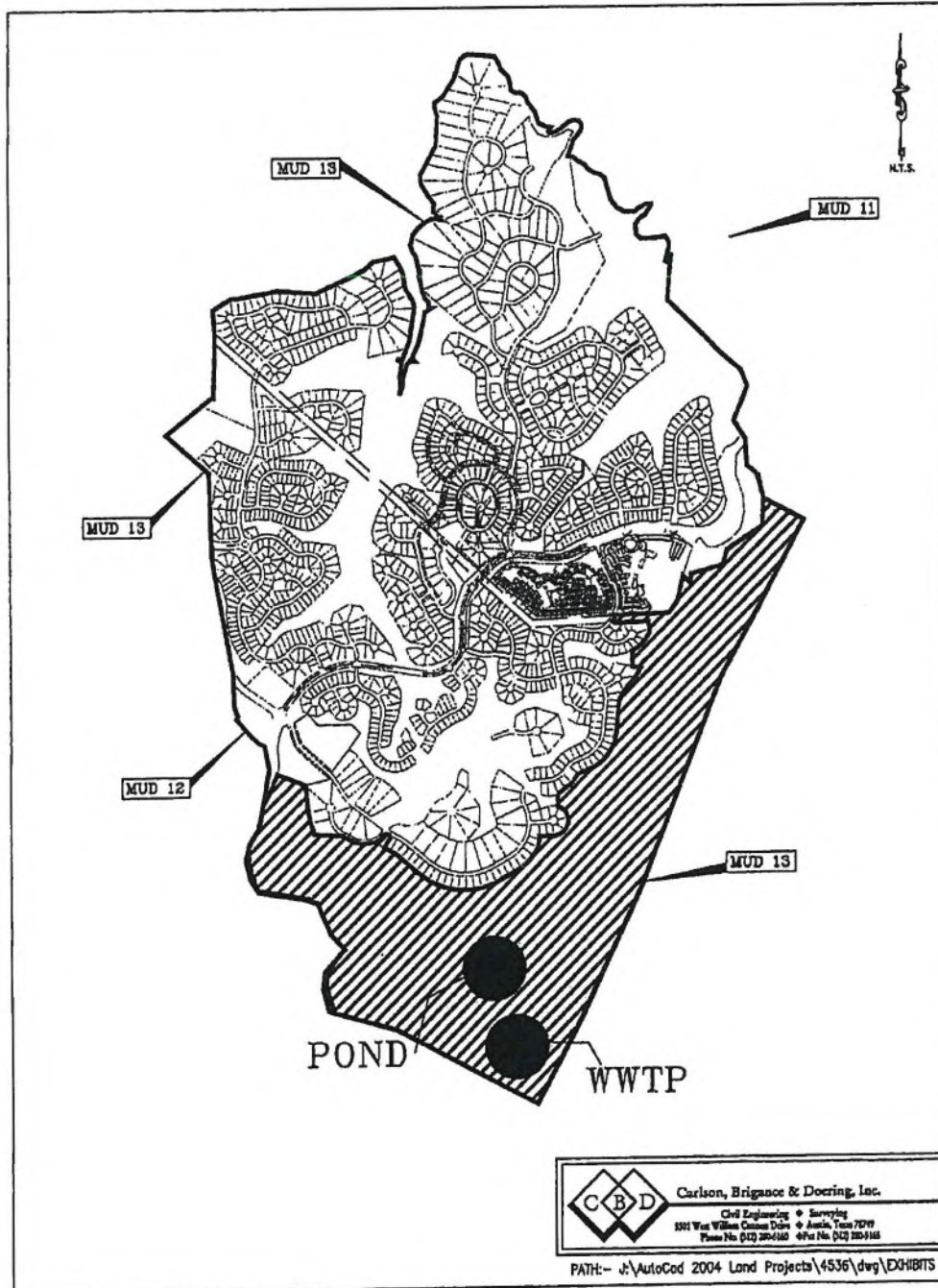


EXHIBIT B IRRIGATION LAND

371.87 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46,
C.E.P.I. & M. CO. SURVEY NUMBER 47,
RUSK TRANSPORTATION SURVEY NUMBER 85
TRAVIS COUNTY, TX
IRRIGATION TRACT

FIELD NOTES

BEING ALL OF THAT CERTAIN TRACT OF LAND OUT OF THE C.E.P.I. & M. CO. SURVEY NUMBER 46, THE C.E.P.I. & M. CO. SURVEY NUMBER 47, AND THE JOHN H. GIBSON SURVEY NUMBER 49, SITUATED IN TRAVIS COUNTY, TEXAS, BEING MORE PARTICULARLY DESCRIBED AS BEING OUT OF AND PART OF THE REMAINDER OF A 1023.257 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2004230439 OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, FIVE 0.138 ACRE TRACTS CONVEYED TO LAS VENTANAS LAND PARTNERS LTD, IN DOCUMENT NUMBER 2005152672, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY TEXAS, A 0.138 ACRE TRACT CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD, IN DOCUMENT NUMBER 2005169277, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, A 0.138 ACRE TRACT CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD, IN DOCUMENT NUMBER 2005174987, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, A 0.138 ACRE TRACT CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD, IN DOCUMENT NUMBER 2005171006, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, A 0.138 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD, IN DOCUMENT NUMBER 2005152674, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, AND A 0.138 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD, IN DOCUMENT NUMBER 2005174987, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, ALL OF A 1.00 ACRE TRACT OF LAND CONVEYED TO LOUIS GRANGER, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064148, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, MICHAEL MATZ, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064148, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, JESSE KENNIS, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007192461, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, RICHARD FADAL, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064140, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, SEAN MILLS, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2010175380, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, SUE BROOKS LITTLEFIELD, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064145, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, AND SUE BROOKS LITTLEFIELD, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064147, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, ALL OF A 0.138 ACRE TRACT OF LAND CONVEYED TO AMIE PARKS, UNDIVIDED 1/6TH INTEREST, IN DOCUMENT NUMBER 2006073878, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, MARK BURTON, UNDIVIDED 1/6TH INTEREST, IN DOCUMENT NUMBER 2011120491, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, DAVID COX, UNDIVIDED 1/6TH INTEREST, IN DOCUMENT NUMBER 2004231842, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, NICK CONTI, UNDIVIDED 1/6TH INTEREST, IN DOCUMENT NUMBER 2004113297, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, MICHAEL DE LA FUENTE, UNDIVIDED 1/6TH INTEREST, IN DOCUMENT NUMBER 2004113295, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, AND DAVID L. SMITH, UNDIVIDED 1/6TH INTEREST, IN DOCUMENT NUMBER 2004113290, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, AND A PORTION OF A 1.00 ACRE TRACT CONVEYED TO SUE E. WALL, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064138. OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, MELISSA MILLER, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064134, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, JIM A. HENRY, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064132, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, ROBERT R. GRIFFITH, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064130, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, DANIEL L. ROBERTSON, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064136, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, SAID 371.87 ACRE TRACT OF LAND BEING MORE FULLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING, at a 3/4" capped iron rod found for an eastern corner of Lot 1, Block A, Lakeway Highlands Village, recorded in Document No. 201100126, Official Public Records of Travis County, Texas (O.P.R.T.C.TX.), common to a western corner of Lakeway Highlands Greenbelt Lot, recorded Document No. 201100038, (O.P.R.T.C.TX.), also being a northern corner of Rough Hollow Irrigation Lot Plat, recorded in Document No. 200500233, (O.P.R.T.C.TX.), for the POINT OF BEGINNING of the herein described tract,

THENCE, with the common boundary line of said Rough Hollow Irrigation Lot Plat and said Lakeway Highlands Greenbelt Lot, the following six (6) courses and distances, numbered 1 through 6,

1. S46°27'57"E, a distance of 134.49 feet to a capped 3/4" iron rod found,
2. N07°47'30"E, a distance of 119.94 feet to a capped 3/4" iron rod found,

J: 4510\SURVEY\FIELD NOTES\FN-IRRIGATION TRACT.doc

371.87 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46,
C.E.P.I. & M. CO. SURVEY NUMBER 47,
RUSK TRANSPORTATION SURVEY NUMBER 85
TRAVIS COUNTY, TX
IRRIGATION TRACT

3. N75°10'08"E, a distance of 436.06 feet to a capped ½" iron rod found,
4. N14°19'32"E, a distance of 198.14 feet to a capped ½" iron rod found,
5. N56°49'00"E, a distance of 552.72 feet to a capped ½" iron rod found, and
6. N03°21'44"E, a distance of 365.55 feet to a mag nail found, for the northernmost corner of said Rough Hollow Irrigation Lot Plat, common to an eastern corner of said Lakeway Highlands Greenbelt Lot, also being the southwest corner of Lot 27, Block A, of Rough Hollow Section 1, a subdivision recorded in Document No. 200600276, (O.P.R.T.C.TX.),

THENCE, with the common boundary line of said Rough Hollow Section 1, and said Rough Hollow Irrigation Lot Plat, the following two (2) courses and distances, numbered 1 and 2,

1. S61°41'59"E, a distance of 365.06 feet to a calculated point,
2. S61°46'16"E, a distance of 234.14 feet to a ½" iron rod found for the southeast corner of said Rough Hollow Section 1, common to the northeast corner of said Rough Hollow Irrigation Lot Plat, also being in a western line of a tract of land conveyed to City of Lakeway in Document No. 2002162268, (O.P.R.T.C.TX.), for the northeastern corner of the herein described tract,

THENCE, with the common boundary line of said City of Lakeway tract and said Rough Hollow Irrigation Lot Plat, S28°04'07"W, a distance of 106.81 feet to a ½" iron rod found at a southwestern corner of said City of Lakeway tract, common to the northwestern corner of a tract of land conveyed to the City of Lakeway in Document No. 2002073174, (O.P.R.T.C.TX.),

THENCE, with the common boundary line of said City of Lakeway tract and said Rough Hollow Irrigation Lot Plat, S28°10'54"W, a distance of 1246.40 feet to a ½" iron rod found at a southwestern corner of a tract of land conveyed to the City of Lakeway, (O.P.R.T.C.TX.),

THENCE, with the common boundary line of said City of Lakeway tract and said Rough Hollow Irrigation Lot Plat, N89°26'15"E, a distance of 5.94 feet to a ½" iron rod found at a southern corner of said City of Lakeway tract, common to the northwestern corner of a tract of land conveyed to Ron White in Vol. 12797, Pg. 1822, (O.P.R.T.C.TX.),

THENCE, with the common boundary line of said Ron White tract and said Rough Hollow Irrigation Lot Plat, the following three (3) courses and distances numbered 1 through 3,

1. S28°34'53"W, a distance of 760.21 feet to a capped ½" iron rod found,
2. S28°10'19"W, a distance of 239.20 feet to a capped ½" iron pipe found, and
3. S21°05'10"W, a distance of 954.56 feet to a capped ½" iron rod found, for the southwest corner of a 22.048 acre tract of land conveyed to Frank Brown and Nancy B. Word in Document No. 2007209245, (O.P.R.T.C.TX.), common to a northern corner of a 24.61 acre tract of land conveyed to John Hickman Baker in Document No. 2010020988, (O.P.R.T.C.TX.),

THENCE, with the common boundary line of said 24.61 acre tract and said Rough Hollow Irrigation Lot Plat, N75°43'03"W, a distance of 1.88 feet to a capped ½" iron rod found, for the northwest corner of said 24.61 acre tract,

THENCE, with the common boundary line of said 24.61 acre tract and said Rough Hollow Irrigation Lot Plat, S21°10'17"W, a distance of 1286.40 feet to a capped ½" iron rod found, for the southwest corner of said 24.61 acre tract, common to the northwest corner of a 20.00 acre tract of land conveyed to Jay and Terry Wilemon in Vol. 13211, Pg. 1777, (O.P.R.T.C.TX.),

THENCE, with the common boundary line of said 20.00 acre tract and said Rough Hollow Irrigation Lot Plat, S21°16'08"W, a distance of 625.92 feet to a capped ½" iron pipe found, for the southwest corner of said 20.00 acre tract, common to the northwest corner of a 23.262 acre tract of land conveyed to Norman and Suzanne Myers in Vol. 11715, Pg. 82, (O.P.R.T.C.TX.),

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371.87 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46,
C.E.P.I. & M. CO. SURVEY NUMBER 47,
RUSK TRANSPORTATION SURVEY NUMBER 85
TRAVIS COUNTY, TX
IRRIGATION TRACT

THENCE, with the common boundary line of said 23.262 acre tract and said Rough Hollow Irrigation Lot Plat, the following two (2) courses and distances numbered 1 and 2,

1. S23°49'43"W, a distance of 342.55 feet to a capped ½" Iron pipe found, and
2. S25°12'51"W, a distance of 1628.19 feet to a capped ½" Iron rod found, in a western line of a 273.397 acre tract of land conveyed to Serene Hills Ltd, in Document No. 2007079264, (O.P.R.T.C.TX.), common to an eastern corner of said remainder of 1023.257 acre tract,

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said 273.397 acre tract, the following three (3) courses and distances numbered 1 through 3,

1. S28°04'42"W, a distance of 1290.99 feet to a cotton spindle found,
2. N61°56'09"W, a distance of 2159.25 feet to a ½" Iron pipe found,
3. N74°17'20"W, a distance of 856.69 feet to a capped ½" Iron rod found, in the south line of said remainder of 1023.257 acre tract common to the eastern right-of-way line as dedicated by Highlands Boulevard plat in Document No. 200900056, (O.P.R.T.C.TX.),

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said eastern right-of-way line of Bee Creek Road, the following fifteen (15) courses and distances numbered 1 through 15,

1. N17°57'24"W, a distance of 345.70 feet to a capped ½" Iron rod found,
2. N03°18'00"E, a distance of 131.65 feet to a capped ½" Iron rod found,
3. N25°38'41"E, a distance of 261.75 feet to a capped ½" Iron rod found,
4. N39°09'29"E, a distance of 190.39 feet to a capped ½" Iron rod found,
5. N42°25'31"W, a distance of 269.32 feet to a capped ½" Iron rod found,
6. N22°51'15"W, a distance of 273.32 feet to a ½" Iron pipe found,
7. N22°55'14"W, a distance of 182.15 feet to a ½" Iron pipe found,
8. N75°39'35"W, a distance of 101.77 feet to a cotton spindle found,
9. N28°16'12"W, a distance of 31.21 feet to a capped ½" Iron rod found,
10. N79°50'25"W, a distance of 687.75 feet to a capped ½" Iron rod found,
11. N18°21'11"W, a distance of 333.00 feet to a capped ½" Iron rod found,
12. N00°54'55"W, a distance of 230.66 feet to a capped ½" Iron rod found,
13. N18°37'26"E, a distance of 100.05 feet to a capped ½" Iron rod found,
14. N31°31'12"E, a distance of 191.80 feet to an Iron pipe found, and
15. N10°38'10"E, a distance of 308.04 feet to a capped ½" Iron rod found, for a southern corner of Highlands Boulevard plat, recorded in Document No. 200900056, Official Public Records of Travis County, Texas,

THENCE, leaving said common boundary line and with a southeastern boundary line of said Highlands Boulevard Plat the following two (2) courses and distances numbered 1 and 2,

1. N26°49'04"E, a distance of 229.65 feet to a capped ½" Iron rod found, and
2. N22°21'22"E, a distance of 229.14 feet to a capped ½" Iron rod found,

THENCE, leaving said boundary line and crossing said remainder of 1023.257 acre tract and the following sixty-nine (69) courses and distances numbered 1 through 69,

1. S68°25'45"E, a distance of 397.18 feet to a calculated point,
2. S06°02'45"E, a distance of 357.34 feet to a calculated point,
3. S10°35'40"E, a distance of 144.32 feet to a calculated point,
4. S17°46'15"E, a distance of 166.51 feet to a calculated point,
5. S85°53'06"E, a distance of 386.91 feet to a calculated point,
6. S60°24'05"E, a distance of 117.33 feet to a calculated point, at a point of curvature to the left,

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371.87 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46,
C.E.P.I. & M. CO. SURVEY NUMBER 47,
RUSK TRANSPORTATION SURVEY NUMBER 85
TRAVIS COUNTY, TX
IRRIGATION TRACT

7. with said curve to the left having a radius of 350.00 feet, an arc length of 223.00 feet and whose chord bears S78°39'15"E, a distance of 219.25 feet to a calculated point,
8. N83°05'35"E, a distance of 57.83 feet to a calculated point, at a point of curvature to the left,
9. with said curve to the left having a radius of 254.50 feet, an arc length of 199.96 feet and whose chord bears N60°35'05"E, a distance of 194.85 feet to a calculated point,
10. N38°04'36"E, a distance of 20.02 feet to a calculated point, at a point of curvature to the right,
11. with said curve to the right having a radius of 25.00 feet, an arc length of 37.84 feet and whose chord bears N81°26'04"E, a distance of 34.33 feet to a calculated point, at a point of curvature to the left,
12. with said curve to the left having a radius of 405.93 feet, an arc length of 55.70 feet and whose chord bears S59°19'20"E, a distance of 55.66 feet to a calculated point,
13. S28°55'29"W, a distance of 179.96 feet to a calculated point,
14. S61°04'31"E, a distance of 167.85 feet to a calculated point,
15. S49°53'54"E, a distance of 388.57 feet to a calculated point,
16. S51°59'47"E, a distance of 73.59 feet to a calculated point,
17. S57°07'58"E, a distance of 106.53 feet to a calculated point,
18. S63°12'32"E, a distance of 106.53 feet to a calculated point,
19. S69°17'07"E, a distance of 106.53 feet to a calculated point,
20. S75°21'41"E, a distance of 106.53 feet to a calculated point,
21. S81°26'15"E, a distance of 106.53 feet to a calculated point,
22. S87°30'50"E, a distance of 106.53 feet to a calculated point,
23. N86°24'36"E, a distance of 106.53 feet to a calculated point,
24. N80°20'02"E, a distance of 106.53 feet to a calculated point,
25. N74°15'28"E, a distance of 106.53 feet to a calculated point,
26. N68°10'53"E, a distance of 106.53 feet to a calculated point,
27. N62°38'59"E, a distance of 100.05 feet to a calculated point,
28. N61°27'43"E, a distance of 215.79 feet to a calculated point,
29. N58°38'51"E, a distance of 69.24 feet to a calculated point,
30. N51°09'19"E, a distance of 114.98 feet to a calculated point,
31. N41°48'02"E, a distance of 114.98 feet to a calculated point,
32. N32°26'46"E, a distance of 114.98 feet to a calculated point,
33. N11°12'22"E, a distance of 115.51 feet to a calculated point,
34. N02°34'30"W, a distance of 43.14 feet to a calculated point,
35. N89°28'01"E, a distance of 102.03 feet to a calculated point,
36. N89°59'40"E, a distance of 91.47 feet to a calculated point,
37. N76°10'26"E, a distance of 89.96 feet to a calculated point,
38. N52°15'31"E, a distance of 75.77 feet to a calculated point,
39. N27°03'49"E, a distance of 98.64 feet to a calculated point,
40. N00°26'20"W, a distance of 91.52 feet to a calculated point,
41. N28°47'28"W, a distance of 104.38 feet to a calculated point,
42. N56°39'55"W, a distance of 88.26 feet to a calculated point,
43. N80°41'07"W, a distance of 9.26 feet to a calculated point,
44. N02°23'55"W, a distance of 160.79 feet to a calculated point,
45. N53°18'48"E, a distance of 127.77 feet to a calculated point,
46. N51°45'18"E, a distance of 121.69 feet to a calculated point,
47. N34°50'52"E, a distance of 140.00 feet to a calculated point,
48. N67°32'39"E, a distance of 142.73 feet to a calculated point,
49. N66°05'09"E, a distance of 89.78 feet to a calculated point,
50. N57°28'24"E, a distance of 100.77 feet to a calculated point,
51. N47°30'23"E, a distance of 100.77 feet to a calculated point,
52. N37°32'23"E, a distance of 100.77 feet to a calculated point,
53. N27°34'22"E, a distance of 100.77 feet to a calculated point,
54. N17°36'22"E, a distance of 100.77 feet to a calculated point,
55. N08°03'26"E, a distance of 95.65 feet to a calculated point,

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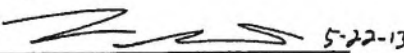
371.87 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46,
C.E.P.I. & M. CO. SURVEY NUMBER 47,
RUSK TRANSPORTATION SURVEY NUMBER 85
TRAVIS COUNTY, TX
IRRIGATION TRACT

56. N04°55'31"E, a distance of 313.12 feet to a calculated point,
57. N07°18'38"E, a distance of 81.06 feet to a calculated point,
58. N27°27'00"E, a distance of 130.49 feet to a calculated point,
59. N39°45'54"E, a distance of 265.58 feet to a calculated point,
60. N27°54'58"E, a distance of 120.60 feet to a calculated point,
61. N77°47'08"W, a distance of 112.15 feet to a calculated point,
62. N00°13'32"E, a distance of 207.84 feet to a calculated point,
63. N73°13'34"E, a distance of 24.56 feet to a calculated point,
64. N54°15'18"E, a distance of 79.00 feet to a calculated point,
65. N45°14'22"E, a distance of 120.36 feet to a calculated point,
66. N29°33'04"E, a distance of 111.78 feet to a calculated point,
67. N04°17'22"W, a distance of 153.73 feet to a calculated point,
68. S87°52'45"W, a distance of 494.17 feet to a calculated point, at a point of curvature to the left, and
69. with said curve to the left having a radius of 500.00 feet, an arc length of 120.60 feet and whose chord bears N31°39'25"E, a distance of 120.31 feet to a capped $\frac{1}{2}$ " Iron rod found, for the southwestern corner of said Lot 1, Block A, Lakeway Highlands Village,

THENCE, with the southern and eastern boundary lines of said Lakeway Highlands Village, the following three (3) courses and distances numbered 1 through 3,

1. N87°55'42"E, a distance of 711.26 feet to a capped $\frac{1}{2}$ " Iron rod found,
2. N34°35'06"E, a distance of 198.59 feet to a capped $\frac{1}{2}$ " Iron rod found, and
3. N12°22'20"E, a distance of 323.56 feet to the POINT OF BEGINNING and containing 371.87 acres of land.

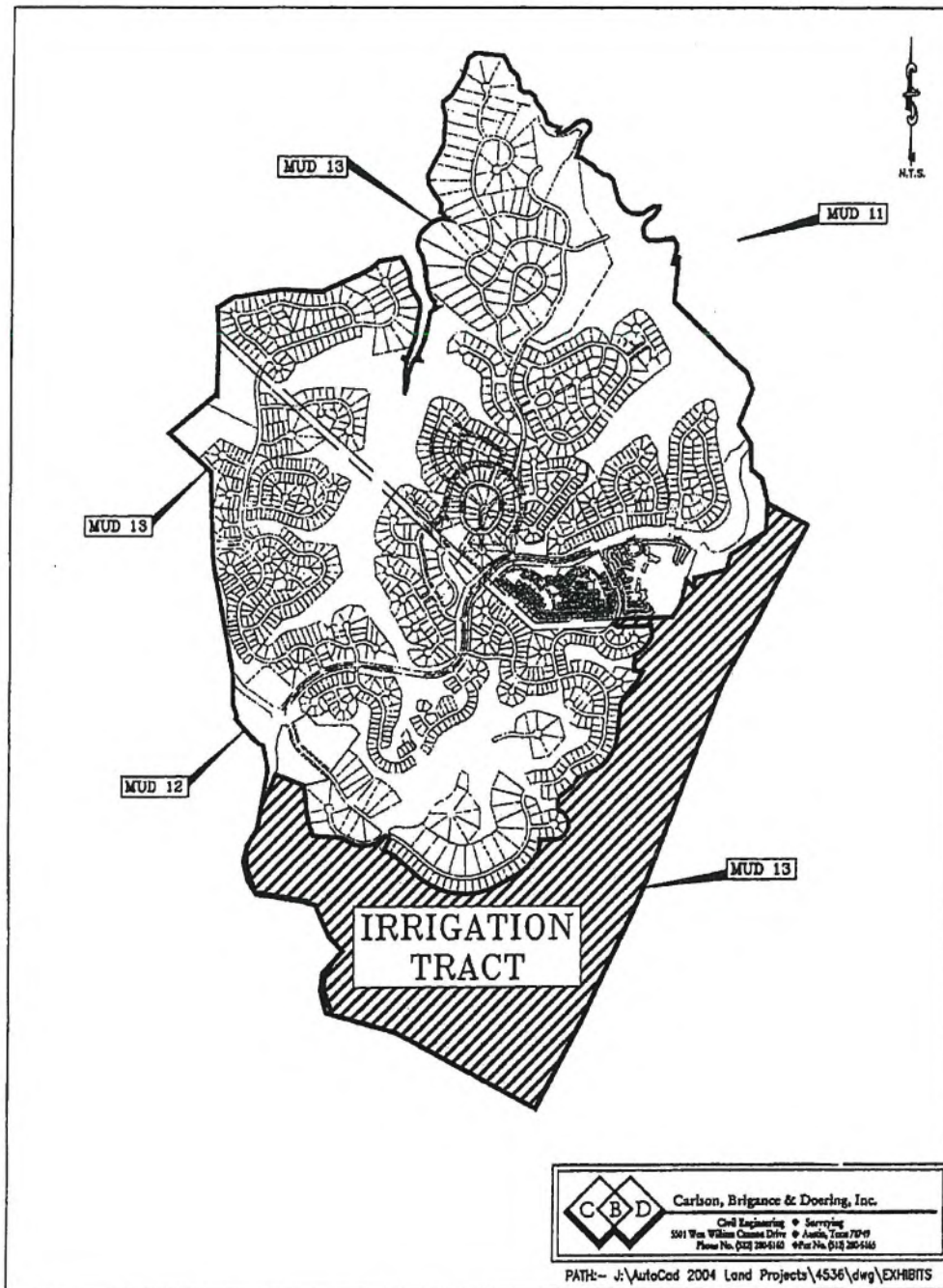
Surveyed by:

 5-22-13
ROBERT J. GERTSON, R.P.L.S. NO. 6367
Carlson, Brigrance and Doering, Inc.
5501 West William Cannon
Austin, TX 78749
Ph: 512-280-5160 Fax: 512-280-5165
rgertson@cbdeng.com



BEARING BASIS: REMAINDER OF 1028.257 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2004230439 OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS.

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



TRANSFER OF

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

PERMIT NO. WQ0014534001

FROM: Travis County Municipal Utility District No. 12

TO: Lakeway Municipal Utility District

Ownership of the facilities covered by the above-referenced permit issued January 17, 2020, has changed. That part of the signature page pertaining to the name and mailing address of the permit holder is hereby changed so that the same shall hereinafter be and read as follows:

"Lakeway Municipal Utility District
1097 Lohmans Crossing Road
Lakeway, Texas 78734"

The transferee is financially responsible for the proper maintenance and operation of the facility so as to comply with the terms and conditions of the permit. The failure to operate the facility in accordance with the terms and conditions of the permit may be good cause for revocation of the permit.

This transfer is in accordance with 30 Texas Administrative Code Section 305.64.

This order is part of the permit and should be attached there to.

Issued Date: May 15, 2024


For The Commission

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

**APPLICATION TO TRANSFER A WASTEWATER PERMIT
OR CAFO PERMIT**

If you have questions about completing this form please contact the Applications Review and Processing Team at 512-239-4671.

SECTION 1. CURRENT PERMIT INFORMATION

What is the Permit Number? WQ0014534001

What is the EPA I.D. Number? TX N/A

What is the Current Name on the Permit?

Travis County Municipal Utility District No. 12

What is the Customer Number (CN) for the current permittee? CN 601357098

What is the Regulated Entity Reference Number (RN): RN 102672623

For Publicly Owned Treatment Works (POTWs) Only:

- a) Does this permit require implementation of an approved pretreatment program by the POTW? Yes ☐ No ☒
- b) Does this permit have a domestic reclaimed water authorization associated with it?
NOTE: The domestic reclaimed water authorization associated with this permit will be cancelled on the same date the transfer took place. See instructions for more information.
Yes ☐ No ☒

SECTION 2. FACILITY OWNER (APPLICANT) INFORMATION

A. What is the Legal Name of the facility owner?

Lakeway Municipal Utility District

B. What is the Customer Number (CN) issued to this entity? CN 600634513

C. Complete and attach a Core Data Form (TCEQ-10400) for this customer.

SECTION 3. CO-APPLICANT INFORMATION

Complete this section only if another person or entity is required to apply as a co-permittee.

A. What is the Legal Name of the co-applicant applying for this permit?

N/A

B. What is the Customer Number (CN) issued to this entity? CN N/A

C. Complete and attach a Core Data Form (TCEQ-10400) for this customer.

SECTION 4. APPLICATION CONTACT INFORMATION

This is the person TCEQ will contact if additional information is needed about this application.

Application Contact First and Last Name: Joe DiQuinzio

Title: General Manager Credentials: 

Company Name: JadCo Development Inc.

Mailing Address: 602 W. 9th St.

City, State, and Zip Code: Austin, TX 78701

Phone Number: 512-478-0017 Fax Number: 512-435-2360

E-mail Address: joe@jadco.us

SECTION 5. PERMIT CONTACT INFORMATION

This is the person TCEQ will contact if additional information is needed during the term of the permit.

Permit Contact First and Last Name: Earl Foster

Title: General Manager Credentials: 

Company Name: Lakeway Municipal Utility District

Mailing Address: 1097 Lohmans Crossing

City, State, and Zip Code: Lakeway, TX 78734

Phone Number: 512-261-6222 Fax Number: 512-261-6681

E-mail Address: efoster@lakewaymud.org

SECTION 6. SITE INFORMATION

Site Name: the Highlands Tract

SECTION 7. LEASE AND EASEMENT REQUIREMENTS

A. Landowner where the facility is or will be located:

Landowner Name: RH Lakeway Holdings, Ltd.

If this individual is not the same person as the facility owner or co-applicant, attach one of the following documents:

- A lease agreement or deed recorded easement, if the facility is NOT a fixture of the land, or
- A deed recorded easement if the facility IS a fixture of the land.

B. Landowner of the effluent disposal site:

Landowner Name: RH Lakeway Holdings, Ltd.

If this individual is not the same person as the facility owner or co-applicant, attach a lease agreement.

C. For CAFOs: Attach the following records:

- Warranty Deed or Property Tax Records
- Lease Agreement (for land management units that are not owned by the facility owner or co-applicant)

Facility Size on the proof of ownership, in acres: N/A


SECTION 8. TRANSFER DATE

What is the date that the transfer of operator or ownership will occur? April 18, 2024

SECTION 9. REPORTING AND BILLING INFORMATION

A. Please identify the individual for receiving the reporting forms.

First and Last Name: Earl Foster

Title: General Manager Credentials: 

Company Name: Lakeway Municipal Utility District

Mailing Address: 1097 Lohmans Crossing

City, State, and Zip Code: Lakeway, Texas 78734

Phone Number: 512-261-6222 Fax Number: 512-261-6681

E-mail Address: efoster@lakewaymud.org

B. Please identify the individual for receiving the annual fee invoices.

First and Last Name: Earl Foster

Title: General Manger Credentials: 

Company Name: Lakeway Municipal Utility District

Mailing Address: 1097 Lohmans Crossing

City, State, and Zip Code: Lakeway, Texas 78734

Phone Number: 512-261-6222 Fax Number: 512-261-6681

E-mail Address: efoster@lakewaymud.org

SECTION 10. DELINQUENT FEES OR PENALTIES

Do you owe fees to the TCEQ? Yes ☐ No ☒

Do you owe any penalties to the TCEQ? Yes ☐ No ☒

If you answered yes to either of the above questions, provide the amount owed, the type of fee or penalty, and an identifying number.

N/A

TRANSFEROR SIGNATURE (Current Facility Owner)

I consent to the transfer of the permit and 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 there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that I am authorized under 30 Texas Administrative Code Section 305.44 to sign this document and can provide documentation in proof of such authorization upon request.

Facility Owner Name: Travis County Municipal Utility District No. 12

Title: Joe DiQuinzio, General Manager

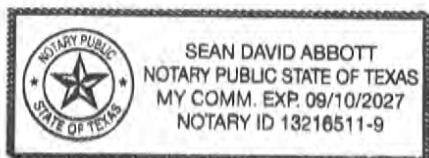
Signature:  Date: 3.13.24

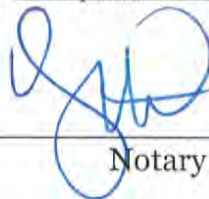
SUBSCRIBED AND SWORN to before me by the said Joe DiQuinzio on

this 13th day of March, 20 24

My commission expires on the 9th day of September, 20 27

(Seal)





Notary Public

Travis County

County, Texas

TRANSFEROR SIGNATURE (Current Facility Co-Applicant)

Complete if a co-applicant is on the current permit.

I consent to the transfer of the permit and 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 there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that I am authorized under 30 Texas Administrative Code Section 305.44 to sign this document and can provide documentation in proof of such authorization upon request.

Facility Co-Applicant Name: N/A

Title:

Signature: _____ Date: _____

SUBSCRIBED AND SWORN to before me by the said _____ on

this _____ day of _____, 20 _____

My commission expires on the _____ day of _____, 20 _____

(Seal)

Notary Public

County, Texas

TRANSFeree SIGNATURE (New Facility Owner)

I certify that a change of ownership of the facility for the subject permit has been issued will occur as indicated in the application. As a condition of the transfer, I do hereby declare that:

The transferee will be the owner of the existing treatment facility from which wastewater is discharged, deposited or disposed or the facilities required to comply with the permit will be constructed as described in the application considered by the TCEQ prior to the issuance of the permit.

The transferee possesses a copy of the permit, understands the terms and conditions therein, and does accept and assume all obligations of the permit.

The transferee assumes financial responsibility for the proper maintenance and operation of all waste treatment and disposal facilities required by the permit or which may be required to comply with the permit terms and conditions. The transferee certifies that the transfer is not made for the purpose of avoiding liability for improper actions carried out prior to the date of transfer. Neither is the transfer made for the purpose of transferring responsibility for improper operations to an insolvent entity.

The transferee certifies under penalty of law that this document is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for known violations and revocation of this permit.

New Facility Owner: Lakeway Municipal Utility District

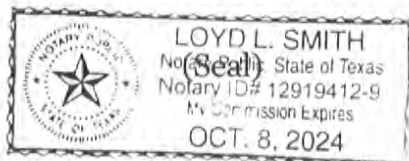
Title: Earl Foster, General Manager

Signature: Earl Foster Date: 3-15-2024

SUBSCRIBED AND SWORN to before me by the said EARL FOSTER on

this 15th day of MARCH, 20 24

My commission expires on the 8th day of OCTOBER, 20 24



Lou Ann

Notary Public

TRAVIS

County, Texas

TRANSFeree SIGNATURE (New Facility Co-Applicant)

Complete if a co-applicant is required.

I certify that a change of ownership of the facility for the subject permit has been issued will occur as indicated in the application. As a condition of the transfer, I do hereby declare that:

The transferee will be the operator of the existing treatment facility from which wastewater is discharged, deposited or disposed or the facilities required to comply with the permit will be constructed as described in the application considered by the TCEQ prior to the issuance of the permit.

The transferee possesses a copy of the permit, understands the terms and conditions therein, and does accept and assume all obligations of the permit.

The transferee assumes financial responsibility for the proper maintenance and operation of all waste treatment and disposal facilities required by the permit or which may be required to comply with the permit terms and conditions. The transferee certifies that the transfer is not made for the purpose of avoiding liability for improper actions carried out prior to the date of transfer. Neither is the transfer made for the purpose of transferring responsibility for improper operations to an insolvent entity.

The transferee certifies under penalty of law that this document is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for known violations and revocation of this permit.

New Facility Co-Applicant: N/A

Title:

Signature: _____ Date: _____

SUBSCRIBED AND SWORN to before me by the said _____ on

this _____ day of _____, 20 _____

My commission expires on the _____ day of _____, 20 _____

(Seal)

Notary Public

County, Texas

SITE OPERATOR SIGNATURE

Complete only for permits that include composting facilities, land application and/or disposal of sewage sludge **AND** the transferee does not own the land where the disposal activity is conducted.

I understand that I am responsible for operating the site described in the legal description in accordance with the Texas Commission on Environmental Quality requirements in 30 TAC, Chapter 332 and/or 312, the conditions set forth in the permit, and any additional conditions as required by the Texas Commission on Environmental Quality. I also certify under penalty of law that all 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, imprisonment for violations, and revocation of this permit.

Site Operator Name: N/A

Title:

Signature: _____ Date: _____

SUBSCRIBED AND SWORN to before me by the said _____ on

this _____ day of _____, 20_____

My commission expires on the _____ day of _____, 20_____

(Seal)

Notary Public

County, Texas

LAND OWNER SIGNATURE

Complete Only If Landowner Is Not the Site Operator

I certify that I am the owner of the land described in this application and have all rights and covenants to authorize the applicant for this permit, to use this site for the composting, disposal and/or land application. I understand that 30 Texas Administrative Code Chapters 332 and 312 require me to make a reasonable effort to see that the applicant complies with requirements in 30 Texas Administrative Code Chapters 332 and 312, the conditions set forth in this application, and any additional conditions as required by the Texas Commission on Environmental Quality. I also certify under penalty of law that all 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, imprisonment for violations, and revocation of this permit.

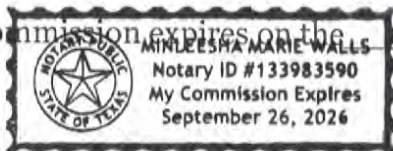
Landowner Name: RH Lakeway Holdings, Ltd

Signature: [Signature] Date: 3/15/2024
Asst Vice President, RH Lakeway Holdings GP, LLC, general partner

SUBSCRIBED AND SWORN to before me by the said Susan G. Crawford on

this 15 day of March, 20 24

My commission expires on the 26 day of September, 20 26



(Seal)

[Signature]

Notary Public

Travis

County, Texas



TCEQ Use Only

TCEQ Core Data Form

For detailed instructions regarding completion of this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission (If other is checked please describe in space provided.)		
<input type="checkbox"/> New Permit, Registration or Authorization (Core Data Form should be submitted with the program application.)		
<input checked="" type="checkbox"/> Renewal (Core Data Form should be submitted with the renewal form) <input type="checkbox"/> Other		
2. Customer Reference Number (if issued)	Follow this link to search for CN or RN numbers in Central Registry**	3. Regulated Entity Reference Number (if issued)
CN 601357098		RN 104372941

SECTION II: Customer Information

4. General Customer Information		5. Effective Date for Customer Information Updates (mm/dd/yyyy)		03/18/2024	
<input type="checkbox"/> New Customer		<input checked="" type="checkbox"/> Update to Customer Information		<input type="checkbox"/> Change in Regulated Entity Ownership	
<input type="checkbox"/> Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)					
The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).					
6. Customer Legal Name (If an individual, print last name first: eg: Doe, John)				If new Customer, enter previous Customer below:	
Travis County Municipal Utility District No 12					
7. TX SOS/CPA Filing Number		8. TX State Tax ID (11 digits)		9. Federal Tax ID (9 digits)	
N/A		N/A		760641618	
10. DUNS Number (if applicable)		N/A			
11. Type of Customer:		<input type="checkbox"/> Corporation		<input type="checkbox"/> Individual	
Partnership: <input type="checkbox"/> General <input type="checkbox"/> Limited					
Government: <input type="checkbox"/> City <input type="checkbox"/> County <input type="checkbox"/> Federal <input type="checkbox"/> State <input checked="" type="checkbox"/> Other		<input type="checkbox"/> Sole Proprietorship		<input type="checkbox"/> Other:	
12. Number of Employees		13. Independently Owned and Operated?			
<input checked="" type="checkbox"/> 0-20 <input type="checkbox"/> 21-100 <input type="checkbox"/> 101-250 <input type="checkbox"/> 251-500 <input type="checkbox"/> 501 and higher		<input type="checkbox"/> Yes <input type="checkbox"/> No			
14. Customer Role (Proposed or Actual) – as it relates to the Regulated Entity listed on this form. Please check one of the following:					
<input type="checkbox"/> Owner		<input type="checkbox"/> Operator		<input checked="" type="checkbox"/> Owner & Operator	
<input type="checkbox"/> Occupational Licensee		<input checked="" type="checkbox"/> Responsible Party		<input type="checkbox"/> Voluntary Cleanup Applicant	
<input type="checkbox"/> Other:					
15. Mailing Address:					
100 CONGRESS AVE STE 1300					
ARMBRUST & BROWN					
City		AUSTIN		State	
TX		ZIP		78701	
ZIP + 4		2744			
16. Country Mailing Information (if outside USA)				17. E-Mail Address (if applicable)	
18. Telephone Number		19. Extension or Code		20. Fax Number (if applicable)	
(512) 435-2300				() -	

SECTION III: Regulated Entity Information

21. General Regulated Entity Information (If 'New Regulated Entity' is selected below this form should be accompanied by a permit application)	
<input type="checkbox"/> New Regulated Entity <input type="checkbox"/> Update to Regulated Entity Name <input checked="" type="checkbox"/> Update to Regulated Entity Information	
The Regulated Entity Name submitted may be updated in order to meet TCEQ Agency Data Standards (removal of organizational endings such as Inc, LP, or LLC.)	
22. Regulated Entity Name (Enter name of the site where the regulated action is taking place.)	
Travis County Municipal Utility District No 12	

23. Street Address of the Regulated Entity: (No PO Boxes)	100 CONGRESS AVE STE 1300							
	ARMBRUST & BROWN							
	City	Austin	State		ZIP	78701	ZIP + 4	2744
24. County	Travis							

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:	0.5 miles East of Hwy 71/Bee Creek Road intersection							
26. Nearest City					State	Nearest ZIP Code		
Lakeway					TX	78734		
27. Latitude (N) In Decimal:	30.333663				28. Longitude (W) In Decimal:	-98.018799		
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds			
29. Primary SIC Code (4 digits)	30. Secondary SIC Code (4 digits)		31. Primary NAICS Code (5 or 6 digits)		32. Secondary NAICS Code (5 or 6 digits)			
4952	N/A		221320		N/A			
33. What is the Primary Business of this entity? (Do not repeat the SIC or NAICS description.)								
Provision of water and wastewater services								
34. Mailing Address:	100 Congress Ave., Suite 1300							
	Austin, Texas 78701							
	City	AUSTIN	State	TX	ZIP	78701	ZIP + 4	2744
35. E-Mail Address:	sabbott@abaustin.com							
36. Telephone Number	37. Extension or Code		38. Fax Number (if applicable)					
(512) 435-2300			() -					

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

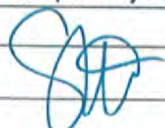
<input type="checkbox"/> Dam Safety	<input checked="" type="checkbox"/> Districts	<input type="checkbox"/> Edwards Aquifer	<input type="checkbox"/> Emissions Inventory Air	<input type="checkbox"/> Industrial Hazardous Waste
<input type="checkbox"/> Municipal Solid Waste	<input type="checkbox"/> New Source Review Air	<input type="checkbox"/> OSSF	<input type="checkbox"/> Petroleum Storage Tank	<input type="checkbox"/> PWS
<input type="checkbox"/> Sludge	<input type="checkbox"/> Storm Water	<input type="checkbox"/> Title V Air	<input type="checkbox"/> Tires	<input type="checkbox"/> Used Oil
<input type="checkbox"/> Voluntary Cleanup	<input checked="" type="checkbox"/> Waste Water	<input type="checkbox"/> Wastewater Agriculture	<input type="checkbox"/> Water Rights	<input type="checkbox"/> Other:
WQ0014534001				

SECTION IV: Preparer Information

40. Name:	Ronnie Moore	41. Title:	District Engineer
42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(512) 779-9926		() -	ronnie@cbdeng.com

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	Travis County Municipal Utility District No 12	Job Title:	General Counsel
Name(In Print) :	Sean Abbott	Phone:	(512) 435-2334
Signature:		Date:	3/18/24

THE STATE OF TEXAS §
 §
COUNTY OF TRAVIS §

LEASE AGREEMENT

This Lease Agreement (the "Lease") is entered into effective 5/22/2013, 2013 (the "Effective Date") between LAS VENTANAS LAND PARTNERS, LTD., a Texas limited partnership, as Lessor, and TRAVIS COUNTY MUNICIPAL UTILITY DISTRICT NO. 12, a political subdivision of the State of Texas, as Lessee, and is as follows:

RECITALS

WHEREAS, Lessor is the owner of the real property in Travis County, Texas, more particularly described on:

Exhibit "A", attached hereto and incorporated herein by reference for all purposes (the "Plant Site & Pond Site");

Exhibit "B", attached hereto and incorporated herein by reference for all purposes (the "Irrigation Land"); and

WHEREAS, Lessor has joined in a "Wastewater Facilities Acquisition and Construction Agreement" between Rough Hollow Development, Ltd. (the "Developer") and Lessee (the "Agreement") and has agreed, pursuant to the Agreement, to transfer TPDES Permit No. WQ0014534001 (as it may be transferred, amended, renewed or reissued, the "Permit") issued by the Texas Commission on Environmental Quality (the "Commission") to Lessee; and

WHEREAS, the Agreement provides for the Developer's construction of certain wastewater treatment and disposal facilities to serve Lessee, Travis County Municipal Utility District No. 11 and Travis County Municipal Utility District No. 13 (collectively, the "Participating Districts") in accordance with the Permit; and

WHEREAS, Lessor is an affiliate of the Developer and the owner of land located within the Participating Districts and will benefit, directly and indirectly, from the construction of the proposed wastewater treatment and disposal facilities; and

WHEREAS, Lessor has agreed, pursuant to the Agreement, to lease the Plant Site, the Pond Site and the Irrigation Land (collectively, the "Property") to Lessee for the proposed wastewater treatment and disposal facilities;

NOW, THEREFORE, for and in consideration of the premises, the benefits to be received under the Agreement and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Lessor and Lessee (collectively the "Parties"), agree as follows:

I. TITLE - QUIET POSSESSION

Lessor confirms that it is the fee simple owner of the Property and has full power to lease the Property and any improvements thereon (collectively, the "Leased Premises") to Lessee. Lessor covenants that Lessee will peaceably hold and enjoy the Leased Premises during the term of this Lease, without interruption by Lessor or any person claiming by, through, or under it. Lessor agrees that it will not, during the term of this Lease, grant any liens or easements or place any restrictions or encumbrances of any kind upon any portion of the Leased Premises which are not subordinate to the this Lease unless such liens, easements, restrictions or encumbrances are approved by Lessee in {W0581558.1}

writing. Lessor further covenants that the only lienholder on the Property is IBC Bank, and that such lienholder has consented to this Lease as evidenced by the Lienholder's Consent attached hereto as Exhibit "C".

II. TERM; TERMINATION

Lessor hereby leases the Leased Premises to Lessee for the purposes set forth herein. This Lease will begin on the Effective Date and remain in effect for 99 years (the "Term"); provided, however, that this Lease will automatically terminate as to portions of the Property upon their conveyance by Lessor to Lessee in accordance with the terms of the Agreement. Further, at such time as all of the land to be provided with wastewater service under the Permit has been developed and fully built-out and is being provided with wastewater service, and all Irrigation Land required under the Permit and the related irrigation facilities have been conveyed to Lessee, this Lease will terminate as to any remaining Irrigation Land that is not required for effluent disposal. Lessee agrees to execute a written termination of this Lease as to that remaining, unused Irrigation Land at that time.

III. USE

Lessor agrees that Lessee may use and improve the Leased Premises for the construction, operation, replacement and maintenance of wastewater collection, treatment, and disposal facilities; for the storage, transmission and spray irrigation of wastewater effluent, and any other lawful use related thereto.

IV. MISCELLANEOUS

1. Notice. Any notice or other communication ("Notice") given under this Agreement must be in writing. Notice may be given or served: (i) by depositing it in the United States Mail, postage paid, certified with return receipt requested, and addressed to the party to be notified; or (ii) by personally delivering it to the party to be notified. Notice deposited in the mail will be effective three days after such deposit. Notice given in any other manner will be effective only if and when received by the party to be notified. For the purposes of notice, the addresses of the parties will be, until changed as provided below, as follows:

District: Travis County Municipal Utility District No. 12
c/o Armbrust & Brown, PLLC
100 Congress Avenue, Suite 1300
Austin, Texas 78701
Fax: (512) 435-2360

Developer: Las Ventanas Land Partners, Ltd.
2101 Lakeway Blvd.
Suite 205
Austin, TX 78734
Fax: (512) 306-1620
Attn: Haythem Dawlett

The parties may change their respective addresses for purposes of notice by giving at least five days written notice of the new address to the other party. If any date or any period provided in this Agreement ends on a Saturday, Sunday, or legal holiday, the applicable period will be extended to the next business day.

2. Severability. If any provision of this Lease is held to be illegal, invalid or unenforceable under present or future laws, the legality, validity and enforceability of the remaining provisions will not be affected and, in lieu of such illegal, invalid or unenforceable provision, a provision that is legal, valid and enforceable and is as similar in terms to such illegal, invalid or unenforceable provision as is possible will be added to this Lease.

3. Construction. The parties each acknowledge that they and their respective counsel have reviewed and revised this Lease and that the normal rule of construction that any ambiguities are to be resolved and construed against the drafting party will not be employed in the interpretation of this Lease.

4. Counterparts. This Lease may be executed in one or more counterparts, each of which will be an original and all of which, taken together, will constitute a single document binding and effective as to all parties hereto. An electronic copy or telecopy of an executed counterpart will be considered to have the same binding legal effect as an original.

5. Venue; Attorney's Fees. This Lease is made and entered into in Travis County, Texas, where venue will lie for any proceedings relating to this Lease. If either party retains an attorney to enforce this Lease, the party who prevails at the time of trial is entitled to recover reasonable attorney's fees.

6. Amendment. This Lease may only be amended by a written instrument, signed by both Lessor and Lessee,

IN WITNESS WHEREOF, the Parties have caused this Lease to be executed as of the Effective Date.

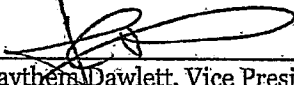
TRAVIS COUNTY MUNICIPAL UTILITY DISTRICT NO. 12

By: Dan Robertson
Dan Robertson, President
Board of Directors

Date: May 28, 2013

LAS VENTANAS LAND PARTNERS, LTD., a
Texas limited partnership

By: JHLV GP, INC., a Texas corporation, its
General Partner

By: 
Haythem Dawlett, Vice President

Date: 5/22/2013

EXHIBIT A **POND SITE & PLANT SITE**

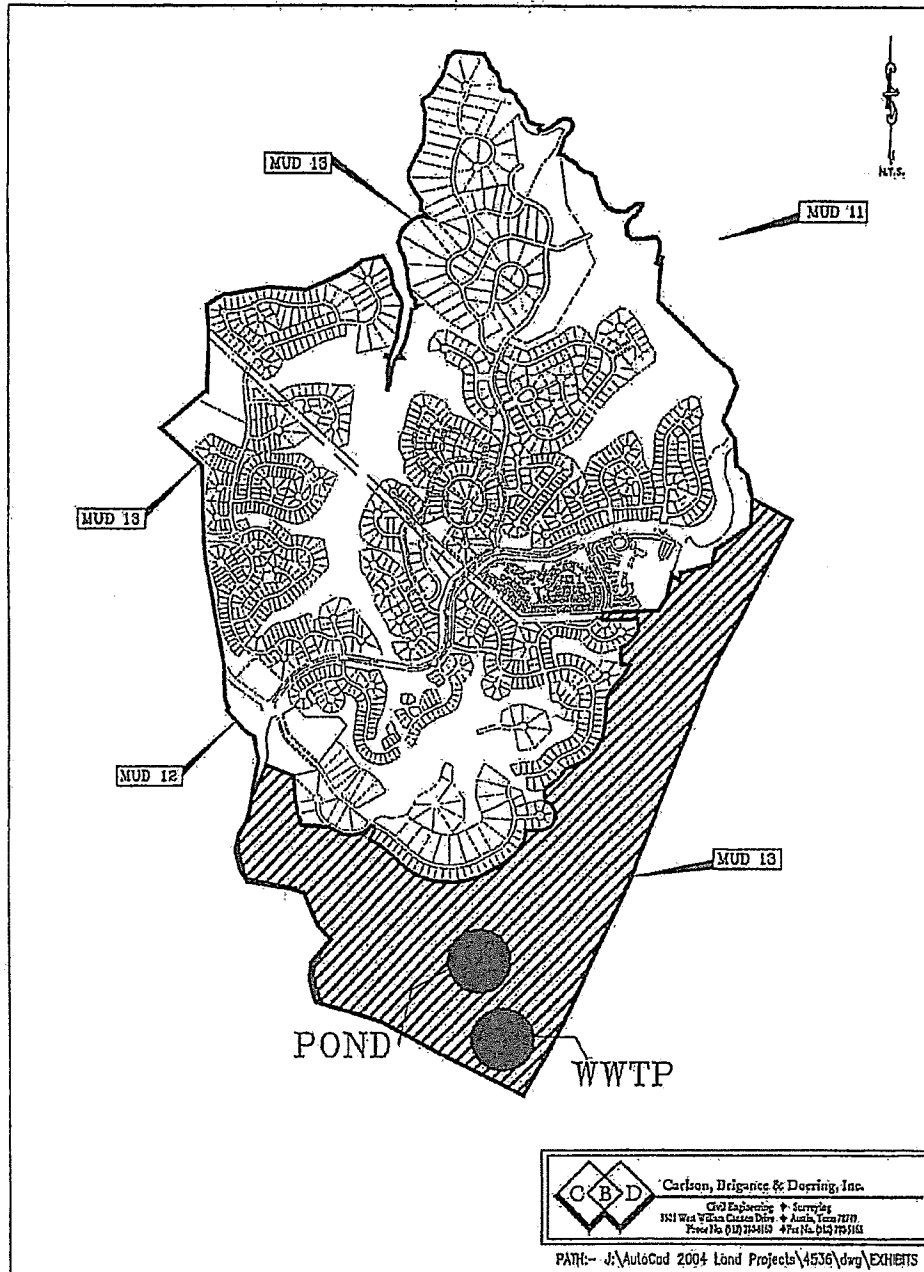


EXHIBIT B IRRIGATION LAND

371.87 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46,
C.E.P.I. & M. CO. SURVEY NUMBER 47,
RUSK TRANSPORTATION SURVEY NUMBER 83
TRAVIS COUNTY, TX
IRRIGATION TRACT

FIELD NOTES

BEING ALL OF THAT CERTAIN TRACT OF LAND OUT OF THE C.E.P.I. & M. CO. SURVEY NUMBER 46, THE C.E.P.I. & M. CO. SURVEY NUMBER 47, AND THE JOHN H. GIBSON SURVEY NUMBER 49, SITUATED IN TRAVIS COUNTY, TEXAS, BEING MORE PARTICULARLY DESCRIBED AS BEING OUT OF AND PART OF THE REMAINDER OF A 1023.257 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2004230439 OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, FIVE 0.138 ACRE TRACTS CONVEYED TO LAS VENTANAS LAND PARTNERS LTD. IN DOCUMENT NUMBER 2005152672, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY TEXAS, A 0.138 ACRE TRACT CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2005169277, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, A 0.138 ACRE TRACT CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2005171006, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, A 0.138 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2005152674, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, AND A 0.138 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2005174987, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, ALL OF A 1.00 ACRE TRACT OF LAND CONVEYED TO LOUIS GRANGER, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007084148, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, MICHAEL MATZ, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064148, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, JESSE KENNIS, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007192461, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, RICHARD FADAL, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064140, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, SEAN MILLS, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2010175380, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, SUE BROOKS LITTLEFIELD, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064145, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, AND SUE BROOKS LITTLEFIELD, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064147, OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, ALL OF A 0.138 ACRE TRACT OF LAND CONVEYED TO AMIE PARKS, UNDIVIDED 1/6TH INTEREST, IN DOCUMENT NUMBER 2006073878, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, MARK BURTON, UNDIVIDED 1/6TH INTEREST, IN DOCUMENT NUMBER 2011120491, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, DAVID COX, UNDIVIDED 1/6TH INTEREST, IN DOCUMENT NUMBER 2004231842, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, NICK CONTI, UNDIVIDED 1/6TH INTEREST, IN DOCUMENT NUMBER 2004113297, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, MICHAEL DE LA FUENTE, UNDIVIDED 1/6TH INTEREST, IN DOCUMENT NUMBER 2004113295, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, AND DAVID L. SMITH, UNDIVIDED 1/6TH INTEREST, IN DOCUMENT NUMBER 2004113290, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, AND A PORTION OF A 1.00 ACRE TRACT CONVEYED TO SUE E. WALL, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064138, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, MEUSSA MILLER, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064134, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, JIM A. HENRY, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064132, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, ROBERT R. GRIFFITH, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064130, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, DANIEL L. ROBERTSON, UNDIVIDED 1/7TH INTEREST, IN DOCUMENT NUMBER 2007064136, OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, SAID 371.87 ACRE TRACT OF LAND BEING MORE FULLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING, at a 1/4" capped iron rod found for an eastern corner of Lot 1, Block A, Lakeway Highlands Village, recorded in Document No. 201100126, Official Public Records of Travis County, Texas (O.P.R.T.C.TX.), common to a western corner of Lakeway Highlands Greenbelt Lot, recorded Document No. 201100038, (O.P.R.T.C.TX.), also being a northern corner of Rough Hollow Irrigation Lot Plat, recorded in Document No. 200500233, (O.P.R.T.C.TX.), for the POINT OF BEGINNING of the herein described tract,

THENCE, with the common boundary line of said Rough Hollow Irrigation Lot Plat and said Lakeway Highlands Greenbelt Lot, the following six (6) courses and distances, numbered 1 through 6,

1. S46°27'57"E, a distance of 134.49 feet to a capped 1/4" iron rod found,
2. N07°47'30"E, a distance of 119.94 feet to a capped 1/4" iron rod found,

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371.87 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46,
C.E.P.I. & M. CO. SURVEY NUMBER 47,
RUSK TRANSPORTATION SURVEY NUMBER 85
TRAVIS COUNTY, TX
IRRIGATION TRACT

3. N75°10'08"E, a distance of 436.06 feet to a capped $\frac{1}{4}$ " Iron rod found,
4. N14°19'32"E, a distance of 198.14 feet to a capped $\frac{1}{4}$ " Iron rod found,
5. N56°49'00"E, a distance of 552.72 feet to a capped $\frac{1}{4}$ " Iron rod found, and
6. N03°21'44"E, a distance of 365.55 feet to a mag nail found, for the northernmost corner of said Rough Hollow Irrigation Lot Plat, common to an eastern corner of said Lakeway Highlands Greenbelt Lot, also being the southwest corner of Lot 27, Block A, of Rough Hollow Section 1, a subdivision recorded in Document No. 200600276; (O.P.R.T.C.TX.),

THENCE, with the common boundary line of said Rough Hollow Section 1, and said Rough Hollow Irrigation Lot Plat, the following two (2) courses and distances, numbered 1 and 2,

1. S61°41'59"E, a distance of 365.06 feet to a calculated point,
2. S61°46'16"E, a distance of 234.14 feet to a $\frac{1}{4}$ " Iron rod found for the southeast corner of said Rough Hollow Section 1, common to the northeast corner of said Rough Hollow Irrigation Lot Plat, also being in a western line of a tract of land conveyed to City of Lakeway in Document No. 2002162268, (O.P.R.T.C.TX.), for the northeastern corner of the herein described tract,

THENCE, with the common boundary line of said City of Lakeway tract and said Rough Hollow Irrigation Lot Plat, S28°04'07"W, a distance of 106.81 feet to a $\frac{1}{4}$ " Iron rod found at a southwestern corner of said City of Lakeway tract, common to the northwestern corner of a tract of land conveyed to the City of Lakeway in Document No. 2002073174, (O.P.R.T.C.TX.),

THENCE, with the common boundary line of said City of Lakeway tract and said Rough Hollow Irrigation Lot Plat, S28°10'54"W, a distance of 1246.40 feet to a $\frac{1}{4}$ " Iron rod found at a southwestern corner of a tract of land conveyed to the City of Lakeway, (O.P.R.T.C.TX.),

THENCE, with the common boundary line of said City of Lakeway tract and said Rough Hollow Irrigation Lot Plat, N89°26'15"E, a distance of 5.94 feet to a $\frac{1}{4}$ " Iron rod found at a southern corner of said City of Lakeway tract, common to the northwestern corner of a tract of land conveyed to Ron White in Vol. 12797, Pg. 1822; (O.P.R.T.C.TX.),

THENCE, with the common boundary line of said Ron White tract and said Rough Hollow Irrigation Lot Plat, the following three (3) courses and distances numbered 1 through 3,

1. S28°34'53"W, a distance of 760.21 feet to a capped $\frac{1}{4}$ " Iron rod found,
2. S28°10'19"W, a distance of 239.20 feet to a capped $\frac{1}{4}$ " Iron pipe found, and
3. S21°05'10"W, a distance of 954.56 feet to a capped $\frac{1}{4}$ " Iron rod found, for the southwest corner of a 22.048 acre tract of land conveyed to Frank Brown and Nancy B. Word in Document No. 2007209245, (O.P.R.T.C.TX.), common to a northern corner of a 24.61 acre tract of land conveyed to John Hickman Baker in Document No. 2010020988; (O.P.R.T.C.TX.),

THENCE, with the common boundary line of said 24.61 acre tract and said Rough Hollow Irrigation Lot Plat, N75°43'03"W, a distance of 1.88 feet to a capped $\frac{1}{4}$ " Iron rod found, for the northwest corner of said 24.61 acre tract,

THENCE, with the common boundary line of said 24.61 acre tract and said Rough Hollow Irrigation Lot Plat, S21°10'17"W, a distance of 1286.40 feet to a capped $\frac{1}{4}$ " Iron rod found, for the southwest corner of said 24.61 acre tract, common to the northwest corner of a 20.00 acre tract of land conveyed to Jay and Terry Wilemon in Vol. 13211, Pg. 1777, (O.P.R.T.C.TX.),

THENCE, with the common boundary line of said 20.00 acre tract and said Rough Hollow Irrigation Lot Plat, S21°16'08"W, a distance of 625.92 feet to a capped $\frac{1}{4}$ " Iron pipe found, for the southwest corner of said 20.00 acre tract, common to the northwest corner of a 23.262 acre tract of land conveyed to Norman and Suzanne Myers in Vol. 11715, Pg. 82, (O.P.R.T.C.TX.),

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371.37 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46,
C.E.P.I. & M. CO. SURVEY NUMBER 47,
RUSK TRANSPORTATION SURVEY NUMBER 85
TRAVIS COUNTY, TX
IRRIGATION TRACT

THENCE, with the common boundary line of said 23.262 acre tract and said Rough Hollow Irrigation Lot Plat, the following two (2) courses and distances numbered 1 and 2,

1. S23°49'43"W, a distance of 342.55 feet to a capped 1/2" iron pipe found, and
2. S25°12'51"W, a distance of 1628.19 feet to a capped 1/2" iron rod found, in a western line of a 273.397 acre tract of land conveyed to Serene Hills Ltd, in Document No. 2007079264, (O.P.R.T.C.TX.), common to an eastern corner of said remainder of 1023.257 acre tract,

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said 273.397 acre tract, the following three (3) courses and distances numbered 1 through 3,

1. S28°04'42"W, a distance of 1290.99 feet to a cotton spindle found,
2. N61°56'09"W, a distance of 2159.25 feet to a 1/2" iron pipe found,
3. N74°17'20"W, a distance of 856.69 feet to a capped 1/2" iron rod found, in the south line of said remainder of 1023.257 acre tract common to the eastern right-of-way line as dedicated by Highlands Boulevard plat in Document No. 200900056, (O.P.R.T.C.TX.),

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said eastern right-of-way line of Bee Creek Road, the following fifteen (15) courses and distances numbered 1 through 15,

1. N17°57'24"W, a distance of 345.70 feet to a capped 1/2" iron rod found,
2. N03°18'00"E, a distance of 131.65 feet to a capped 1/2" iron rod found,
3. N25°38'41"E, a distance of 261.75 feet to a capped 1/2" iron rod found,
4. N39°09'29"E, a distance of 190.39 feet to a capped 1/2" iron rod found,
5. N42°25'31"W, a distance of 269.32 feet to a capped 1/2" iron rod found,
6. N22°51'15"W, a distance of 273.32 feet to a 1/2" iron pipe found,
7. N22°55'14"W, a distance of 182.15 feet to a 1/2" iron pipe found,
8. N75°39'35"W, a distance of 101.77 feet to a cotton spindle found,
9. N28°16'12"W, a distance of 31.21 feet to a capped 1/2" iron rod found,
10. N79°50'25"W, a distance of 687.75 feet to a capped 1/2" iron rod found,
11. N18°21'11"W, a distance of 333.00 feet to a capped 1/2" iron rod found,
12. N00°54'55"W, a distance of 230.66 feet to a capped 1/2" iron rod found,
13. N18°37'26"E, a distance of 100.05 feet to a capped 1/2" iron rod found,
14. N31°31'12"E, a distance of 191.80 feet to an iron pipe found, and
15. N10°38'10"E, a distance of 308.04 feet to a capped 1/2" iron rod found, for a southern corner of Highlands Boulevard plat, recorded in Document No. 200900056, Official Public Records of Travis County, Texas,

THENCE, leaving said common boundary line and with a southeastern boundary line of said Highlands Boulevard Plat the following two (2) courses and distances numbered 1 and 2,

1. N26°49'04"E, a distance of 229.65 feet to a capped 1/2" iron rod found, and
2. N22°21'22"E, a distance of 229.14 feet to a capped 1/2" iron rod found,

THENCE, leaving said boundary line and crossing said remainder of 1023.257 acre tract and the following sixty-nine (69) courses and distances numbered 1 through 69,

1. S68°25'45"E, a distance of 397.18 feet to a calculated point,
2. S06°02'45"E, a distance of 357.34 feet to a calculated point,
3. S10°35'40"E, a distance of 144.32 feet to a calculated point,
4. S17°46'15"E, a distance of 166.51 feet to a calculated point,
5. S85°53'06"E, a distance of 386.91 feet to a calculated point,
6. S60°24'05"E, a distance of 117.33 feet to a calculated point, at a point of curvature to the left,

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371.87 ACRES
C.E.P.J. & M. CO. SURVEY NUMBER 46,
C.E.P.J. & M. CO. SURVEY NUMBER 47,
RUSK TRANSPORTATION SURVEY NUMBER 85
TRAVIS COUNTY, TX
IRRIGATION TRACT

7. with said curve to the left having a radius of 350.00 feet, an arc length of 223.00 feet and whose chord bears S78°39'15"E, a distance of 219.25 feet to a calculated point,
8. N83°05'35"E, a distance of 57.83 feet to a calculated point, at a point of curvature to the left,
9. with said curve to the left having a radius of 254.50 feet, an arc length of 199.96 feet and whose chord bears N60°35'05"E, a distance of 194.85 feet to a calculated point,
10. N38°04'36"E, a distance of 20.02 feet to a calculated point, at a point of curvature to the right,
11. with said curve to the right having a radius of 25.00 feet, an arc length of 37.84 feet and whose chord bears N81°26'04"E, a distance of 34.33 feet to a calculated point, at a point of curvature to the left,
12. with said curve to the left having a radius of 405.93 feet, an arc length of 55.70 feet and whose chord bears S59°19'20"E, a distance of 55.66 feet to a calculated point,
13. S28°55'29"W, a distance of 179.96 feet to a calculated point,
14. S61°04'31"E, a distance of 167.85 feet to a calculated point,
15. S49°53'54"E, a distance of 388.57 feet to a calculated point,
16. S51°59'47"E, a distance of 73.59 feet to a calculated point,
17. S57°07'58"E, a distance of 106.53 feet to a calculated point,
18. S63°12'32"E, a distance of 106.53 feet to a calculated point,
19. S69°17'07"E, a distance of 106.53 feet to a calculated point,
20. S75°21'41"E, a distance of 106.53 feet to a calculated point,
21. S81°26'15"E, a distance of 106.53 feet to a calculated point,
22. S87°30'50"E, a distance of 106.53 feet to a calculated point,
23. N86°24'36"E, a distance of 106.53 feet to a calculated point,
24. N80°20'02"E, a distance of 106.53 feet to a calculated point,
25. N74°15'28"E, a distance of 106.53 feet to a calculated point,
26. N68°10'53"E, a distance of 106.53 feet to a calculated point,
27. N62°38'59"E, a distance of 100.05 feet to a calculated point,
28. N61°27'43"E, a distance of 215.79 feet to a calculated point,
29. N58°38'51"E, a distance of 69.24 feet to a calculated point,
30. N51°09'19"E, a distance of 114.98 feet to a calculated point,
31. N41°48'02"E, a distance of 114.98 feet to a calculated point,
32. N32°26'46"E, a distance of 114.98 feet to a calculated point,
33. N11°12'22"E, a distance of 115.51 feet to a calculated point,
34. N02°34'30"W, a distance of 43.14 feet to a calculated point,
35. N89°28'01"E, a distance of 102.03 feet to a calculated point,
36. N89°59'40"E, a distance of 91.47 feet to a calculated point,
37. N76°10'26"E, a distance of 89.96 feet to a calculated point,
38. N52°15'31"E, a distance of 75.77 feet to a calculated point,
39. N27°03'49"E, a distance of 98.64 feet to a calculated point,
40. N00°26'20"W, a distance of 91.52 feet to a calculated point,
41. N28°47'28"W, a distance of 104.38 feet to a calculated point,
42. N56°39'55"W, a distance of 88.26 feet to a calculated point,
43. N80°41'07"W, a distance of 9.26 feet to a calculated point,
44. N02°23'55"W, a distance of 160.79 feet to a calculated point,
45. N53°18'48"E, a distance of 127.77 feet to a calculated point,
46. N51°45'18"E, a distance of 121.69 feet to a calculated point,
47. N34°50'52"E, a distance of 140.00 feet to a calculated point,
48. N67°32'39"E, a distance of 142.73 feet to a calculated point,
49. N65°03'09"E, a distance of 89.78 feet to a calculated point,
50. N57°28'24"E, a distance of 100.77 feet to a calculated point,
51. N47°30'23"E, a distance of 100.77 feet to a calculated point,
52. N37°32'23"E, a distance of 100.77 feet to a calculated point,
53. N27°34'22"E, a distance of 100.77 feet to a calculated point,
54. N17°36'22"E, a distance of 100.77 feet to a calculated point,
55. N08°03'26"E, a distance of 95.65 feet to a calculated point,

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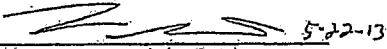
371.87 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46,
C.E.P.I. & M. CO. SURVEY NUMBER 47,
RUSK TRANSPORTATION SURVEY NUMBER 85
TRAVIS COUNTY, TX
IRRIGATION TRACT

56. N04°55'31"E, a distance of 313.12 feet to a calculated point,
57. N07°18'38"E, a distance of 81.06 feet to a calculated point,
58. N27°27'00"E, a distance of 130.49 feet to a calculated point,
59. N39°45'54"E, a distance of 265.58 feet to a calculated point,
60. N27°54'58"E, a distance of 120.60 feet to a calculated point,
61. N77°47'08"W, a distance of 112.15 feet to a calculated point,
62. N00°13'32"E, a distance of 207.84 feet to a calculated point,
63. N73°13'34"E, a distance of 24.56 feet to a calculated point,
64. N54°15'18"E, a distance of 79.00 feet to a calculated point,
65. N45°14'22"E, a distance of 120.36 feet to a calculated point,
66. N29°33'04"E, a distance of 111.78 feet to a calculated point,
67. N04°17'22"W, a distance of 453.73 feet to a calculated point,
68. S87°52'45"W, a distance of 494.17 feet to a calculated point, at a point of curvature to the left, and
69. with said curve to the left having a radius of 500.00 feet, an arc length of 120.60 feet and whose chord bears N31°39'25"E, a distance of 120.31 feet to a capped 1/4" iron rod found, for the southwestern corner of said Lot 1, Block A, Lakeway Highlands Village,

THENCE, with the southern and eastern boundary lines of said Lakeway Highlands Village, the following three (3) courses and distances numbered 1 through 3,

1. N87°55'42"E, a distance of 711.26 feet to a capped 1/4" iron rod found,
2. N34°35'06"E, a distance of 198.59 feet to a capped 1/4" iron rod found, and
3. N12°22'20"E, a distance of 323.56 feet to the POINT OF BEGINNING and containing 371.87 acres of land.

Surveyed by:

 5-22-13
ROBERT J. GERTSON, R.P.L.S. NO. 6367
Carlson, Brigrance and Doering, Inc.
5501 West William Cannon
Austin, TX 78749
Ph: 512-280-5160 Fax: 512-280-5165
rgertson@cbdeng.com



BEARING BASIS: REMAINDER OF 1023.257 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2004230439 OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS.

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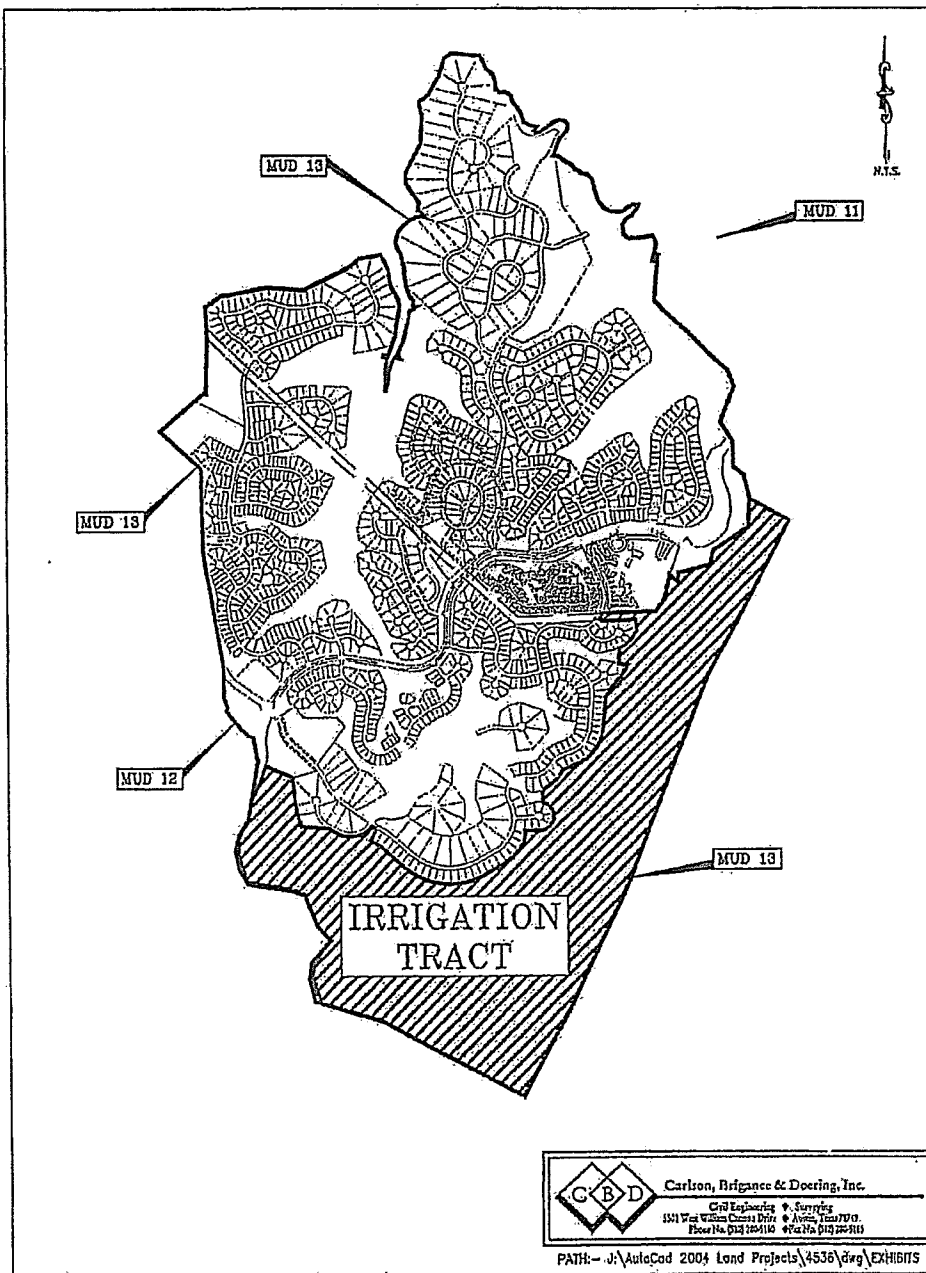


EXHIBIT C

LIENHOLDER CONSENT

STATE OF TEXAS §
 §
COUNTY OF TRAVIS §

The undersigned ("Lienholder"), is the holder of certain liens against the Property, as defined and described in the Lease Agreement (the "Lease") to which this Lienholder Consent is attached, which liens are more fully described in the Deed of Trust dated 1/27/2012, from Las Ventanas Land Partners, Ltd. to International Bank of Commerce, Trustee, securing the payment of a promissory note of even date in the original principal amount of \$22,000,000, payable to Lienholder, of record under Document No. 2012019542, Official Public Records of Travis County, Texas.

For good and valuable consideration, the receipt and sufficiency of which are acknowledged, Lienholder hereby consents to the Lease; subordinates its liens against any portion of the Property to the Lease; and agrees that any foreclosure of its liens will not extinguish the Lease or any rights of the Lessee thereunder.

Executed to be effective this 22nd day of May, 2013.

International Bank of Commerce
a Texas Banking association

By: [Signature]
Allen E. Wise,
Senior Vice President

THE STATE OF TEXAS §
 §
COUNTY OF TRAVIS §

Sworn to and subscribed before me on the 24 day of May, 2013, by
Allen E. Wise Senior Vice President of
International Bank of Commerce Texas Banking Corporation, on behalf of said
Entity

Shana Freeman
Notary Public, State of Texas



THE STATE OF TEXAS §
 §
COUNTY OF TRAVIS §

AMENDMENT NO. 1 TO LEASE AGREEMENT

This Amendment No. 1 to Lease Agreement (this "Amendment") is entered into effective February 5, 2016 (the "Effective Date") between LAS VENTANAS LAND PARTNERS, LTD., a Texas limited partnership, as Lessor, and TRAVIS COUNTY MUNICIPAL UTILITY DISTRICT NO. 12, a political subdivision of the State of Texas, as Lessee, and is as follows:

RECITALS

WHEREAS, Lessor and Lessee previously entered into a Lease Agreement dated May 22, 2013 (the "Original Lease"); and

WHEREAS, Lessor and Lessee now desire to amend the Original Lease in order to revise the legal description of the "Irrigation Land" contained therein;

NOW, THEREFORE, for and in consideration of the premises, the benefits to be received under the Original Lease and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Lessor and Lessee, agree as follows:

1. Amendment to Description of Irrigation Land. The metes and bounds description attached to this Amendment as Exhibit 1 is hereby substituted for and will replace Exhibit B to the Original Lease. Lessor covenants that the only lienholder on the "Irrigation Land" is International Bank of Commerce, and that such lienholder has consented to this Amendment as evidenced by the Lienholder's Consent attached hereto as Exhibit 2.

2. Defined Terms. All terms delineated with initial capital letters in this Amendment that are defined in the Original Lease have the same meanings in this Amendment as in the Original Lease. Other terms have the meanings commonly ascribed to them.

3. Effect of Amendment. Except as provided by this Amendment, the terms and provisions of the Original Lease will continue to govern the rights and obligations of the parties, and all provisions and covenants of the Original Lease, as amended by this Amendment, will remain in full force and effect. In the event of any inconsistency between the Original Lease and this Amendment, this Amendment will control and modify the terms and provisions of the Original Lease.

4. Amendment. This Amendment may only be amended by a written instrument, signed by both Lessor and Lessee.

IN WITNESS WHEREOF, the Parties have caused this Amendment to be executed as of the Effective Date.

TRAVIS COUNTY MUNICIPAL UTILITY DISTRICT NO. 12

By: _____



Brent Heath, President
Board of Directors


Date: _____

February 23, 2016



LAS VENTANAS LAND PARTNERS, LTD., a
Texas limited partnership

By: **JHLV GP, INC., a Texas corporation, its**
General Partner

By: 
Haythem Dawlett, Vice President

Date: 2-5-2016

EXHIBIT 1 IRRIGATION LAND

373.755 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 2098
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX
BUYOUT

FIELD NOTES

BEING ALL OF THAT CERTAIN TRACT OF LAND OUT OF THE C.E.P.I. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 2098, THE RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123, SITUATED IN TRAVIS COUNTY, TEXAS, BEING MORE PARTICULARLY DESCRIBED AS BEING OUT OF AND PART OF THE REMAINDER OF A 1023.257 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2006042798 OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, SAID 373.755 ACRE TRACT OF LAND BEING MORE FULLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING, at a $\frac{1}{4}$ " capped iron rod found for the southwestern corner of Lot 1, Block A, of Lakeway Highlands Village, a subdivision recorded in Document No. 201100126, Official Public Records of Travis County, Texas. (O.P.R.T.C.TX.), also being in the eastern right-of-way line of Highlands Boulevard (50' R.O.W.) and also being in the northern boundary line of a 100' easement conveyed to LCRA in Vol. 579, Pg. 592, Deed Records of Travis County, Texas for a western corner and POINT OF BEGINNING of the herein described tract,

THENCE, leaving said Highlands Boulevard and with the common boundary line of said Lakeway Highlands Village and said LCRA easement, N87°52'45"E, a distance of 711.26 feet to a capped $\frac{1}{4}$ " iron rod found at the southwest corner of Lot 1, Rough Hollow Irrigation Plat, a subdivision recorded in Document No. 200500233, O.P.R.T.C.TX.,

THENCE, leaving said LCRA easement and with common line of said Lakeway Highlands Village and said remainder of 1023.257 acre tract the following two (2) courses and distances, numbered 1 and 2,

1. N34°35'06"E, a distance of 198.59 feet to a capped $\frac{1}{4}$ " iron rod found, and
2. N12°22'20"E, a distance of 323.56 feet to a capped $\frac{1}{4}$ " iron rod found at the westernmost corner of Lakeway Highlands Greenbelt Lot, a subdivision recorded in Document No. 201300038, O.P.R.T.C.TX.,

THENCE, with the common boundary line of said 1023.257 acre tract and said Lakeway Highlands Greenbelt Lot, the following six (6) courses and distances, numbered 1 through 6,

1. S46°03'15"E, a distance of 136.01 feet to a $\frac{1}{4}$ " capped iron rod found,
2. N07°44'33"E, a distance of 119.94 feet to a $\frac{1}{4}$ " capped iron rod found,
3. N75°07'11"E, a distance of 436.06 feet to a $\frac{1}{4}$ " capped iron rod found,
4. N14°16'35"E, a distance of 198.14 feet to a $\frac{1}{4}$ " capped iron rod found,
5. N56°46'03"E, a distance of 552.72 feet to a $\frac{1}{4}$ " capped iron rod found, and
6. N03°17'25"E, a distance of 366.38 feet to a $\frac{1}{4}$ " magnetic found for a northern corner of said remainder of 1023.257 acre tract, common to an eastern corner of said Lakeway Highlands Greenbelt Lot, also being the southwestern corner of Lot 27, Block A, of Rough Hollow Section 1, a subdivision recorded in Document No. 200500276, O.P.R.T.C.TX.,

THENCE, with the common boundary line of said Rough Hollow Section 1, and said remainder of 1023.257 acre tract, S61°42'36"E, a distance of 599.68 feet to a $\frac{1}{4}$ " iron rod found for the southeastern corner of said Rough Hollow Section 1, common to the northeastern corner of said remainder of 1023.257 acre tract, also being in a western line of a 98.774 acre tract of land conveyed to City of Lakeway in Document No. 2002162268, O.P.R.T.C.TX., for the northeastern corner of the herein described tract,

THENCE, with the common boundary line of said City of Lakeway tract and said remainder of 1023.257 acre tract, S28°01'10"W, a distance of 106.81 feet to a $\frac{1}{4}$ " iron rod found at a southwestern corner of said City of Lakeway tract, common to the northwestern corner of a 19.477 acre tract of land conveyed to the City of Lakeway in Document No. 2002073174, O.P.R.T.C.TX.,

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373.798 ACRES
C.E.P.L. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 1068
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2121
TRAVIS COUNTY, TX
BUYOUT

THENCE, with the common boundary line of said City of Lakeway 19.477 acre tract and said remainder of 1023.257 acre tract, S28°07'57"W, a distance of 1246.40 feet to a 1/2" iron rod found at a southwestern corner of said City of Lakeway 38.774 acre tract,

THENCE, with the common boundary line of said City of Lakeway 38.774 acre tract and said remainder of 1023.257 acre tract, N69°23'18"E, a distance of 5.94 feet to a 1/2" iron rod found at a southern corner of said 38.774 acre City of Lakeway tract, common to the northwestern corner of a 21.477 acre tract of land conveyed to Ron White in Vol. 32797, Pg. 1822, O.P.R.T.C.T.X.,

THENCE, with the common boundary line of said Ron White tract and said remainder of 1023.257 acre tract, the following three (3) courses and distances numbered 1 through 3,

1. S28°31'56"W, a distance of 760.21 feet to a capped 1/2" iron rod found,
2. S28°07'22"W, a distance of 239.20 feet to a 1/2" iron pipe found, and
3. S21°02'15"W, a distance of 954.56 feet to a capped 1/2" iron rod found, for the southwestern corner of a 22.048 acre tract of land conveyed to Frank Brown and Nancy B. Word in Document No. 2007209245, (O.P.R.T.C.T.X.), common to a northern corner of a 24.61 acre tract of land conveyed to John Hickman Baker in Document No. 2010020988, O.P.R.T.C.T.X.,

THENCE, with the common boundary line of said 24.61 acre tract and said remainder of 1023.257 acre tract, N75°46'00"W, a distance of 1.88 feet to a capped 1/2" iron rod found, for the northwestern corner of said 24.61 acre tract,

THENCE, with the common boundary line of said 24.61 acre tract and said remainder of 1023.257 acre tract, S21°07'20"W, a distance of 1286.40 feet to a capped 1/2" iron rod found, for the southwestern corner of said 24.61 acre tract, common to the northwestern corner of a 20.00 acre tract of land conveyed to Jay and Terry Wilmon in Vol. 13211, Pg. 1777, O.P.R.T.C.T.X.,

THENCE, with the common boundary line of said 20.00 acre tract and said remainder of 1023.257 acre tract, S21°13'12"W, a distance of 625.92 feet to a 1/2" iron pipe found, for the southwestern corner of said 20.00 acre tract, common to the northwestern corner of a 23.262 acre tract of land conveyed to Norman and Suzanne Myers in Vol. 11715, Pg. 82, O.P.R.T.C.T.X.,

THENCE, with the common boundary line of said 23.262 acre tract and said remainder of 1023.257 acre tract, the following two (2) courses and distances numbered 1 and 2,

1. S23°46'47"W, a distance of 342.55 feet to a capped 1/2" iron pipe found, and
2. S25°09'55"W, a distance of 1628.19 feet to a capped 1/2" iron rod found, in a western line of a 273.397 acre tract of land conveyed to Serene Hills Ltd, in Document No. 2007079264, O.P.R.T.C.T.X., common to an eastern corner of said remainder of 1023.257 acre tract,

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said 273.397 acre tract, the following three (3) courses and distances numbered 1 through 3

1. S28°01'46"W, a distance of 1280.99 feet to a cotton spindle found,
2. N61°59'05"W, a distance of 2159.25 feet to a 1/2" iron pipe found,
3. N74°00'29"W, a distance of 863.16 feet to a capped 1/2" iron rod found, in the southern line of said remainder of 1023.257 acre tract common to the eastern right-of-way line of Bee Creek Road (R.O.W. Varics) as dedicated by Highlands Boulevard plat in Document No. 200900056, O.P.R.T.C.T.X.,

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said eastern right-of-way line of Bee Creek Road, the following sixteen (16) courses and distances numbered 1 through 16,

1. N17°56'36"W, a distance of 345.71 feet to a 1/2" iron rod found,
2. N03°18'47"E, a distance of 131.65 feet to a 1/2" iron rod found,

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3. N25°39'28"E, a distance of 261.75 feet to a 1/2" Iron rod found,
4. N41°20'06"E, a distance of 188.66 feet to a 1/2" Iron rod found,
5. N42°28'28"W, a distance of 269.32 feet to a 1/2" Iron rod found,
6. N22°54'11"W, a distance of 273.32 feet to a 1/2" Iron pipe found,
7. N22°58'10"W, a distance of 182.15 feet to a 1/2" Iron pipe found,
8. N22°40'55"W, a distance of 106.89 feet to a cotton gin spindle found,
9. N28°00'09"W, a distance of 31.25 feet to a 1/2" Iron rod found,
10. N79°51'13"W, a distance of 150.58 feet to a 1/2" Iron rod found,
11. N79°50'58"W, a distance of 537.12 feet to a 1/2" Iron rod found,
12. N18°21'42"W, a distance of 332.94 feet to a 1/2" Iron rod found,
13. N00°55'27"W, a distance of 230.66 feet to a 1/2" Iron rod found,
14. N18°39'13"E, a distance of 100.11 feet to a 1/2" Iron rod found,
15. N33°19'26"E, a distance of 167.02 feet to a 1/2" Iron pipe found, and
16. N09°56'30"E, a distance of 86.55 feet to a calculated point in the eastern right-of-way line of said Bee Creek Road, also being in the western line of said remainder of 1023.257 acre tract,

THENCE, leaving the eastern right-of-way line of Bee Creek Road and crossing said 1023.257 acre tract, the following fifty-three (53) courses and distance, numbered 1 through 53,

1. N75°49'10"E, a distance of 654.11 feet to a 1/2" calculated point,
2. S06°02'45"E, a distance of 20.83 feet to a 1/2" calculated point,
3. S10°35'40"E, a distance of 144.32 feet to a calculated point,
4. S17°46'15"E, a distance of 166.51 feet to a calculated point,
5. S85°53'06"E, a distance of 18.51 feet to a calculated point,
6. S85°53'06"E, a distance of 368.40 feet to a calculated point,
7. S60°24'05"E, a distance of 117.33 feet to a calculated point at a point of curvature to the left,
8. With said curve to the left having a radius of 350.00 feet, an arc length of 223.00 feet, and whose chord bears S78°39'25"E, a distance of 219.25 feet to a calculated point,
9. N83°05'35"E, a distance of 57.63 feet to a calculated point at a point of curvature to the left,
10. With said curve to the left having a radius of 254.50 feet, an arc length of 185.91 feet, and whose chord bears N62°09'57"E, a distance of 181.80 feet to a calculated point,
11. S61°07'10"E, a distance of 274.91 feet to a calculated point,
12. S49°56'33"E, a distance of 480.97 feet to a calculated point,
13. S52°38'48"E, a distance of 68.26 feet to a calculated point,
14. S68°36'07"E, a distance of 103.15 feet to a calculated point,
15. S65°26'31"E, a distance of 103.29 feet to a calculated point,
16. S72°37'27"E, a distance of 103.41 feet to a calculated point,
17. S79°48'48"E, a distance of 103.50 feet to a calculated point,
18. S97°00'28"E, a distance of 103.56 feet to a calculated point,
19. N85°47'39"E, a distance of 103.59 feet to a calculated point,
20. N78°35'42"E, a distance of 103.60 feet to a calculated point,
21. N71°23'46"E, a distance of 103.57 feet to a calculated point,
22. N84°12'00"E, a distance of 103.52 feet to a calculated point,
23. N57°00'31"E, a distance of 103.44 feet to a calculated point,
24. N49°49'24"E, a distance of 103.34 feet to a calculated point,
25. N42°38'47"E, a distance of 103.21 feet to a calculated point,
26. N35°28'45"E, a distance of 103.06 feet to a calculated point,
27. N28°19'24"E, a distance of 102.88 feet to a calculated point,
28. N23°09'53"E, a distance of 102.92 feet to a calculated point,
29. N58°52'36"E, a distance of 110.51 feet to a calculated point,
30. S57°02'30"E, a distance of 180.92 feet to a calculated point,
31. N43°06'29"E, a distance of 125.93 feet to a calculated point,
32. N72°58'05"E, a distance of 135.85 feet to a calculated point,

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373.755 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 1068
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX
BUYOUT

33. N13°31'28"E, a distance of 219.50 feet to a calculated point,
34. N54°07'07"W, a distance of 89.87 feet to a calculated point,
35. N02°23'55"W, a distance of 233.07 feet to a calculated point,
36. N53°18'48"E, a distance of 127.77 feet to a calculated point,
37. N51°45'18"E, a distance of 121.69 feet to a calculated point,
38. N34°50'52"E, a distance of 140.00 feet to a calculated point,
39. N67°32'39"E, a distance of 142.73 feet to a calculated point,
40. N66°05'09"E, a distance of 89.78 feet to a calculated point,
41. N57°28'24"E, a distance of 100.77 feet to a calculated point,
42. N47°30'23"E, a distance of 100.77 feet to a calculated point,
43. N37°32'23"E, a distance of 100.77 feet to a calculated point,
44. N27°34'21"E, a distance of 100.77 feet to a calculated point,
45. N17°36'22"E, a distance of 100.77 feet to a calculated point,
46. N08°03'26"E, a distance of 95.65 feet to a calculated point,
47. N04°55'31"E, a distance of 313.12 feet to a calculated point,
48. N07°18'38"E, a distance of 81.06 feet to a calculated point,
49. N27°27'00"E, a distance of 130.49 feet to a calculated point,
50. N39°45'54"E, a distance of 265.58 feet to a calculated point,
51. N27°54'58"E, a distance of 120.60 feet to a calculated point,
52. N77°47'08"W, a distance of 112.15 feet to a calculated point, and
53. N00°13'32"E, a distance of 207.84 feet to a calculated point in the southeastern line of Lot 12, Block A, Lakeway Highlands, Phase 2, Section 1A, a subdivision recorded in Document No. 201300191, O.P.R.T.C.T.X.

THENCE, with the common boundary line of said Lakeway Highlands, Phase 2, Section 1A and said remainder of 1023.257 acre tract, the following five (5) courses and distances, numbered 1 through 5:

1. N73°13'34"E, a distance of 24.56 feet to a ½" iron rod found
2. N54°15'18"E, a distance of 79.00 feet to a ½" iron rod found
3. N45°14'22"E, a distance of 220.36 feet to a ½" iron rod found
4. N29°33'04"E, a distance of 111.78 feet to a ½" iron rod found, and
5. N04°17'22"W, a distance of 153.73 feet to a ½" iron rod found at the southern boundary of said LCRA easement,

THENCE, with the common boundary line of said Lakeway Highlands, Phase 2, Section 1A and said LCRA easement, S87°52'45"W, a distance of 494.17 feet to a ½" capped iron rod found in the eastern right-of-way of said Highlands Boulevard at a point of curvature to the left.

THENCE, with the common boundary line of said Highlands Boulevard and said remainder of 1023.257 acre tract, with said curve having a radius of 500.00, an arc length of 120.60, and whose chord bears N31°39'25"E, a distance of 120.31 feet to the POINT OF BEGINNING and containing 373.755 acres of land.

Surveyed by:

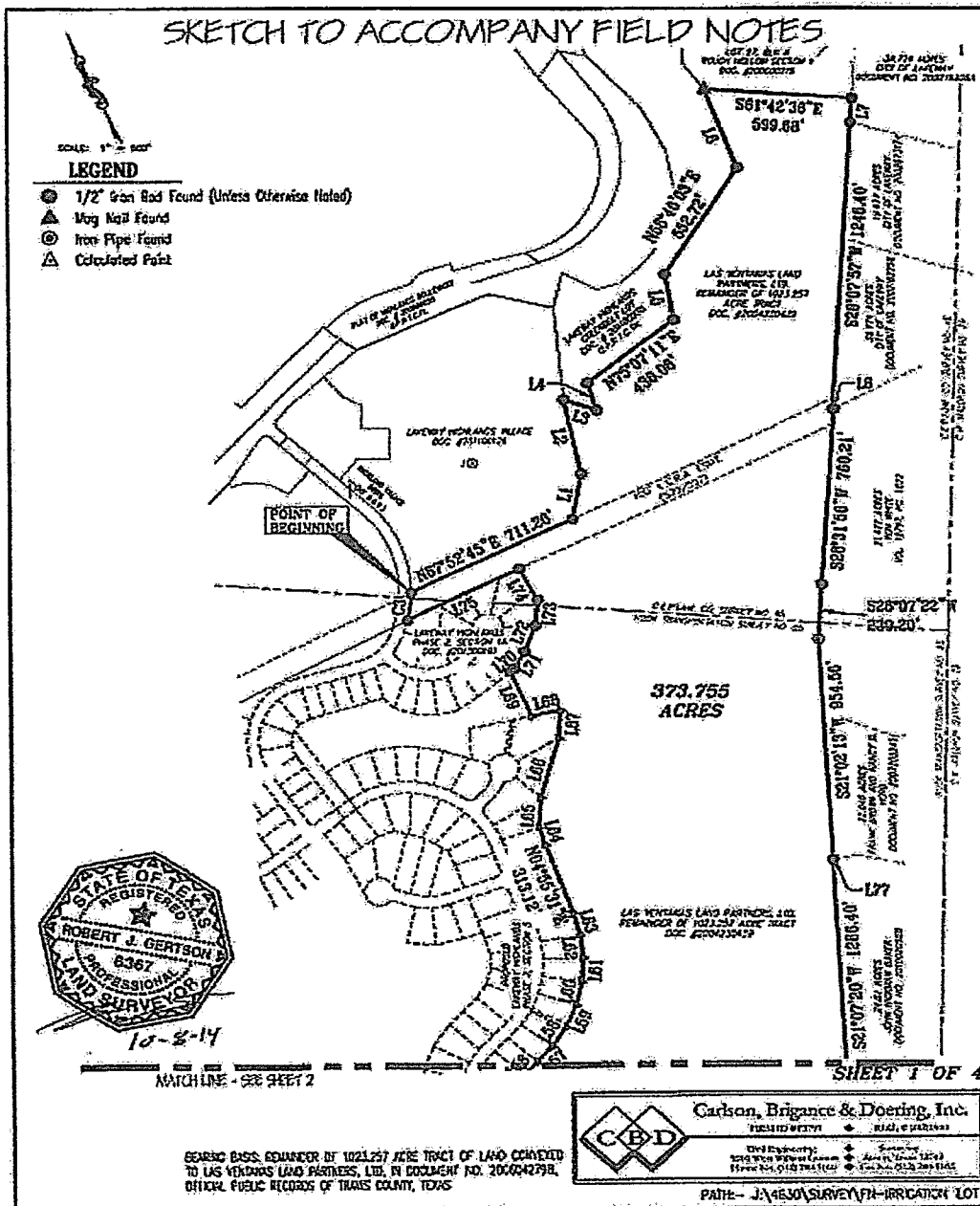
10-8-14

ROBERT GERTSON, R.P.L.S. NO. 6367
Carlson, Brannon and Doering, Inc.
5501 West William Cannon
Austin, TX 78749
Ph: 512-280-5160 Fax: 512-280-5165
rgertson@cbdeng.com



BEARING BASIS: REMAINDER OF 1023.257 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. BY DOCUMENT NUMBER 2006042798 OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS.

J: 4530\SURVEY\FIELD NOTES\F4-IRRIGATION LOT.doc



SKETCH TO ACCOMPANY FIELD NOTES

SCALE: 1" = 600'

LEGEND

- ⊙ 1/2" Iron Rod Found (Unless Otherwise Noted)
- ▲ Mag Nail Found
- ⊙ Iron Pipe Found
- △ Colored Paint

10-5-14

BEARING BASE: BEWANDER OF 1081.257 ACRE TRACT OF LAND CONVEYED TO LAS VENTURAS LAND PARTNERS, LTD. IN DOCUMENT NO. 20060342750. OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS

Carlson, Bigham & Doering, Inc.

FIELD NOTES

FIELD NOTES

CLC Engineering

Survey

2011 01 01 00:00:00

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2011 01 01 00:00:00

2011 01 01 00:00:00

PAGE: JA-4630 SURVEY VN-IRREGULAR LOT

SKETCH TO ACCOMPANY FIELD NOTES

Line Table		
Line #	Length	Direction
L1	198.59	N44°35'05"E
L2	323.58	N12°22'20"E
L3	135.01	S68°09'15"E
L4	119.54	N27°44'33"E
L5	188.14	N16°15'35"E
L6	368.38	N23°17'25"E
L7	106.81	S28°01'10"W
L8	5.94	N55°23'18"E
L10	131.65	N23°18'47"E
L11	281.75	N25°39'28"E
L12	128.05	N11°20'05"E
L13	289.32	N42°28'25"W
L15	182.15	N22°58'10"W
L16	105.89	N72°40'35"W
L17	31.25	N28°00'09"W
L18	332.94	N18°21'42"W
L19	230.68	N27°53'21"W
L20	100.11	N16°39'13"E
L21	187.02	N31°19'26"E
L22	85.55	N95°56'30"E

Line Table		
Line #	Length	Direction
L24	81.85	N27°19'38"E
L25	132.49	N27°27'00"E
L26	265.58	N27°15'34"E
L27	120.60	N27°51'59"E
L28	112.15	N77°47'08"W
L29	287.84	N60°13'33"E
L30	24.58	S73°13'34"E
L31	79.00	N54°15'28"E
L32	120.36	N45°14'22"E
L33	111.28	N27°33'04"E
L34	153.73	N24°17'22"W
L35	434.17	S87°52'45"W
L37	1.88	N75°16'00"W
L38	114.42	S10°35'40"E

Line Table		
Line #	Length	Direction
L23	20.83	S68°02'45"E
L24	166.51	S17°46'15"E
L25	18.51	S55°53'05"E
L27	117.33	S40°24'05"E
L28	57.83	N37°05'35"E
L29	274.91	S61°07'10"E
L30	68.26	S52°18'48"E
L31	103.15	S58°16'07"E
L32	103.29	S65°28'31"E
L33	103.41	S72°37'27"E
L34	103.59	S79°48'48"E
L35	103.58	S87°00'28"E
L36	103.59	N85°47'38"E
L37	103.60	N76°33'42"E
L38	103.57	N71°23'46"E
L39	103.52	N64°12'00"E
L40	103.44	N57°00'31"E
L41	103.34	N49°49'24"E
L42	103.21	N42°38'47"E
L43	103.06	N35°28'45"E

Line Table		
Line #	Length	Direction
L44	102.88	N26°19'24"E
L45	102.92	N23°09'53"E
L46	110.51	N58°52'36"E
L47	180.92	S57°02'38"E
L48	125.93	N43°06'29"E
L49	135.85	N72°53'06"E
L50	219.50	N13°31'28"E
L51	89.87	N54°07'07"W
L52	223.07	N27°23'55"W
L53	127.27	N23°18'43"E
L54	123.69	N51°45'18"E
L55	140.00	N45°05'52"E
L56	142.73	N57°32'37"E
L57	89.78	N56°05'09"E
L58	160.77	N57°28'24"E
L59	100.77	N47°30'23"E
L60	100.77	N37°32'23"E
L61	100.77	N27°34'22"E
L62	100.77	N17°36'22"E
L63	95.65	N08°03'26"E

Curve Table						
Curve #	Length	Radius	Chord Direction	Chord Length	Tangent	Delta
C1	223.00	360.00	S78°39'15"E	219.25	115.43	36°30'24"
C2	185.91	254.50	N52°08'37"E	181.80	87.32	41°51'15"
C3	120.60	500.00	N31°39'25"E	120.31	60.59	13°49'11"



SHEET 4 OF 4

Carlson, Brignace & Doering, Inc.

1501 W. 15th St. • P.O. Box 1000

Midland, Texas 79701 • Phone: (409) 692-1100

Fax: (409) 692-1100

PATH - J:\4630\SURVEY\FIN-IRRIGATION LOT

EXHIBIT 2

LIENHOLDER CONSENT

STATE OF TEXAS §
 §
COUNTY OF TRAVIS §

The undersigned ("Lienholder"), is the holder of certain liens against the Irrigation Land, as defined and described in the Amendment No. 1 to Lease Agreement (the "Amendment") to which this Lienholder Consent is attached, which liens are more fully described in the Deed of Trust dated 1/27/2012, from Las Ventanas Land Partners, Ltd. to International Bank of Commerce, Trustee, Trustee, securing the payment of a promissory note of even date in the original principal amount of \$22,000,000, payable to Lienholder, of record under Document No. 2012019542, Official Public Records of Travis County, Texas.

For good and valuable consideration, the receipt and sufficiency of which are acknowledged, Lienholder hereby consents to the Amendment; subordinates its liens against any portion of the Irrigation Land to the Amendment; and agrees that any foreclosure of its liens will not extinguish the Lease or any rights of the Lessee thereunder.

Executed to be effective this 5 day of February, 2016.

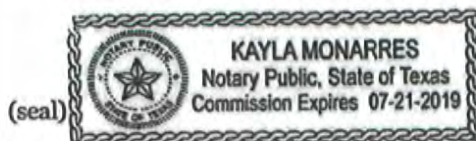
INTERNATIONAL BANK OF COMMERCE, a
Texas banking association

By: [Signature]
Allen E. Wise, Executive Vice President

Date: 2/9/16

THE STATE OF TEXAS §
 §
COUNTY OF TRAVIS §

This instrument was executed before me on this 9th day of February, 2016, by Allen E. Wise, Executive Vice President of INTERNATIONAL BANK OF COMMERCE, on behalf of said bank.



[Signature]
Notary Public Signature

ELECTRONICALLY RECORDED

2017179700

TRV

15

PGS

After Recording

Return To:

RH Lakeway Holdings, Ltd.
2101 Lakeway Blvd., Suite 100
Austin, Texas 78734

ASSIGNMENT AND ASSUMPTION AGREEMENT -LEASE AGREEMENT

State of Texas

Know all persons by these presents.

County of Travis

THIS ASSIGNMENT AND ASSUMPTION - LEASE AGREEMENT ("Assignment"), is signed to be effective as of November 1, 2017 ("Effective Date"), by and between Las Ventanas Land Partners, Ltd., a Texas limited partnership ("Assignor") and RH Lakeway Holdings, Ltd., a Texas limited partnership ("Assignee").

WITNESSETH:

WHEREAS, Assignor has of even date herewith conveyed to Assignee, in a Special Warranty Deed of even date with this Assignment (the "Deed") certain real property located in Travis County, Texas, as more particularly described in Exhibit A attached to and made a part of this Assignment ("Property").

In connection with the conveyance of the Property, Assignor desires to assign, grant and convey to Assignee, and Assignee desires to accept from Assignor, Assignor's right, title and interest in and to the agreement (the "Lease") listed on Exhibit B attached to and made a part of this Assignment;

NOW, THEREFORE, in consideration of TEN AND NO/100 DOLLARS (\$10.00) in hand paid to Assignor, the mutual covenants contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor and Assignee agree as follows:

Assignor does hereby ASSIGN, GRANT and CONVEY to Assignee all of Assignor's right, title and interest in and to the Lease.

Assignee does hereby assume all of Assignor's right, title, interest, duties, obligations, liabilities, powers and privileges in, to and under the Lease,

Assignor covenants and agrees to warrant and defend the assignment, grant and conveyance, of the Contracts hereby made against all persons whomsoever, to take all steps reasonably necessary to establish the record of Assignee's title to the Lease and, at the request of Assignee, to execute and deliver further instruments of transfer and assignment and take such other action as Assignee may reasonably request to more effectively transfer and assign to and vest in Assignee each of the Lease, all at Assignor's sole cost and expense.

This Assignment shall inure to the benefit of and be binding upon the successors and assigns of Assignor and Assignee. This Assignment shall be construed under and enforced in accordance with the laws of the State of Texas. This Assignment may be executed in multiple counterparts, each of which shall be deemed an original, and all of which shall constitute one and the same instrument.

[SIGNATURES BEGIN ON NEXT PAGE]

EXECUTED to be effective as of the Effective Date.

ASSIGNOR:

Las Ventanas Land Partners, Ltd., a Texas limited partnership

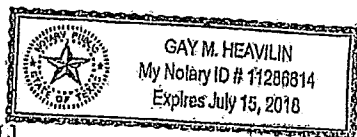
By: JHLV GP, Inc., a Texas corporation, its general partner

By: [Signature]
Haythem Dawlett, Vice President

STATE OF TEXAS

COUNTY OF Travis

The foregoing instrument was acknowledged before me on the 3 day of November, 2017, by Haythem Dawlett, Vice President of JHLV GP, Inc., a Texas corporation, general partner of Las Ventanas Land Partners, Ltd., a Texas limited partnership, on behalf of such company and limited partnership.



[SEAL]

[Signature]
Notary Public, State of Texas
My Commission Expires: _____

ASSIGNEE:

RH Lakeway Holdings, Ltd., a Texas limited partnership

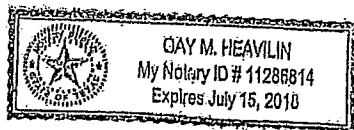
By: RH Lakeway Holdings GP, LLC, a Texas limited liability company, its general partner

By: [Signature]
Haythem Dawlett, Vice President

STATE OF TEXAS

COUNTY OF Travis

The foregoing instrument was acknowledged before me on the 3 day of November, 2017, by Haythem Dawlett, Vice President of RH Lakeway Holdings GP, LLC, a Texas limited liability company, general partner of RH Lakeway Holdings, Ltd., a Texas limited partnership, on behalf of such company and limited partnership.



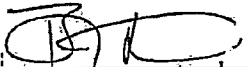
[SEAL]

[Signature]
Notary Public, State of Texas
My Commission Expires: _____

CONSENT:

The municipal utility district below is signing this Assignment solely for the purposes of consenting to this Assignment to the extent such consent may be required under the terms of the Lease.

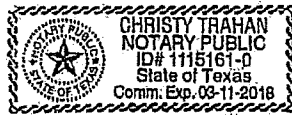
Travis County Municipal Utility District No. 12, a political subdivision of the State of Texas


By: 
Print Name: Brent A. Heath
Print Title: President

STATE OF TEXAS

COUNTY OF Travis

The foregoing instrument was acknowledged before me on the 1st day of November, 2017, by Brent Heath, President of Travis County Municipal Utility District No. 12, a political subdivision of the State of Texas, on behalf of such municipal utility district.




Notary Public, State of Texas
My Commission Expires: _____

[SEAL]

EXHIBIT A

Property

TRACT 2: Being all of that certain tract of land containing 363.376 acres of land, more or less, situated in the C.E.P.I. & M. Co. SURVEY NO. 46, ABSTRACT NO. 2098, and the RUSK TRANSPORTATION SURVEY NO. 85, ABSTRACT NO. 2123, in Travis County, Texas, being out of and a portion of the the remainder of a 1023.257 acre tract of land conveyed to Las Ventanas Land Partners, LTD. in Document No. 2004230439 of the Official Public Records of Travis County, Texas, said 363.376 acres being more particularly described by metes and bounds description shown in EXHIBIT "B" attached hereto and incorporated herein by reference.

TRACT 3: Being all of that certain tract of land containing 18.491 acres of land, more or less, situated in the C.E.P.I. & M. Co. SURVEY NO. 47, ABSTRACT NO. 2097, and the RUSK TRANSPORTATION SURVEY NO. 85, ABSTRACT NO. 2123, in Travis County, Texas, being out of and a portion of the the remainder of a 1023.257 acre tract of land conveyed to Las Ventanas Land Partners, LTD. in Document No. 2004230439 of the Official Public Records of Travis County, Texas, said 18.491 acres being more particularly described by metes and bounds description shown in EXHIBIT "C" attached hereto and incorporated herein by reference.

TRACT 4: Being all of that certain tract of land containing 9.578 acres of land, more or less, situated in the C.E.P.I. & M. Co. SURVEY NO. 47, ABSTRACT NO. 2097, in Travis County, Texas, being out of and a portion of the the remainder of a 1023.257 acre tract of land conveyed to Las Ventanas Land Partners, LTD. in Document No. 2004230439 of the Official Public Records of Travis County, Texas, said 9.578 acres being more particularly described by metes and bounds description shown in EXHIBIT "D" attached hereto and incorporated herein by reference.

TRACT 18: Lot 1, Block A and Lot 1, Block B; LAKEWAY HIGHLANDS COMMERCIAL 1, according to the map or plat thereof, recorded in Document No. 200900109, Official Public Records, Travis County, Texas.

Exhibit "B"

363.376 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 2098
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX

FIELD NOTES TRACT # 2

BEING ALL OF THAT CERTAIN TRACT OR PARCEL OF LAND OUT OF AND A PART OF THE C.E.P.I. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 2098 AND THE RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123, SITUATED IN TRAVIS COUNTY, TEXAS, BEING MORE PARTICULARLY DESCRIBED AS BEING OUT OF AND PART OF THE REMAINDER OF A 1023.257 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2004230439 OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, SAID 363.376 ACRE TRACT OF LAND BEING MORE FULLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING, at a ½" capped iron rod found for the northeast corner of a called 1.0 acre tract of land, conveyed to Rough Hollow Development Ltd. Etal. in Document No. 2016090450, Official Public Records of Travis County, Texas, same being in the south line of Lot 1, Block A, of Lakeway Highlands Village, a subdivision recorded in Document No. 201100126, Official Public Records of Travis County, Texas, (O.P.R.T.C.TX.), also being in the north line of a 100 foot LCRA electric transmission line easement, recorded Volume 579, Page 592, Deed Records of Travis County, Texas, for a western corner and POINT OF BEGINNING of the herein described tract,

THENCE, with the common boundary line of said Lakeway Highlands Village and said LCRA easement, N87°55'42"E, a distance of 204.13 feet to a capped ½" iron rod found, at the northwest corner of a called 0.138 acre tract of land conveyed to Commercial Lakeway Limited Partnership etal. in Document Number 2014150091, Official Public Records of Travis County, Texas,

THENCE, with the common line of said 0.138 acre tract, the following three (3) courses and distances, numbered 1 through 3,

- 1) S02°04'18"E, crossing said 100 feet LCRA easement, a distance of 100.00 feet, to a ½" iron rod found, at the southwest corner of said 0.138 acre tract, same being in the south line of said LCRA easement,
- 2) N87°55'42"E, with the south line of said LCRA easement, a distance of 60.00 feet to a ½" iron rod found, at the southeast corner of said 0.138 acre tract, and
- 3) N02°04'18"W, crossing said LCRA easement, a distance of 100.00 feet to a ½" iron rod found, at the northeast corner of said 0.138 acre tract, same being in the north line of said LCRA easement, also being in the south line of said Lot 1,

THENCE, with the common boundary line of said Lakeway Highlands Village and said LCRA easement, N87°55'42"E, a distance of 78.02 feet to a capped ½" iron rod found, at the southeast corner of said Lot 1,

THENCE, leaving said LCRA easement and with common line of said Lakeway Highlands Village and said remainder of 1023.257 acre tract, the following two (2) courses and distances, numbered 1 and 2,

1. N34°38'03"E, a distance of 198.59 feet to a capped ½" iron rod found, and
2. N12°25'17"E, a distance of 323.56 feet to a capped ½" iron rod found at the westernmost corner of Lakeway Highlands Greenbelt Lot, a subdivision recorded in Document No. 201100038, O.P.R.T.C.TX.,

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said Lakeway Highlands Greenbelt Lot, the following six (6) courses and distances, numbered 1 through 6,

1. S46°06'18"E, a distance of 136.01 feet to a ½" capped iron rod found,
2. N07°47'30"E, a distance of 119.94 feet to a ½" capped iron rod found,
3. N75°10'08"E, a distance of 436.06 feet to a ½" capped iron rod found,
4. N14°19'32"E, a distance of 198.14 feet to a ½" capped iron rod found,
5. N56°49'00"E, a distance of 552.72 feet to a ½" capped iron rod found, and

Exhibit "B"

363.376 ACRES
C.E.P.L. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 2098
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX

6. N03°20'22"E, a distance of 366.38 feet to a mag nail found for a northern corner of said remainder of 1023.257 acre tract, common to an eastern corner of said Lakeway Highlands Greenbelt Lot, and also being the southwestern corner of Lot 27, Block A, of Rough Hollow Section 1, a subdivision recorded in Document No. 200600276, O.P.R.T.C.TX.,

THENCE, with the common boundary line of said Rough Hollow Section 1 and said remainder of 1023.257 acre tract, S61°39'39"E, a distance of 599.68 feet to a 1/2" Iron rod found for the southeastern corner of said Rough Hollow Section 1, common to the northeastern corner of said remainder of 1023.257 acre tract, same being in a western line of a 38.774 acre tract of land conveyed to City of Lakeway in Document No. 2002162268, O.P.R.T.C.TX., for the northeastern corner of the herein described tract,

THENCE, with the common boundary line of said City of Lakeway tract and said remainder of 1023.257 acre tract, S28°04'07"W, a distance of 106.81 feet to a 1/2" Iron rod found at a southwestern corner of said City of Lakeway tract, common to the northwestern corner of a 19.477 acre tract of land conveyed to the City of Lakeway in Document No. 2002073174, O.P.R.T.C.TX.,

THENCE, with the common boundary line of said City of Lakeway 19.477 acre tract, said 38.774 acre tract, and said remainder of 1023.257 acre tract, S28°10'54"W, a distance of 1246.40 feet to a 1/2" Iron rod found at a southwestern corner of said City of Lakeway 38.774 acre tract,

THENCE, with the common boundary line of said City of Lakeway 38.774 acre tract and said remainder of 1023.257 acre tract, N89°26'15"E, a distance of 5.94 feet to a 1/2" Iron rod found at a southern corner of said 38.774 acre City of Lakeway tract, common to the northwestern corner of a 21.477 acre tract of land conveyed to Ron White in Volume 12797, Page 1822, Real Property Records of Travis County, Texas,

THENCE, with the common boundary line of said Ron White tract and said remainder of 1023.257 acre tract, the following three (3) courses and distances, numbered 1 through 3,

1. S28°34'53"W, a distance of 760.21 feet to a capped 1/2" Iron rod found,
2. S28°10'19"W, a distance of 239.20 feet to a 1/2" Iron pipe found, and
3. S21°05'10"W, a distance of 954.56 feet to a capped 1/2" Iron rod found, for the southwestern corner of a 22.048 acre tract of land conveyed to Frank Brown and Nancy B. Word in Document No. 2007209245, (O.P.R.T.C.TX.), common to a northern corner of a 24.61 acre tract of land conveyed to John Hickman Baker in Document No. 2010020988, O.P.R.T.C.TX.,

THENCE, with the common boundary line of said 24.61 acre tract and said remainder of 1023.257 acre tract the following two (2) courses and distances, numbered 1 and 2;

- 1) N75°43'03"W, a distance of 1.88 feet to a capped 1/2" Iron rod found, for the northwestern corner of said 24.61 acre tract, and
- 2) S21°10'17"W, a distance of 1286.40 feet to a capped 1/2" iron rod found, for the southwestern corner of said 24.61 acre tract, common to the northwestern corner of a 20.00 acre tract of land conveyed to Jay and Terry Wilemon in Volume 13211, Page 1777, Real Property Records of Travis County, Texas,

THENCE, with the common boundary line of said 20.00 acre tract and said remainder of 1023.257 acre tract, S21°16'09"W, a distance of 625.92 feet to a 1/2" Iron pipe found, for the southwestern corner of said 20.00 acre tract, common to the northwestern corner of a 23.262 acre tract of land conveyed to Norman and Suzanne Myers in Volume 11715, Page 82, Real Property Records of Travis County, Texas;

Exhibit "B"

363.376 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 2098
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX

THENCE, with the common boundary line of said 23.262 acre tract, said remainder of 1023.257 acre tract, and a called 28.222 acre tract of land conveyed to Norman & Suzanne Myers in Volume 11095, Page 2310, Real Property Records of Travis County, Texas, the following two (2) courses and distances, numbered 1 and 2,

1. S23°49'43"W, a distance of 342.55 feet to a capped 1/2" iron rod found, and
2. S25°12'52"W, a distance of 1628.19 feet to a capped 1/2" iron rod found, in a western line of a 273.397 acre tract of land conveyed to Serene Hills Ltd, in Document No. 2007079264, O.P.R.T.C.TX., common to an eastern corner of said remainder of 1023.257 acre tract,

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said 273.397 acre tract, the following three (3) courses and distances, numbered 1 through 3;

1. S28°04'42"W, a distance of 1290.99 feet to a cotton spindle found,
2. N61°56'08"W, a distance of 2159.25 feet to a 1/2" iron pipe found, and
3. N73°57'32"W, a distance of 863.16 feet to a capped 1/2" iron rod found, in the southern line of said remainder of 1023.257 acre tract, common to the eastern right-of-way line of Bee Creek Road (R.O.W. Varles), as dedicated by Highlands Boulevard plat in Document No. 200900056, O.P.R.T.C.TX.,

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said right-of-way line of Bee Creek Road, the following thirteen (13) courses and distances, numbered 1 through 13,

1. N17°53'39"W, a distance of 345.71 feet to a 1/2" iron rod found,
2. N03°21'44"E, a distance of 131.65 feet to a 1/2" iron rod found,
3. N25°42'25"E, a distance of 261.75 feet to a 1/2" iron rod found,
4. N41°23'02"E, a distance of 188.06 feet to a 1/2" iron rod found,
5. N42°25'31"W, a distance of 214.97 feet to a 1/2" iron rod found, at the beginning of a curve to the left,
6. Along said curve to the left, having a radius of 567.00 feet, an arc length of 112.21 feet, and a chord that bears, N20°50'52"W, a distance of 112.03 feet to a 1/2" iron rod found,
7. N26°31'06"W, a distance of 159.67 feet to a 1/2" iron rod found, at the beginning of a curve to the left,
8. Along said curve to the left, having a radius of 567.00 feet, an arc length of 85.94 feet, and a chord that bears, N30°51'39"W, a distance of 85.86 feet to a 1/2" iron rod found,
9. N22°55'13"W, a distance of 150.35 feet to a 1/2" iron pipe found,
10. N72°37'58"W, a distance of 106.89 feet to a cotton gin spindle found,
11. N27°57'12"W, a distance of 31.25 feet to a 1/2" iron rod found,
12. N79°47'38"W, a distance of 59.58 feet to a 1/2" iron rod found, and
13. N79°48'09"W, a distance of 77.09 feet to a capped 1/2" iron rod set,

THENCE, leaving the right-of-way line of Bee Creek Road and crossing said 1023.257 acre tract, the following fifty-nine (59) courses and distance, numbered 1 through 59,

1. N28°17'26"W, a distance of 677.24 feet to a capped 1/2" iron rod set,
2. N12°27'53"E, a distance of 465.64 feet to a capped 1/2" iron rod set,
3. N75°52'07"E, a distance of 365.39 feet to capped 1/2" iron rod set,
4. S05°59'48"E, a distance of 20.83 feet to a capped 1/2" iron rod set,
5. S10°32'43"E, a distance of 144.32 feet to a capped 1/2" iron rod set,
6. S17°43'19"E, a distance of 166.51 feet to a capped 1/2" iron rod set,
7. S85°50'09"E, a distance of 386.91 feet to a capped 1/2" iron rod set,
8. S60°21'08"E, a distance of 117.33 feet to capped 1/2" iron rod set at the beginning of a curve to the left,
9. Along said curve to the left, having a radius of 350.00 feet, an arc length of 223.00 feet, and a chord that bears S78°36'18"E, a distance of 219.25 feet to a capped 1/2" iron rod set,
10. N83°08'32"E, a distance of 57.83 feet to a capped 1/2" iron rod set at the beginning of a curve to the left,

Exhibit "B"

363.376 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 2098
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX

11. Along said curve to the left, having a radius of 254.50 feet, an arc length of 185.91 feet, and a chord that bears N62°12'54"E, a distance of 181.80 feet to a capped ½" iron rod set,
12. S61°04'13"E, a distance of 274.91 feet to a capped ½" iron rod set,
13. S49°53'36"E, a distance of 480.97 feet to a capped ½" iron rod set,
14. S52°15'51"E, a distance of 68.26 feet to a capped ½" iron rod set,
15. S58°13'10"E, a distance of 103.15 feet to a capped ½" iron rod set,
16. S65°23'34"E, a distance of 103.29 feet to a capped ½" iron rod set,
17. S72°34'30"E, a distance of 103.41 feet to a capped ½" iron rod set,
18. S79°45'51"E, a distance of 103.50 feet to a capped ½" iron rod set,
19. S86°57'32"E, a distance of 103.56 feet to a capped ½" iron rod set,
20. N85°50'36"E, a distance of 103.59 feet to a capped ½" iron rod set,
21. N78°38'38"E, a distance of 103.60 feet to a capped ½" iron rod set,
22. N71°26'43"E, a distance of 103.57 feet to a capped ½" iron rod set,
23. N64°14'57"E, a distance of 103.52 feet to a capped ½" iron rod set,
24. N57°03'27"E, a distance of 103.44 feet to a capped ½" iron rod set,
25. N49°52'21"E, a distance of 103.34 feet to a capped ½" iron rod set,
26. N42°41'44"E, a distance of 103.21 feet to a capped ½" iron rod set,
27. N35°31'42"E, a distance of 103.06 feet to a capped ½" iron rod set,
28. N28°22'21"E, a distance of 102.88 feet to a capped ½" iron rod set,
29. N23°12'50"E, a distance of 102.92 feet to a capped ½" iron rod set,
30. N58°55'32"E, a distance of 110.51 feet to a capped ½" iron rod set,
31. S56°59'34"E, a distance of 155.98 feet to a capped ½" iron rod set,
32. N50°16'30"E, a distance of 59.04 feet to a capped ½" iron rod set,
33. N54°27'09"E, a distance of 60.66 feet to a capped ½" iron rod set,
34. N66°46'35"E, a distance of 55.57 feet to a capped ½" iron rod set,
35. N75°48'54"E, a distance of 94.00 feet to a capped ½" iron rod set,
36. N13°34'25"E, a distance of 219.50 feet to a capped ½" iron rod set,
37. N54°04'10"W, a distance of 198.48 feet to a capped ½" iron rod set,
38. N83°24'42"W, a distance of 20.12 feet to a capped ½" iron rod set,
39. N78°47'54"E, a distance of 38.10 feet to a capped ½" iron rod set,
40. S80°38'10"E, a distance of 68.93 feet to a capped ½" iron rod set,
41. N02°20'59"W, a distance of 160.79 feet to a capped ½" iron rod set,
42. N53°21'44"E, a distance of 127.77 feet to a capped ½" iron rod set,
43. N51°48'15"E, a distance of 121.69 feet to a capped ½" iron rod set,
44. N34°53'49"E, a distance of 140.00 feet to a capped ½" iron rod set,
45. N67°35'35"E, a distance of 142.73 feet to a capped ½" iron rod set,
46. N66°08'06"E, a distance of 89.78 feet to a capped ½" iron rod set,
47. N57°31'20"E, a distance of 100.77 feet to a capped ½" iron rod set,
48. N47°33'20"E, a distance of 100.77 feet to a capped ½" iron rod set,
49. N37°35'19"E, a distance of 100.77 feet to a capped ½" iron rod set,
50. N27°37'19"E, a distance of 100.77 feet to a capped ½" iron rod set,
51. N17°39'18"E, a distance of 100.77 feet to a capped ½" iron rod set,
52. N08°06'23"E, a distance of 95.65 feet to a capped ½" iron rod set,
53. N04°58'28"E, a distance of 313.12 feet to a capped ½" iron rod set,
54. N07°21'35"E, a distance of 81.06 feet to a capped ½" iron rod set,
55. N27°29'57"E, a distance of 130.49 feet to a capped ½" iron rod set,
56. N39°48'50"E, a distance of 265.58 feet to a capped ½" iron rod set,
57. N27°57'54"E, a distance of 120.60 feet to a capped ½" iron rod set,
58. N77°44'11"W, a distance of 112.15 feet to a capped ½" iron rod set, and
59. N00°16'29"E, a distance of 207.84 feet to a capped ½" iron rod set in the southeastern line of Lot 12, Block A, Lakeway Highlands, Phase 2, Section 1A, a subdivision recorded in Document No. 201300191, O.P.R.T.C.TX.,

THENCE, with the common boundary line of said Lakeway Highlands, Phase 2, Section 1A and said remainder of 1023.257 acre tract, the following five (5) courses and distances, numbered 1 through 5;

Exhibit "B"

363.376 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 2098
RUSK TRANSPORTATION SURVEY NUMBER B5, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX

1. N73°16'31"E, a distance of 24.56 feet to a ½" iron rod found,
2. N54°18'14"E, a distance of 79.00 feet to a ½" iron rod found,
3. N45°17'18"E, a distance of 120.36 feet to a ½" iron rod found,
4. N29°36'01"E, a distance of 111.78 feet to a ½" iron rod found, and
5. N04°14'26"W, a distance of 153.73 feet to a ½" iron rod found in the southern line of the aforesaid 100 foot LCRA easement,

THENCE S87°55'42"W, with the common boundary line of said Lakeway Highlands, Phase 2, Section 1A, said LCRA easement, and said remainder of 1023.257 acre tract, a distance of 58.17 feet to a capped ½" iron rod found,

THENCE, N02°04'18"W, crossing said LCRA easement, a distance of 100.00 feet to the POINT OF BEGINNING and containing 363.376 acres of land.

SAVE AND EXCEPT TRACT 1.00 ACRE
TRAVIS COUNTY MUD NO. 13
DIRECTOR LOT

COMMENCING, at a ½" capped iron rod found for an eastern corner of Lot 1, Block A, Lakeway Highlands Village, recorded in Document No. 201100126, Official Public Records of Travis County, Texas (O.P.R.T.C.TX.), also being a northern corner of Rough Hollow Irrigation Lot Plat, recorded in Document No. 200500233, (O.P.R.T.C.TX.), for the POINT OF COMMENCEMENT of the herein described tract,

THENCE, crossing said Rough Hollow Irrigation Lot plat, S55°18'51"E, a distance of 266.05 feet to a capped ½" iron rod set for the POINT OF BEGINNING of the herein described tract,

THENCE, continuing across said Rough Hollow Irrigation Lot plat, the following four (4) courses and distances, numbered 1 through 4,

1. N87°55'42"E, a distance of 436.00 feet to a capped ½" iron rod set,
2. S02°04'18"E, a distance of 100.00 feet to a capped ½" iron rod set,
3. S87°55'42"W, a distance of 436.00 feet to a capped ½" iron rod set, and
4. N02°04'18"W, a distance of 100.00 feet to the POINT OF BEGINNING and containing 1.00 acre of land.

364.376 ACRES
~~1.00 ACRE SAVE AND EXCEPT~~

363.376 ACRES

Surveyed by:


AARON V. THOMASON RPLS NO. 6214

Carlson, Brigrance and Doering, Inc.

5501 West William Cannon

Austin, TX 78749

Ph: 512-280-5160

Fax: 512-280-5165

azertson@cbdeng.com



BEARING BASIS: TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NAD83

J: AC2004LP\4486-096\SURVEY\FIELD NOTES\FN-TRACT # 2-363.376 ACRES

Exhibit "C"

18.491 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 47, ABSTRACT NUMBER 2097
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX

FIELD NOTES
TRACT # 3

BEING ALL OF THAT CERTAIN TRACT OR PARCEL OF LAND OUT OF AND A PART OF THE C.E.P.I. & M. CO. SURVEY NUMBER 47, ABSTRACT NUMBER 2097, AND THE RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123, SITUATED IN TRAVIS COUNTY, TEXAS, BEING MORE PARTICULARLY DESCRIBED AS BEING OUT OF AND PART OF THE REMAINDER OF A 1023.257 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2004230439 OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, SAID 18.491-ACRE TRACT OF LAND BEING MORE FULLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING, at a 1/2" iron rod found in the southeast right of way line of Highlands Boulevard (Variable Width R.O.W.), common interior corner of said remainder of 1023.257 acres, for the northwest corner and POINT OF BEGINNING of the herein described tract,

THENCE, with the right of way line of said Highlands Boulevard and the common line of said remainder of 1023.27 acre tract, the following
two (2) courses and distances, numbered 1 and 2;

- 1) N84°44'49"E, a distance of 62.27 feet to a 1/2" iron rod found, and
- 2) N39°25'16"E, a distance of 13.93 feet to a 1/2" capped iron rod set, at the beginning of a curve to the right,

THENCE, leaving said Highlands Boulevard, over and across said remainder of 1023.27 acre tract, the following ten (10)
courses and distances, numbered 1 through 10,

- 1) Along said curve to the right, having a radius of 160.00 feet, an arc length of 104.29 feet, and a chord that bears S27°06'41"E, a distance of 102.45 feet to a 1/2" capped iron rod set,
- 2) S08°26'19"E, a distance of 114.79 feet to a 1/2" capped iron rod set, at the beginning of a curve to the left,
- 3) Along said curve to the left, having a radius of 240.00 feet, an arc length of 164.31 feet, and a chord that bears S28°03'08"E, a distance of 161.12 feet to a 1/2" capped iron rod set,
- 4) S47°39'57"E, a distance of 242.41 feet to a 1/2" capped iron rod set, at the beginning of a curve to the right,
- 5) Along said curve to the right, having a radius of 575.00 feet, an arc length of 292.38 feet, and a chord that bears S33°05'55"E, a distance of 289.24 feet to a 1/2" capped iron rod set, for the easternmost corner of the herein described tract of land,
- 6) S76°08'19"W, a distance of 262.22 feet to a 1/2" capped iron rod set,
- 7) S05°59'48"E, a distance of 336.51 feet to a 1/2" capped iron rod set,
- 8) S75°52'07"W, a distance of 365.39 feet to a 1/2" capped iron rod set,
- 9) S12°27'53"W, a distance of 465.64 feet to a 1/2" capped iron rod set, and
- 10) S28°17'26"E, a distance of 677.24 feet to a 1/2" capped iron rod set, for the southernmost corner of the herein described tract of land, same being in the north right-of-way line of Bee Creek Road (Variable Width R.O.W.),

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said Bee Creek Road, the following twelve (12) courses and distances, numbered 1 through 12,

- 1) N79°48'09"W, a distance of 225.54 feet to a 1/2" iron rod found, at the beginning of a curve to the right,
- 2) Along said curve to the right, having a radius of 543.00 feet, an arc length of 871.60 feet, and a chord that bears N31°27'11"W, a distance of 781.00 feet to a 1/2" iron rod found,
- 3) N18°42'09"E, a distance of 34.76 feet to a 1/2" iron rod found,
- 4) N33°22'22"E, a distance of 80.55 feet to a 1/2" iron rod found,
- 5) S71°14'48"E, a distance of 81.24 feet to a 1/2" iron rod found,

Exhibit "C"

18.491 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 47, ABSTRACT NUMBER 2097
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX

- 6) N18°45'12"E, a distance of 571.20 feet to a ½" iron rod found,
7) N71°14'48"W, a distance of 79.89 feet to a ½" iron rod found,
8) N26°52'03"E, a distance of 70.77 feet to a ½" iron rod found,
9) N22°23'09"E, a distance of 229.04 feet to a ½" iron rod found, at the beginning of a curve to the left,
10) Along said curve to the left, having a radius of 880.62 feet, an arc length of 334.99 feet, and a chord that
bears N00°28'33"W, a distance of 332.97 feet to a ½" iron rod found,
11) N07°09'00"E, a distance of 142.89 feet to a ½" iron rod found, and
12) N18°57'09"E, a distance of 187.44 feet to the POINT OF BEGINNING and containing 18.491 acres of land.

Surveyed by:



25 Oct 2017

AARON V. THOMASON, RPLS 6214
Carlson, Brigance and Doering, Inc.
5501 West William Cannon
Austin, TX 78749
Ph: 512-280-5160 Fax: 512-280-5165
aaron@cbdenig.com



BEARING BASIS: TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NAD83

Exhibit "D"

9.578 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 47, ABSTRACT NUMBER 2097
TRAVIS COUNTY, TX

FIELD NOTES
TRACT # 4

BEING ALL OF THAT CERTAIN TRACT OR PARCEL OF LAND OUT OF AND PART OF THE C.E.P.I. & M. CO, SURVEY NUMBER 47, ABSTRACT NUMBER 2097, SITUATED IN TRAVIS COUNTY, TEXAS, BEING MORE PARTICULARLY DESCRIBED AS BEING OUT OF AND PART OF THE REMAINDER OF A 1023.257 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2004230439 OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, SAID 9.578 ACRE TRACT OF LAND BEING MORE FULLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING, at a $\frac{1}{4}$ " iron rod found in the southeast right-of-way line of Highlands Boulevard (Variable Width R.O.W.), same being at the west corner of Lot 62, Lakeway Highlands, Phase 2, Section 4, as recorded in Document Number 201500090, Official Public Record of Travis County, Texas, for the north corner and POINT OF BEGINNING of the herein described tract,

THENCE, leaving the right of way line of said Highlands Boulevard, with the common line of said remainder of 1023.27 acre tract and said Lakeway Highlands, Phase 2, Section 4, the following two (2) courses and distances, numbered 1 and 2;

- 1) S14°26'55"E, a distance of 153.63 feet to a $\frac{1}{2}$ " iron rod found, and
- 2) S63°45'17"E, a distance of 73.83 feet to a $\frac{1}{2}$ " capped iron rod set,

THENCE, over and across said remainder of 1023.27 acre tract, the following nine (9) courses and distances, numbered 1 through 9;

1. S41°39'32"E, a distance of 201.54 feet to a $\frac{1}{2}$ " capped iron rod set,
2. N89°55'23"E, a distance of 454.73 feet to a $\frac{1}{2}$ " capped iron rod set,
3. S43°05'03"E, a distance of 165.72 feet to a $\frac{1}{2}$ " capped iron rod set, at the east corner of the herein described tract of land,
4. S37°15'30"W, a distance of 736.88 feet to a $\frac{1}{2}$ " capped iron rod set, at the beginning of a curve to the left, for the south corner of the herein described tract of land,
5. Along said curve to the left, having a radius of 625.00 feet, an arc length of 299.83 feet, and a chord that bears N33°55'22"W, a distance of 296.96 feet to a $\frac{1}{2}$ " capped iron rod set,
6. N47°39'57"W, a distance of 242.41 feet to a $\frac{1}{2}$ " capped iron rod set at the beginning of a curve to the right,
7. Along said curve to the right, having a radius of 190.00 feet, an arc length of 130.08 feet, and a chord that bears N28°03'08"W, a distance of 127.56 feet to a $\frac{1}{2}$ " capped iron rod set,
8. N08°26'19"W, a distance of 114.79 feet to a $\frac{1}{2}$ " capped iron rod set at the beginning of a curve to the left, and
9. Along said curve to the left, having a radius of 210.00 feet, an arc length of 141.07 feet, and a chord that bears N27°40'59"W, a distance of 138.43 feet to a $\frac{1}{2}$ " capped iron rod set in the southeast line of aforesaid Highlands Boulevard,

Exhibit "D"

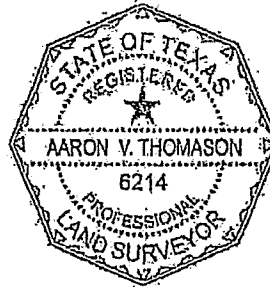
9.578 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 47, ABSTRACT NUMBER 2097
TRAVIS COUNTY, TX

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said Highlands Boulevard, the following three (3) courses and distances, numbered 1 through 3,

1. N39°25'15"E, a distance of 1.72 feet to a ½" iron rod found,
2. N12°03'58"W, a distance of 67.47 feet to a ½" iron rod found, and
3. N33°03'05"E, a distance of 254.40 feet to the POINT OF BEGINNING and containing 9.578 acres of land.

Surveyed by: Aaron V. Thomason 25 OCT 2017

AARON V. THOMASON
Carlson, Brigrance and Doering, Inc.
5501 West William Cannon
Austin, TX 78749
Ph: 512-280-5160 Fax: 512-280-5165
aaron@cbdeng.com



BEARING BASIS: TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NAD83

EXHIBIT B

Lease

Lease Agreement dated May 22, 2013, between Las Ventanas Land Partners, Ltd., a Texas limited partnership ("Lessor") and Travis County Municipal Utility District No. 12, a political subdivision of the State of Texas ("Lessee"), as evidenced by Memorandum of Lease between Lessor and Lessee dated January 26, 2016 and recorded as Document No. 2016012680 in the Official Public Records of Travis County, Texas; as amended in Amendment No. 1 to Lease Agreement dated February 5, 2016 between Lessor and Lessee, as evidenced by Amendment No. 1 to Memorandum of Lease between Lessor and Lessee dated February 5, 2016 and recorded as Document No. 2016029441 in the Official Public Records of Travis County, Texas.

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{W0757569.1}

5



FILED AND RECORDED
OFFICIAL PUBLIC RECORDS

[Signature]

DANA DEBEAUVOIR, COUNTY CLERK
TRAVIS COUNTY, TEXAS

November 13, 2017 08:28 AM

FEE: \$ 82.00 2017179700

NOTE: the Transferor, Travis County Municipal Utility District No. 12, anticipates assigning the underlying Lease Agreement to Lakeway Municipal Utility District, the Transferee, contemporaneously with the actual transfer of the permit. Attached is a form of assignment to be used, which includes a provision for the consent of RH Lakeway Holdings, Ltd., the Landowner.

After Recording Return To:
RH Lakeway Holdings, Ltd.
2101 Lakeway Blvd., Suite 100
Austin, Texas 78734

ASSIGNMENT AND ASSUMPTION AGREEMENT –LEASE AGREEMENT

State of Texas

Know all persons by these presents.

County of Travis

THIS ASSIGNMENT AND ASSUMPTION – LEASE AGREEMENT ("Assignment"), is signed to be effective as of _____, 2024 ("Effective Date"), by and between Travis County Municipal Utility District No. 12, a municipal utility district created pursuant to Article XVI, Section 59 of the Texas Constitution ("Assignor") and Lakeway Municipal Utility District, a municipal utility district created pursuant to Article XVI, Section 59 of the Texas Constitution ("Assignee").

WITNESSETH:

WHEREAS, Assignor has submitted an Application to Transfer a Wastewater Permit or CAFO Permit to the Texas Commission on Environmental Quality to transfer wastewater discharge permit WQ0014534001 (the "Discharge Permit") to Assignee;

WHEREAS, certain property relating to the Discharge Permit, as more particularly described in Exhibit A, attached to and made a part of this Assignment ("Property") has been leased to the Assignee for purposes relating to the Discharge Permit.

In connection with the transfer of the Discharge Permit, Assignor desires to assign, grant and convey to Assignee, and Assignee desires to accept from Assignor, Assignor's right, title and interest in and to the agreement (the "Lease") listed on Exhibit B attached to and made a part of this Assignment;

NOW, THEREFORE, in consideration of TEN AND NO/100 DOLLARS (\$10.00) in hand paid to Assignor, the mutual covenants contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor and Assignee agree as follows:

Assignor does hereby ASSIGN, GRANT and CONVEY to Assignee all of Assignor's right, title and interest in and to the Lease.

Assignee does hereby assume all of Assignor's right, title, interest, duties, obligations, liabilities, powers and privileges in, to and under the Lease.

Assignor covenants and agrees to warrant and defend the assignment, grant and conveyance, of the Contracts hereby made against all persons whomsoever, to take all steps reasonably necessary to establish the record of Assignee's title to the Lease and, at the request of Assignee, to execute and deliver further instruments of transfer and assignment and take such other action as Assignee may reasonably request to more effectively transfer and assign to and vest in Assignee each of the Lease, all at Assignor's sole cost and expense.

This Assignment shall inure to the benefit of and be binding upon the successors and assigns of Assignor and Assignee. This Assignment shall be construed under and enforced in accordance with the laws of the State of Texas. This Assignment may be executed in multiple counterparts, each of which shall be deemed an original, and all of which shall constitute one and the same instrument.

[SIGNATURES BEGIN ON NEXT PAGE]

EXECUTED to be effective as of the Effective Date.

ASSIGNOR:

Travis County Municipal Utility District No. 12

By: _____
_____, _____

STATE OF TEXAS

§
§
§

COUNTY OF _____

The foregoing instrument was acknowledges before me on the ____ day of _____, 2024, by
_____, _____ of Travis County Municipal Utility
District No. 12, on behalf of the District.

Notary Public, State of Texas
My Commission Expires: _____

[SEAL]

ASSIGNEE:

Lakeway Municipal Utility District

By: _____
_____, _____

STATE OF TEXAS

§
§
§

COUNTY OF _____

The foregoing instrument was acknowledges before me on the ____ day of _____, 2024, by
_____, _____ of Lakeway Municipal Utility
District, on behalf of the District.

Notary Public, State of Texas
My Commission Expires: _____

[SEAL]

CONSENT:

RH Lakeway Holdings, Ltd. is executing this Assignment solely for the purposes of consenting to this Assignment to the extent such consent may be required under the terms of the Lease.

RH Lakeway Holdings, Ltd:

By: RH Lakeway Holdings, GP, LLC,
a Texas limited liability company, its
general partner

By: _____
Print Name: _____
Print Title: _____

STATE OF TEXAS

COUNTY OF _____

§
§
§

The foregoing instrument was acknowledged before me on the ____ day of _____, 2024, by _____, _____ of Travis County Municipal Utility District No. 12, a political subdivision of the State of Texas, on behalf of such municipal utility district.

Notary Public, State of Texas
My Commission Expires: _____

[SEAL]

EXHIBIT A

Property

TRACT 2: Being all of that certain tract of land containing 363.376 acres of land, more or less, situated in the C.E.P.I. & M. Co. SURVEY NO. 46, ABSTRACT NO. 2098, and the RUSK TRANSPORTATION SURVEY NO. 85, ABSTRACT NO. 2123, in Travis County, Texas, being out of and a portion of the the remainder of a 1023.257 acre tract of land conveyed to Las Ventanas Land Partners, LTD. in Document No. 2004230439 of the Official Public Records of Travis County, Texas, said 363.376 acres being more particularly described by metes and bounds description shown in EXHIBIT "B" attached hereto and incorporated herein by reference.

TRACT 3: Being all of that certain tract of land containing 18.491 acres of land, more or less, situated in the C.E.P.I. & M. Co. SURVEY NO. 47, ABSTRACT NO. 2097, and the RUSK TRANSPORTATION SURVEY NO. 85, ABSTRACT NO. 2123, in Travis County, Texas, being out of and a portion of the the remainder of a 1023.257 acre tract of land conveyed to Las Ventanas Land Partners, LTD. in Document No. 2004230439 of the Official Public Records of Travis County, Texas, said 18.491 acres being more particularly described by metes and bounds description shown in EXHIBIT "C" attached hereto and incorporated herein by reference.

TRACT 4: Being all of that certain tract of land containing 9.578 acres of land, more or less, situated in the C.E.P.I. & M. Co. SURVEY NO. 47, ABSTRACT NO. 2097, in Travis County, Texas, being out of and a portion of the the remainder of a 1023.257 acre tract of land conveyed to Las Ventanas Land Partners, LTD. in Document No. 2004230439 of the Official Public Records of Travis County, Texas, said 9.578 acres being more particularly described by metes and bounds description shown in EXHIBIT "D" attached hereto and incorporated herein by reference.

TRACT 18: Lot 1, Block A and Lot 1, Block B; LAKEWAY HIGHLANDS COMMERCIAL 1, according to the map or plat thereof, recorded in Document No. 200900109, Official Public Records, Travis County, Texas.



Exhibit "B"

363.376 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 2098
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX

FIELD NOTES
TRACT # 2

BEING ALL OF THAT CERTAIN TRACT OR PARCEL OF LAND OUT OF AND A PART OF THE C.E.P.I. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 2098 AND THE RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123, SITUATED IN TRAVIS COUNTY, TEXAS, BEING MORE PARTICULARLY DESCRIBED AS BEING OUT OF AND PART OF THE REMAINDER OF A 1023.257 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2004230439 OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, SAID 363.376 ACRE TRACT OF LAND BEING MORE FULLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING, at a ½" capped iron rod found for the northeast corner of a called 1.0 acre tract of land, conveyed to Rough Hollow Development Ltd. Etal. in Document No. 2016090450, Official Public Records of Travis County, Texas, same being in the south line of Lot 1, Block A, of Lakeway Highlands Village, a subdivision recorded in Document No. 201100126, Official Public Records of Travis County, Texas, (O.P.R.T.C.TX.), also being in the north line of a 100 foot LCRA electric transmission line easement, recorded Volume 579, Page 592, Deed Records of Travis County, Texas, for a western corner and POINT OF BEGINNING of the herein described tract,

THENCE, with the common boundary line of said Lakeway Highlands Village and said LCRA easement, N87°55'42"E, a distance of 204.13 feet to a capped ½" iron rod found, at the northwest corner of a called 0.138 acre tract of land conveyed to Commercial Lakeway Limited Partnership etal. in Document Number 2014150091, Official Public Records of Travis County, Texas,

THENCE, with the common line of said 0.138 acre tract, the following three (3) courses and distances, numbered 1 through 3,

- 1) S02°04'18"E, crossing said 100 feet LCRA easement, a distance of 100.00 feet, to a ½" iron rod found, at the southwest corner of said 0.138 acre tract, same being in the south line of said LCRA easement,
- 2) N87°55'42"E, with the south line of said LCRA easement, a distance of 60.00 feet to a ½" iron rod found, at the southeast corner of said 0.138 acre tract, and
- 3) N02°04'18"W, crossing said LCRA easement, a distance of 100.00 feet to a ½" iron rod found, at the northeast corner of said 0.138 acre tract, same being in the north line of said LCRA easement, also being in the south line of said Lot 1,

THENCE, with the common boundary line of said Lakeway Highlands Village and said LCRA easement, N87°55'42"E, a distance of 78.02 feet to a capped ½" iron rod found, at the southeast corner of said Lot 1,

THENCE, leaving said LCRA easement and with common line of said Lakeway Highlands Village and said remainder of 1023.257 acre tract, the following two (2) courses and distances, numbered 1 and 2,

1. N34°38'03"E, a distance of 198.59 feet to a capped ½" iron rod found, and
2. N12°25'17"E, a distance of 323.56 feet to a capped ½" iron rod found at the westernmost corner of Lakeway Highlands Greenbelt Lot, a subdivision recorded in Document No. 201100038, O.P.R.T.C.TX.,

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said Lakeway Highlands Greenbelt Lot, the following six (6) courses and distances, numbered 1 through 6,

1. S46°06'18"E, a distance of 136.01 feet to a ½" capped iron rod found,
2. N07°47'30"E, a distance of 119.94 feet to a ½" capped iron rod found,
3. N75°10'08"E, a distance of 436.06 feet to a ½" capped iron rod found,
4. N14°19'32"E, a distance of 198.14 feet to a ½" capped iron rod found,
5. N56°49'00"E, a distance of 552.72 feet to a ¾" capped iron rod found, and

J:\AC2004LP\4486-096\SURVEY\FIELD NOTES\FN-TRACT # 2 - 363.376 ACRES

Exhibit " B "

363.376 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 2098
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX

6. N03°20'22"E, a distance of 366.38 feet to a mag nail found for a northern corner of said remainder of 1023.257 acre tract, common to an eastern corner of said Lakeway Highlands Greenbelt Lot, and also being the southwestern corner of Lot 27, Block A, of Rough Hollow Section 1, a subdivision, recorded in Document No. 200600276, O.P.R.T.C.TX.,

THENCE, with the common boundary line of said Rough Hollow Section 1 and said remainder of 1023.257 acre tract, S61°39'39"E, a distance of 599.68 feet to a ½" iron rod found for the southeastern corner of said Rough Hollow Section 1, common to the northeastern corner of said remainder of 1023.257 acre tract, same being in a western line of a 38.774 acre tract of land conveyed to City of Lakeway in Document No. 2002162268, O.P.R.T.C.TX., for the northeastern corner of the herein described tract,

THENCE, with the common boundary line of said City of Lakeway tract and said remainder of 1023.257 acre tract, S28°04'07"W, a distance of 106.81 feet to a ½" iron rod found at a southwestern corner of said City of Lakeway tract, common to the northwestern corner of a 19.477 acre tract of land conveyed to the City of Lakeway in Document No. 2002073174, O.P.R.T.C.TX.,

THENCE, with the common boundary line of said City of Lakeway 19.477 acre tract, said 38.774 acre tract, and said remainder of 1023.257 acre tract, S28°10'54"W, a distance of 1246.40 feet to a ½" iron rod found at a southwestern corner of said City of Lakeway 38.774 acre tract,

THENCE, with the common boundary line of said City of Lakeway 38.774 acre tract and said remainder of 1023.257 acre tract, N89°26'15"E, a distance of 5.94 feet to a ½" iron rod found at a southern corner of said 38.774 acre City of Lakeway tract, common to the northwestern corner of a 21.477 acre tract of land conveyed to Ron White in Volume 12797, Page 1822, Real Property Records of Travis County, Texas,

THENCE, with the common boundary line of said Ron White tract and said remainder of 1023.257 acre tract, the following three (3) courses and distances, numbered 1 through 3,

1. S28°34'53"W, a distance of 760.21 feet to a capped ½" iron rod found,
2. S28°10'19"W, a distance of 239.20 feet to a ½" iron pipe found, and
3. S21°05'10"W, a distance of 954.56 feet to a capped ½" iron rod found, for the southwestern corner of a 22.048 acre tract of land conveyed to Frank Brown and Nancy B. Word in Document No. 2007209245, (O.P.R.T.C.TX.), common to a northern corner of a 24.61 acre tract of land conveyed to John Hickman Baker in Document No. 2010020988, O.P.R.T.C.TX.,

THENCE, with the common boundary line of said 24.61 acre tract and said remainder of 1023.257 acre tract the following two (2) courses and distances, numbered 1 and 2;

- 1) N75°43'03"W, a distance of 1.88 feet to a capped ½" iron rod found, for the northwestern corner of said 24.61 acre tract, and
- 2) S21°10'17"W, a distance of 1286.40 feet to a capped ½" iron rod found, for the southwestern corner of said 24.61 acre tract, common to the northwestern corner of a 20.00 acre tract of land conveyed to Jay and Terry Wilmon in Volume 13211, Page 1777, Real Property Records of Travis County, Texas,

THENCE, with the common boundary line of said 20.00 acre tract and said remainder of 1023.257 acre tract, S21°16'09"W, a distance of 625.92 feet to a ½" iron pipe found, for the southwestern corner of said 20.00 acre tract, common to the northwestern corner of a 23.262 acre tract of land conveyed to Norman and Suzanne Myers in Volume 11715, Page 82, Real Property Records of Travis County, Texas;

J:\AC2004LP\4486-095\SURVEY\FIELD NOTES\FN-TRACT # 2--363.376 ACRES

Exhibit "B"

363.376 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 2098
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX

THENCE, with the common boundary line of said 23.262 acre tract, said remainder of 1023.257 acre tract, and a called 28.222 acre tract of land conveyed to Norman & Suzanne Myers in Volume 11095, Page 2310, Real Property Records of Travis County, Texas, the following two (2) courses and distances, numbered 1 and 2,

1. S23°49'43"W, a distance of 342.55 feet to a capped ½" iron rod found, and
2. S25°12'52"W, a distance of 1628.19 feet to a capped ½" iron rod found, in a western line of a 273.397 acre tract of land conveyed to Serene Hills Ltd, in Document No. 2007079264, O.P.R.T.C.TX., common to an eastern corner of said remainder of 1023.257 acre tract,

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said 273.397 acre tract, the following three (3) courses and distances, numbered 1 through 3;

1. S28°04'42"W, a distance of 1290.99 feet to a cotton spindle found,
2. N61°56'08"W, a distance of 2159.25 feet to a ½" iron pipe found, and
3. N73°57'32"W, a distance of 863.16 feet to a capped ½" iron rod found, in the southern line of said remainder of 1023.257 acre tract, common to the eastern right-of-way line of Bee Creek Road (R.O.W. Varles), as dedicated by Highlands Boulevard plat in Document No. 200900056, O.P.R.T.C.TX.,

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said right-of-way line of Bee Creek Road, the following thirteen (13) courses and distances, numbered 1 through 13;

1. N17°53'39"W, a distance of 345.71 feet to a ½" iron rod found,
2. N03°21'44"E, a distance of 131.65 feet to a ½" iron rod found,
3. N25°42'25"E, a distance of 261.75 feet to a ½" iron rod found
4. N41°23'02"E, a distance of 188.05 feet to a ½" iron rod found,
5. N42°25'31"W, a distance of 214.97 feet to a ½" iron rod found, at the beginning of a curve to the left,
6. Along said curve to the left, having a radius of 567.00 feet, an arc length of 112.21 feet, and a chord that bears, N20°50'52"W, a distance of 112.03 feet to a ½" iron rod found,
7. N26°31'06"W, a distance of 159.67 feet to a 1/2" iron rod found, at the beginning of a curve to the left,
8. Along said curve to the left, having a radius of 567.00 feet, an arc length of 85.94 feet, and a chord that bears, N30°51'39"W, a distance of 85.86 feet to a ½" iron rod found,
9. N22°55'13"W, a distance of 150.35 feet to a ½" iron pipe found,
10. N72°37'58"W, a distance of 105.89 feet to a cotton gin spindle found,
11. N27°57'12"W, a distance of 31.25 feet to a ½" iron rod found,
12. N79°47'38"W, a distance of 59.58 feet to a ½" iron rod found, and
13. N79°48'09"W, a distance of 77.09 feet to a capped ½" iron rod set,

THENCE, leaving the right-of-way line of Bee Creek Road and crossing said 1023.257 acre tract, the following fifty-nine (59) courses and distance, numbered 1 through 59,

1. N28°17'26"W, a distance of 677.24 feet to a capped ½" iron rod set,
2. N12°27'53"E, a distance of 465.64 feet to a capped ½" iron rod set,
3. N75°52'07"E, a distance of 365.39 feet to capped ½" iron rod set,
4. S05°59'48"E, a distance of 20.83 feet to a capped ½" iron rod set,
5. S10°32'43"E, a distance of 144.32 feet to a capped ½" iron rod set,
6. S17°43'19"E, a distance of 166.51 feet to a capped ½" iron rod set,
7. S85°50'09"E, a distance of 386.91 feet to a capped ½" iron rod set,
8. S60°21'08"E, a distance of 117.33 feet to capped ½" iron rod set at the beginning of a curve to the left,
9. Along said curve to the left, having a radius of 350.00 feet, an arc length of 223.00 feet, and a chord that bears S78°36'18"E, a distance of 219.25 feet to a capped ½" iron rod set,
10. N83°08'32"E, a distance of 57.83 feet to a capped ½" iron rod set at the beginning of a curve to the left,

J: AC2004LP\4486-096\SURVEY\FIELD NOTES\FN-TRACT # 2--363.376 ACRES

Exhibit "B"

363.376 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 2098
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX

11. Along said curve to the left, having a radius of 254.50 feet, an arc length of 185.91 feet, and a chord that bears N62°12'54"E, a distance of 181.80 feet to a capped ½" iron rod set,
12. S61°04'13"E, a distance of 274.91 feet to a capped ½" iron rod set,
13. S49°53'36"E, a distance of 480.97 feet to a capped ½" iron rod set,
14. S52°15'51"E, a distance of 68.26 feet to a capped ½" iron rod set,
15. S58°13'10"E, a distance of 103.15 feet to a capped ½" iron rod set,
16. S65°23'34"E, a distance of 103.29 feet to a capped ½" iron rod set,
17. S72°34'30"E, a distance of 103.41 feet to a capped ½" iron rod set,
18. S79°45'51"E, a distance of 103.50 feet to a capped ½" iron rod set,
19. S86°57'32"E, a distance of 103.56 feet to a capped ½" iron rod set,
20. N85°50'36"E, a distance of 103.59 feet to a capped ½" iron rod set,
21. N78°38'38"E, a distance of 103.60 feet to a capped ½" iron rod set,
22. N71°26'43"E, a distance of 103.57 feet to a capped ½" iron rod set,
23. N64°14'57"E, a distance of 103.52 feet to a capped ½" iron rod set,
24. N57°03'27"E, a distance of 103.44 feet to a capped ½" iron rod set,
25. N49°52'21"E, a distance of 103.34 feet to a capped ½" iron rod set,
26. N42°41'44"E, a distance of 103.21 feet to a capped ½" iron rod set,
27. N35°31'42"E, a distance of 103.06 feet to a capped ½" iron rod set,
28. N28°22'21"E, a distance of 102.88 feet to a capped ½" iron rod set,
29. N23°12'50"E, a distance of 102.92 feet to a capped ½" iron rod set,
30. N58°55'32"E, a distance of 110.51 feet to a capped ½" iron rod set,
31. S56°59'34"E, a distance of 155.98 feet to a capped ½" iron rod set,
32. N50°16'30"E, a distance of 59.04 feet to a capped ½" iron rod set,
33. N54°27'09"E, a distance of 60.66 feet to a capped ½" iron rod set,
34. N66°46'35"E, a distance of 55.57 feet to a capped ½" iron rod set,
35. N75°48'54"E, a distance of 94.00 feet to a capped ½" iron rod set,
36. N13°34'25"E, a distance of 219.50 feet to a capped ½" iron rod set,
37. N54°04'10"W, a distance of 198.48 feet to a capped ½" iron rod set,
38. N83°24'42"W, a distance of 20.12 feet to a capped ½" iron rod set,
39. N78°47'54"E, a distance of 38.10 feet to a capped ½" iron rod set,
40. S80°38'10"E, a distance of 68.93 feet to a capped ½" iron rod set,
41. N02°20'59"W, a distance of 160.79 feet to a capped ½" iron rod set,
42. N53°21'44"E, a distance of 127.77 feet to a capped ½" iron rod set,
43. N51°48'15"E, a distance of 121.69 feet to a capped ½" iron rod set,
44. N34°53'49"E, a distance of 140.00 feet to a capped ½" iron rod set,
45. N67°35'35"E, a distance of 142.73 feet to a capped ½" iron rod set,
46. N66°08'06"E, a distance of 89.78 feet to a capped ½" iron rod set,
47. N57°31'20"E, a distance of 100.77 feet to a capped ½" iron rod set,
48. N47°33'20"E, a distance of 100.77 feet to a capped ½" iron rod set,
49. N37°35'19"E, a distance of 100.77 feet to a capped ½" iron rod set,
50. N27°37'19"E, a distance of 100.77 feet to a capped ½" iron rod set,
51. N17°39'18"E, a distance of 100.77 feet to a capped ½" iron rod set,
52. N08°06'23"E, a distance of 95.65 feet to a capped ½" iron rod set,
53. N04°58'28"E, a distance of 313.12 feet to a capped ½" iron rod set,
54. N07°21'35"E, a distance of 81.06 feet to a capped ½" iron rod set,
55. N27°29'57"E, a distance of 130.49 feet to a capped ½" iron rod set,
56. N39°48'50"E, a distance of 265.58 feet to a capped ½" iron rod set,
57. N27°57'54"E, a distance of 120.60 feet to a capped ½" iron rod set,
58. N77°44'11"W, a distance of 112.15 feet to a capped ½" iron rod set, and
59. N00°16'29"E, a distance of 207.84 feet to a capped ½" iron rod set in the southeastern line of Lot 12, Block A, Lakeway Highlands, Phase 2, Section 1A, a subdivision recorded in Document No. 201300191, O.P.R.T.C.TX.,

THENCE, with the common boundary line of said Lakeway Highlands, Phase 2, Section 1A and said remainder of 1023.257 acre tract, the following five (5) courses and distances, numbered 1 through 5;

J: AC2004LP\4486-096\SURVEY\FIELD NOTES\FN-TRACT # 2 - 363.376 ACRES

Exhibit "B"

363.376 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 46, ABSTRACT NUMBER 2098
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX

1. N73°16'31"E, a distance of 24.56 feet to a ½" iron rod found,
2. N54°18'14"E, a distance of 79.00 feet to a ½" iron rod found,
3. N45°17'18"E, a distance of 120.36 feet to a ½" iron rod found,
4. N29°36'01"E, a distance of 111.78 feet to a ½" iron rod found, and
5. N04°14'26"W, a distance of 153.73 feet to a ½" iron rod found in the southern line of the aforesaid 100 foot LCRA easement,

THENCE S87°55'42"W, with the common boundary line of said Lakeway Highlands, Phase 2, Section 1A, said LCRA easement, and said remainder of 1023.257 acre tract, a distance of 58.17 feet to a capped ½" iron rod found,

THENCE, N02°04'18"W, crossing said LCRA easement, a distance of 100.00 feet to the POINT OF BEGINNING and containing 363.376 acres of land.

SAVE AND EXCEPT TRACT 1.00 ACRE
TRAVIS COUNTY MUD NO. 13
DIRECTOR LOT

COMMENCING, at a ½" capped iron rod found for an eastern corner of Lot 1, Block A, Lakeway Highlands Village, recorded in Document No. 201100126, Official Public Records of Travis County, Texas (O.P.R.T.C.TX.), also being a northern corner of Rough Hollow Irrigation Lot Plat, recorded in Document No. 200500233, (O.P.R.T.C.TX.), for the POINT OF COMMENCEMENT of the herein described tract,

THENCE, crossing said Rough Hollow Irrigation Lot plat, S55°18'51"E, a distance of 266.05 feet to a capped ½" iron rod set for the POINT OF BEGINNING of the herein described tract,

THENCE, continuing across said Rough Hollow Irrigation Lot plat, the following four (4) courses and distances, numbered 1 through 4,

1. N87°55'42"E, a distance of 436.00 feet to a capped ½" iron rod set,
2. S02°04'18"E, a distance of 100.00 feet to a capped ½" iron rod set,
3. S87°55'42"W, a distance of 436.00 feet to a capped ½" iron rod set, and
4. N02°04'18"W, a distance of 100.00 feet to the POINT OF BEGINNING and containing 1.00 acre of land.

364.376 ACRES
~~-1.00 ACRE SAVE AND EXCEPT~~

363.376 ACRES

Surveyed by:

AARON V. THOMASON RPLS NO. 6214

Carlson, Brigance and Doering, Inc.

5501 West William Cannon

Austin, TX 78749

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BEARING BASIS: TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NAD83

J: ACZ004LP\4486-096\SURVEY\FIELD NOTES\FIN-TRACT # 2 - 363.376 ACRES

Exhibit "C"

18.491 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 47, ABSTRACT NUMBER 2097
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX

FIELD NOTES
TRACT # 3

BEING ALL OF THAT CERTAIN TRACT OR PARCEL OF LAND OUT OF AND A PART OF THE C.E.P.I. & M. CO. SURVEY NUMBER 47, ABSTRACT NUMBER 2097, AND THE RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123, SITUATED IN TRAVIS COUNTY, TEXAS, BEING MORE PARTICULARLY DESCRIBED AS BEING OUT OF AND PART OF THE REMAINDER OF A 1023.257 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2004230439 OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, SAID 18.491 ACRE TRACT OF LAND BEING MORE FULLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING, at a 1/4" iron rod found in the southeast right of way line of Highlands Boulevard (Variable Width R.O.W.), common interior corner of said remainder of 1023.257 acres, for the northwest corner and POINT OF BEGINNING of the herein described tract,

THENCE, with the right of way line of said Highlands Boulevard and the common line of said remainder of 1023.27 acre tract, the following

two (2) courses and distances, numbered 1 and 2;

- 1) N84°44'49"E, a distance of 62.27 feet to a 1/4" iron rod found, and
- 2) N39°25'16"E, a distance of 13.93 feet to a 1/4" capped iron rod set, at the beginning of a curve to the right,

THENCE, leaving said Highlands Boulevard, over and across said remainder of 1023.27 acre tract, the following ten (10)

courses and distances, numbered 1 through 10,

- 1) Along said curve to the right, having a radius of 160.00 feet, an arc length of 104.29 feet, and a chord that bears S27°06'41"E, a distance of 102.45 feet to a 1/4" capped iron rod set,
- 2) S08°26'19"E, a distance of 114.79 feet to a 1/4" capped iron rod set, at the beginning of a curve to the left,
- 3) Along said curve to the left, having a radius of 240.00 feet, an arc length of 164.31 feet, and a chord that bears S28°03'08"E, a distance of 161.12 feet to a 1/4" capped iron rod set,
- 4) S47°39'57"E, a distance of 242.41 feet to a 1/4" capped iron rod set, at the beginning of a curve to the right,
- 5) Along said curve to the right, having a radius of 575.00 feet, an arc length of 292.38 feet, and a chord that bears S33°05'55"E, a distance of 289.24 feet to a 1/4" capped iron rod set, for the easternmost corner of the herein described tract of land,
- 6) S76°08'19"W, a distance of 262.22 feet to a 1/4" capped iron rod set,
- 7) S05°59'48"E, a distance of 336.51 feet to a 1/4" capped iron rod set,
- 8) S75°52'07"W, a distance of 365.39 feet to a 1/4" capped iron rod set,
- 9) S12°27'53"W, a distance of 465.64 feet to a 1/4" capped iron rod set, and
- 10) S28°17'26"E, a distance of 677.24 feet to a 1/4" capped iron rod set, for the southernmost corner of the herein described tract of land, same being in the north right-of-way line of Bee Creek Road (Variable Width R.O.W.),

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said Bee Creek Road, the following twelve (12) courses and distances, numbered 1 through 12,

- 1) N79°48'09"W, a distance of 225.54 feet to a 1/4" iron rod found, at the beginning of a curve to the right,
- 2) Along said curve to the right, having a radius of 543.00 feet, an arc length of 871.60 feet, and a chord that bears N31°27'11"W, a distance of 781.00 feet to a 1/4" iron rod found,
- 3) N18°42'09"E, a distance of 34.76 feet to a 1/4" iron rod found,
- 4) N33°22'22"E, a distance of 80.55 feet to a 1/4" iron rod found,
- 5) S71°14'48"E, a distance of 81.24 feet to a 1/4" iron rod found,


J: AC2004LP\4486-096\SURVEY\FIELD NOTES\FN - TRACT # 3 - 18.491 ACRES

Exhibit "C"

18.491 ACRES
C.E.P.L. & M. CO. SURVEY NUMBER 47, ABSTRACT NUMBER 2097
RUSK TRANSPORTATION SURVEY NUMBER 85, ABSTRACT NUMBER 2123
TRAVIS COUNTY, TX

- 6) N18°45'12"E, a distance of 571.20 feet to a 1/2" iron rod found,
7) N71°14'48"W, a distance of 79.89 feet to a 1/2" iron rod found,
8) N26°52'03"E, a distance of 70.77 feet to a 1/2" iron rod found,
9) N22°23'09"E, a distance of 229.04 feet to a 1/2" iron rod found, at the beginning of a curve to the left,
10) Along said curve to the left, having a radius of 880.62 feet, an arc length of 334.99 feet, and a chord that
bears N00°28'33"W, a distance of 332.97 feet to a 1/2" iron rod found,
11) N07°09'00"E, a distance of 142.89 feet to a 1/2" iron rod found, and
12) N18°57'09"E, a distance of 187.44 feet to the POINT OF BEGINNING and containing 18.491 acres of land.

Surveyed by:

 25 Oct 2017
AARON V. THOMASON, RPLS 6214
Carlson, Briggance and Doering, Inc.
5501 West William Cannon
Austin, TX 78749
Ph: 512-280-5160 Fax: 512-280-5165
aaron@cbdenr.com



BEARING BASIS: TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NAD83

J:\ACZ0041P\1486-096\SURVEY\FIELD NOTES\FN - TRACT # 3 - 18.491 ACRES

Exhibit "D"

9.578 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 47, ABSTRACT NUMBER 2097
TRAVIS COUNTY, TX

FIELD NOTES
TRACT # 4

BEING ALL OF THAT CERTAIN TRACT OR PARCEL OF LAND OUT OF AND PART OF THE C.E.P.I. & M. CO. SURVEY NUMBER 47, ABSTRACT NUMBER 2097, SITUATED IN TRAVIS COUNTY, TEXAS, BEING MORE PARTICULARLY DESCRIBED AS BEING OUT OF AND PART OF THE REMAINDER OF A 1023.257 ACRE TRACT OF LAND CONVEYED TO LAS VENTANAS LAND PARTNERS, LTD. IN DOCUMENT NUMBER 2004230439 OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS, SAID 9.578 ACRE TRACT OF LAND BEING MORE FULLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING, at a $\frac{1}{2}$ " iron rod found in the southeast right-of-way line of Highlands Boulevard (Variable Width R.O.W.), same being at the west corner of Lot 62, Lakeway Highlands, Phase 2, Section 4, as recorded in Document Number 201500090, Official Public Record of Travis County, Texas, for the north corner and POINT OF BEGINNING of the herein described tract,

THENCE, leaving the right of way line of said Highlands Boulevard, with the common line of said remainder of 1023.27 acre tract and said Lakeway Highlands, Phase 2, Section 4, the following two (2) courses and distances, numbered 1 and 2;

- 1) S14°26'55"E, a distance of 153.63 feet to a $\frac{1}{2}$ " iron rod found, and
- 2) S63°45'17"E, a distance of 73.83 feet to a $\frac{1}{2}$ " capped iron rod set,

THENCE, over and across said remainder of 1023.27 acre tract, the following nine (9) courses and distances, numbered 1 through 9;

1. S41°39'32"E, a distance of 201.54 feet to a $\frac{1}{2}$ " capped iron rod set,
2. N89°55'23"E, a distance of 454.73 feet to a $\frac{1}{2}$ " capped iron rod set,
3. S43°05'03"E, a distance of 165.72 feet to a $\frac{1}{2}$ " capped iron rod set, at the east corner of the herein described tract of land,
4. S37°15'30"W, a distance of 736.88 feet to a $\frac{1}{2}$ " capped iron rod set, at the beginning of a curve to the left, for the south corner of the herein described tract of land,
5. Along said curve to the left, having a radius of 625.00 feet, an arc length of 299.83 feet, and a chord that bears N33°55'22"W, a distance of 296.96 feet to a $\frac{1}{2}$ " capped iron rod set,
6. N47°39'57"W, a distance of 242.41 feet to a $\frac{1}{2}$ " capped iron rod set at the beginning of a curve to the right,
7. Along said curve to the right, having a radius of 190.00 feet, an arc length of 130.08 feet, and a chord that bears N28°03'08"W, a distance of 127.56 feet to a $\frac{1}{2}$ " capped iron rod set,
8. N08°26'19"W, a distance of 114.79 feet to a $\frac{1}{2}$ " capped iron rod set at the beginning of a curve to the left, and
9. Along said curve to the left, having a radius of 210.00 feet, an arc length of 141.07 feet, and a chord that bears N27°40'59"W, a distance of 138.43 feet to a $\frac{1}{2}$ " capped iron rod set in the southeast line of aforesaid Highlands Boulevard,

J: AC2004LP\4486-096\SURVEY\FIELD NOTES\FN - TRACT # 4 - 9.578 ACRES

Exhibit "D"

9.578 ACRES
C.E.P.I. & M. CO. SURVEY NUMBER 47, ABSTRACT NUMBER 2097
TRAVIS COUNTY, TX

THENCE, with the common boundary line of said remainder of 1023.257 acre tract and said Highlands Boulevard, the following three (3) courses and distances, numbered 1 through 3,

1. N39°25'15"E, a distance of 1.72 feet to a ½" iron rod found,
2. N12°03'58"W, a distance of 67.47 feet to a ½" iron rod found, and
3. N33°03'06"E, a distance of 254.40 feet to the POINT OF BEGINNING and containing 9.578 acres of land.

Surveyed by: *Aaron V. Thomason* 25 OCT 2017

AARON V. THOMASON
Carlson, Brignance and Doering, Inc.
5501 West William Cannon
Austin, TX 78749
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aaron@cbdeng.com



BEARING BASIS: TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NAD83

J: AC2004LP\4486-096\SURVEY\FIELD NOTES\FN--TRACT # 4--9.578 ACRES

EXHIBIT B

Lease

Lease Agreement dated May 22, 2013, between Las Ventanas Land Partners, Ltd., a Texas limited partnership ("Original Lessor") and Travis County Municipal Utility District No. 12, a political subdivision of the State of Texas ("Lessee"), as evidenced by Memorandum of Lease between Lessor and Lessee dated January 26, 2016 and recorded as Document No. 2016012680 in the Official Public Records of Travis County, Texas; as amended in Amendment No. 1 to Lease Agreement dated February 5, 2016 between Lessor and Lessee, as evidenced by Amendment No. 1 to Memorandum of Lease between Original Lessor and Lessee dated February 5, 2016 and recorded as Document No. 2016029441 in the Official Public Records of Travis County, Texas; and the Assignment and Assumption Agreement, dated November 1, 2017, between Las Ventanas Land Partners, Ltd., a Texas limited partnership, and RH Lakeway Holdings, Ltd., a Texas limited partnership ("Lessor"), recorded as Document No. 2017179700 in the Official Public Records of Travis County, Texas.

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ATTACHMENT D

Effluent Transport

Contents:

D1. Effluent Transport Description

(Administrative Report 1.0, Section 11, Items 11E and 11F)

D2. Chapter 210 Authorization

(Technical Report 1.0, Section 12, Item A)

D3. Reclaimed Water Reuse Agreement with City of Lakeway

(Technical Report 1.0, Section 12, Item A)

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ATTACHMENT D1. Effluent Transport Description

(Administrative Report 1.0, Section 11, Items 11E and 11F)

Golf Course Irrigation

The existing S-5 Water Recycling Plant (a.k.a. New World of Tennis Wastewater Plant S-5) pumps effluent to the existing adjacent I-5 Pond for storage. From the pond, effluent transfers by a force main and existing gravity line to existing Live Oak Tank (located at the decommissioned W-2 Water Treatment Plant). Effluent is then pumped from the Live Oak Tank into the irrigation system and is spray irrigated onto the Live Oak Golf Course. The nearest water courses are Hurst Creek and an unnamed tributary, both of which drain into Lake Travis.

Reuse Transfers

Lakeway MUD holds a reuse authorization for the S-4 and S-5 facilities under the rules of TAC Chapter 210. A copy of the existing reuse Authorization No. R11495001 is included as part of this attachment. An amendment was submitted in June 2023 to include the nearby Travis County Municipal Utility Districts 11, 12 and 13 (TCMUDs 11/12/13) as an authorized reclaimed water user, expanding the irrigation area to incorporate the combined districts' furthest boundary extents, accordingly, but the authorization has yet to be finalized.

The existing Authorization allows for the reuse of effluent from the S-4 and S-5 facilities (permit No.s 11495-001 and 11495-006) for irrigation of Type 1 effluent anywhere within the City of Lakeway, its ETJ, and the Hills of Lakeway. The Authorization also allows the transfer of reclaimed water between the S-4 and S-5 reuse systems. Because of this Authorization, effluent from either plant may be directed to the holding pond(s) and disposal system of the other, meaning that effluent from the two plants may be blended in the holding ponds and/or reuse system. Regardless of the fact that effluent from the two plants may be blended, each treatment and disposal system will continue to be operated in accordance with the terms and conditions of the applicable permit, 11495-006 or 11495-001.

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Robert J. Huston, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Jeffrey A. Saitas, *Executive Director*



TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

July 7, 2000

Mr. Richard W. Eason
General Manager
Lakeway Municipal Utility District
1097 Lohmans Crossing
Austin, Texas 78734-4459

Re: Reclaimed Water Project
Texas Natural Resource Conservation Commission (TNRCC) Permit Nos. 11495-001 and
11495-006
Authorization No. R11495-001
Travis County, Texas

Dear Mr. Eason:

We have completed our review of information on the above referenced project. The project under review consists of adding Lakeway Municipal Utility District wastewater treatment facility (Permit No. 11495-006) to the existing authorization. The treated effluent will be used for landscape irrigation, parklands common areas of homeowner association, homeowner landscape, greenbelt, commercial building landscapes and other beneficial irrigation uses.

Our review showed that the material generally meets the applicable minimum standards as set forth in the Texas Natural Resource Conservation Commission's rules titled Use of Reclaimed Water. The project is approved. The attachment to this letter indicates the approved site and conditions that apply to this approval.

If you have any questions please contact me at (512) 239-4552.

Sincerely,

A handwritten signature in black ink, appearing to read "Louis C. Herrin, III", followed by a stylized flourish.

Louis C. Herrin, III, P.E. (MC 148)
Permitting Section

cc: TNRCC, Region 11 Office, w/attachments
TNRCC, Wastewater Data Management Team, (Att.: Ms. Jan Sills), w/attachments
TNRCC, Application Team, (Att.: Ms. Mary Taylor), w/attachments



Authorization No. R 11495-001

This authorization supersedes
and replaces R 11495-001
approved March 26, 1999.

AUTHORIZATION FOR RECLAIMED WATER

Producer: Lakeway Municipal Utility District
1097 Lohmans Crossing Road
Austin, Texas 78734

Provider: Lakeway Municipal Utility District
1097 Lohmans Crossing Road
Austin, Texas 78734


Users: The reclaimed water will be used within the City of Lakeway, City of Lakeway ETJ and the Hills of Lakeway as shown on Attachment "A" in Travis County, Texas.

Location: Lakeway MUD is authorized to use the reclaimed water from the following treatment plants: Permit Nos 11495-001 and 11495-006. The irrigation sites are located between Ranch Road 620 and the plant site in Travis County, Texas shown in Attachment "A".

Authorization: Reclaimed water from the Lakeway Municipal Utility District's Wastewater Treatment Facilities (Permit Nos. 11495-001 and 11495-006) to be used for landscape irrigation, parklands common areas of homeowner association, homeowner landscape, greenbelt, commercial building landscapes and other beneficial irrigation uses.

This authorization contained the conditions that apply for the uses of the reclaimed water. The approval of a reclaimed water use project under Chapter 210 does not affect any existing water rights. If applicable, a reclaimed water use authorization in no way affects the need of a producer, provider and/or user to obtain a separate water right authorization from the commission.

Issued Date: July 7, 2000


Louis C. Herrin, III, P.E.
Wastewater Permitting Section
Water Permits & Resource
Management Division

Limitations: The authorization is subjected to the following requirements:

I. General Requirements.

- (a) No wastewater treatment plant operator (producer) shall transfer to a user reclaimed water without first notifying the commission.
- (b) Irrigation with untreated wastewater is prohibited.
- (c) Food crops that may be consumed raw by humans shall not be spray irrigated. Food crops including orchard crops that will be substantially processed prior to human consumption may be spray irrigated. Other types of irrigation that avoid contact of reclaimed water with edible portions of food crops are acceptable.
- (d) There shall be no nuisance conditions resulting from the distribution, the use, and/or storage of reclaimed water.
- (e) Reclaimed water shall not be utilized in a way that degrades ground water quality to a degree adversely affecting its actual or potential uses.
- (f) Reclaimed water managed in ponds for storage must be prevented from discharge into waters in the state, except for discharges directly resulting from rainfall events or in accordance with a permit issued by the commission. All other discharges are unauthorized. If any unauthorized overflow of a holding pond occurs causing discharge into or adjacent to waters in the state, the user or provider, as appropriate, shall report any noncompliance. A written submission of such information shall also be provided to the commission regional office and to the Austin Office, Water Enforcement Section (MC-149), within five (5) working days of becoming aware of the overflow. The written submission shall contain a description of the noncompliance and its cause; the potential danger to human health or safety, or the environment; the period of noncompliance, including exact dates and times; 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 recurrence of the noncompliance, and to mitigate its adverse effects.
- (g) Unless otherwise provided in this authorization, there shall be no off-site discharge, either airborne or surface runoff, of reclaimed water from the user's property except to a wastewater treatment system or wastewater treatment collection system unless the reclaimed water user applies for and obtains a permit from the commission which authorizes discharge of the water.
- (h) Signs in both English and Spanish shall be posted at storage areas, hose bibs and faucets reading "Reclaimed Water, Do Not Drink" or similar warnings. Alternately, the area may be secured to prevent access by the public.
- (i) Reclaimed water piping shall be separated from potable water piping when trenched by a distance of at least nine feet. Exposed piping shall be painted purple and all piping shall be stenciled with a warning reading "NON-POTABLE WATER".
- (j) The design of distribution systems which will convey reclaimed water to a user shall be approved by the executive director. Materials shall be submitted for approval by the executive director in accordance with the Texas Engineering Practice Act (Article 3271a, Vernon's Annotated Texas Statutes). The plans and specifications for the distribution systems authorized by this authorization must be approved pursuant to state law, and failure to secure approval before commencing construction of such works or making a transfer of reclaim water therefrom is a violation of this authorization, and each day of a transfer is an additional violation until approval has been secured.
- (k) Nothing in this authorization modifies any requirements of the Texas Department of Health found in Title 25 Texas Administrative Code (TAC), Chapter 337.

- (l) Major changes from a prior notification for use of reclaimed water must be approved by the executive director. A major change includes:
 - (1) a change in the boundary of the approved service area not including the conversion of individual lots within a subdivision to reclaimed water use;
 - (2) the addition of a new producer;
 - (3) major changes in the intended use, such as conversion from irrigation of a golf course to residential irrigation; or
 - (4) changes from either Type I or Type II uses to the other.
- (m) The reclaimed water producer and user shall maintain on the sites a current operation and maintenance plan. The operation and maintenance plan which shall contain, as a minimum the following:
 - (1) a copy of a signed contracts between the user, producer and provider;
 - (2) a labeling and separation plan for the prevention of cross connections between reclaimed water distribution lines and potable water lines;
 - (3) the measures that will be implemented to prevent unauthorized access to reclaimed water facilities (e.g., secured valves);
 - (4) procedures for monitoring reclaimed water;
 - (5) a plan for how reclaimed water use will be scheduled to minimize the risk of inadvertent human exposure;
 - (6) schedules for routine maintenance;
 - (7) a plan for worker training and safety; and
 - (8) contingency plan for system failure or upsets.

II. Storage Requirements for Reclaimed Water

- (a) All initial holding ponds designed to contain Type I effluent shall conform to the following requirements:
 - (1) The ponds, whether constructed of earthen or other impervious materials, shall be designed and constructed so as to prevent groundwater contamination;
 - (2) Soils used for pond lining shall be free from foreign material such as paper, brush, trees, and large rocks;
 - (3) All soil liners must be of compacted material having a permeability less than or equal to 1×10^{-4} cm/sec, at least 24 inches thick, compacted in lifts no greater than 6 inches each;
 - (4) Synthetic membrane linings shall have a minimum thickness of 40 mils. In situ liners at least 24 inches thick meeting a permeability less than or equal to 1×10^{-4} cm/sec are acceptable alternatives;
 - (5) Certification shall be furnished by a Texas Registered Professional Engineer that the pond lining meets the appropriate criteria prior to utilization of the facilities;
 - (6) Soil embankment walls shall have a top width of at least five feet. The interior and exterior slopes of soil embankment walls shall be no steeper than one foot vertical to three feet horizontal unless alternate methods of slope stabilization are utilized. All soil embankment walls shall be protected by a vegetative cover or other stabilizing material to prevent erosion. Erosion stops and water seals shall be installed on all piping penetrating the embankments;
 - (7) An alternative method of pond lining which provides equivalent or better water quality protection than provided under this section may be utilized with the prior approval of the executive director; and

- (8) A specific exemption may be obtained from the executive director if, after the review of data submitted by the reclaimed water provider or user, as appropriate, the executive director determines containment of the reclaimed water is not necessary, considering:
 - (A) soil and geologic data, and ground water data, including its quality, uses, quantity and yield; and
 - (B) adequate demonstration that impairment of ground water for its actual or potential use will be prevented.
- (b) Reclaimed water may be stored in leak-proof, fabricated tanks.

III. Specific Uses and Quality Standards for Reclaimed Water

Numerical parameter limits pertaining to specific reclaimed water use categories are contained in this section. These limits apply to reclaimed water before discharge to initial holding ponds or a reclaimed water distribution system. It shall be the responsibility of the reclaimed water producer to establish that the reclaimed water meets the quality limits at the sample point for the intended use in accordance with the monitoring requirements identified in Section IV relating to Sampling and Analysis.

- (a) Type I Reclaimed Water Use. The type of use where the public would come in contact with the reclaimed water. The following use is allowed by this authorization maintenance of impoundments or natural water bodies where direct human contact is likely and the irrigation of parkland.
- (b) The following conditions apply to this type of use of reclaimed water. At a minimum, the reclaimed water producer shall only transfer reclaimed water of the following quality as described for each type of specific use:
for Type I reclaimed water use, reclaimed water on a 30-day average shall have a quality of:

BOD ₅ or CBOD ₅	5 mg/l
Turbidity	3 NTU
Fecal Coliform	20 CFU/100 ml*
Fecal Coliform (not to exceed)	75 CFU/100 ml**
* geometric mean	
** single grab sample	

IV. Sampling and Analysis.

The reclaimed water producer shall sample the reclaimed water prior to distribution to user to assure that the water quality is in accord with the intended contracted use. Analytical methods shall be in accord with those specified in Chapter 319 (relating to Monitoring and Reporting). The minimum sampling and analysis frequency for Type I reclaimed water is twice per week.

The monitoring shall be done after the final treatment unit. These records shall be maintained on a monthly basis and be available at the plant site for inspection by authorized representatives of the Commission for at least five years.

V. Record Keeping and Reporting.

- (a) The reclaimed water provider and user shall maintain records on site for a period of five years.
 - (1) Records to be maintained by the provider include:
 - (A) copies of notifications made to the commission concerning reclaimed water projects.
 - (B) as applicable, copies of contracts made with each reclaimed water user (this requirement does not include reclaimed water users at residences that have separate distribution lines for potable water).
 - (C) records of volume of water delivered to each reclaimed water user per delivery (this requirement does not apply to reclaimed water users at residences that have separate distribution lines for potable water).
 - (D) reclaimed water quality analyses.
- (b) The reclaimed water producer shall report to the commission on a monthly basis the following information on forms furnished by the executive director. Such reports are due to the commission by the 20th day of the month following the reporting period.
 - (1) volume of reclaimed water delivered to provider.
 - (2) quality of reclaimed water delivered to a user or provider reported as a monthly average for each quality criteria except those listed as "not to exceed" which shall be reported as individual analyses.
- (c) Monitoring requirements contained in the authorization are suspended from the effective date of the authorization until the reclaim water is transferred. The provider shall provide written notice to the Austin Office, Water Quality Division, Applications Unit and the Region 11 Office of the Commission thirty (30) days prior to transfer.

VI. Transfer of Reclaimed Water.

Reclaimed water transferred from a provider to a user shall be done on a demand only basis. This means that the reclaimed water user may refuse delivery of such water at any time. All reclaimed water transferred to a user must be of at least the treatment quality specified in Section IV. Transfer shall be accomplished via pipes or tank trucks.

VII. General Prohibitions.

Except for on-channel ponds, storage facilities for retaining reclaimed water prior to use shall not be located within the floodway and shall be protected from the 100-year flood.

VIII. Restrictions.

This authorization does not convey any property right and does not grant any exclusive privilege.

IX. Responsibilities and Contracts.

- (a) The producer of reclaimed water will not be liable for misapplication of reclaimed water by users, except as provided in this section. Both the reclaimed water provider and user have, but are not limited to, the following responsibilities:
 - (1) The reclaimed water producer shall:
 - (A) transfer reclaimed water of at least the minimum quality required by this chapter at the point of delivery to the user for the specified use;
 - (B) sample and analyze the reclaimed water and report such analyses in accordance with Sections IV and V relating to Sampling and Analysis and Record keeping and Reporting, respectively; and
 - (C) notify the executive director in writing within five (5) days of obtaining knowledge of reclaimed water use not authorized by the executive director's reclaimed water use approval.
 - (2) The reclaimed water provider shall:
 - (A) assure construction of reclaimed water distribution lines/systems in accordance with 30 TAC Chapter 317 and in accordance with approved plans and specifications;
 - (B) transfer reclaimed water of at least the minimum quality required by this chapter at the point of delivery to the user for the specified use;
 - (C) notify the executive director in writing within five (5) days of obtaining knowledge of reclaimed water use not authorized by the executive director's reclaimed water use approval; and
 - (D) not be found in violation of this chapter for the misuse of the reclaimed water by the user if transfer of such water is shut off promptly upon knowledge of misuse regardless of contract provisions.
 - (3) The reclaimed water user shall:
 - (A) use the reclaimed water in accordance with this authorization; and
 - (B) maintain and provide records as required by Section III relating to Record Keeping and Reporting.

X. Enforcement.

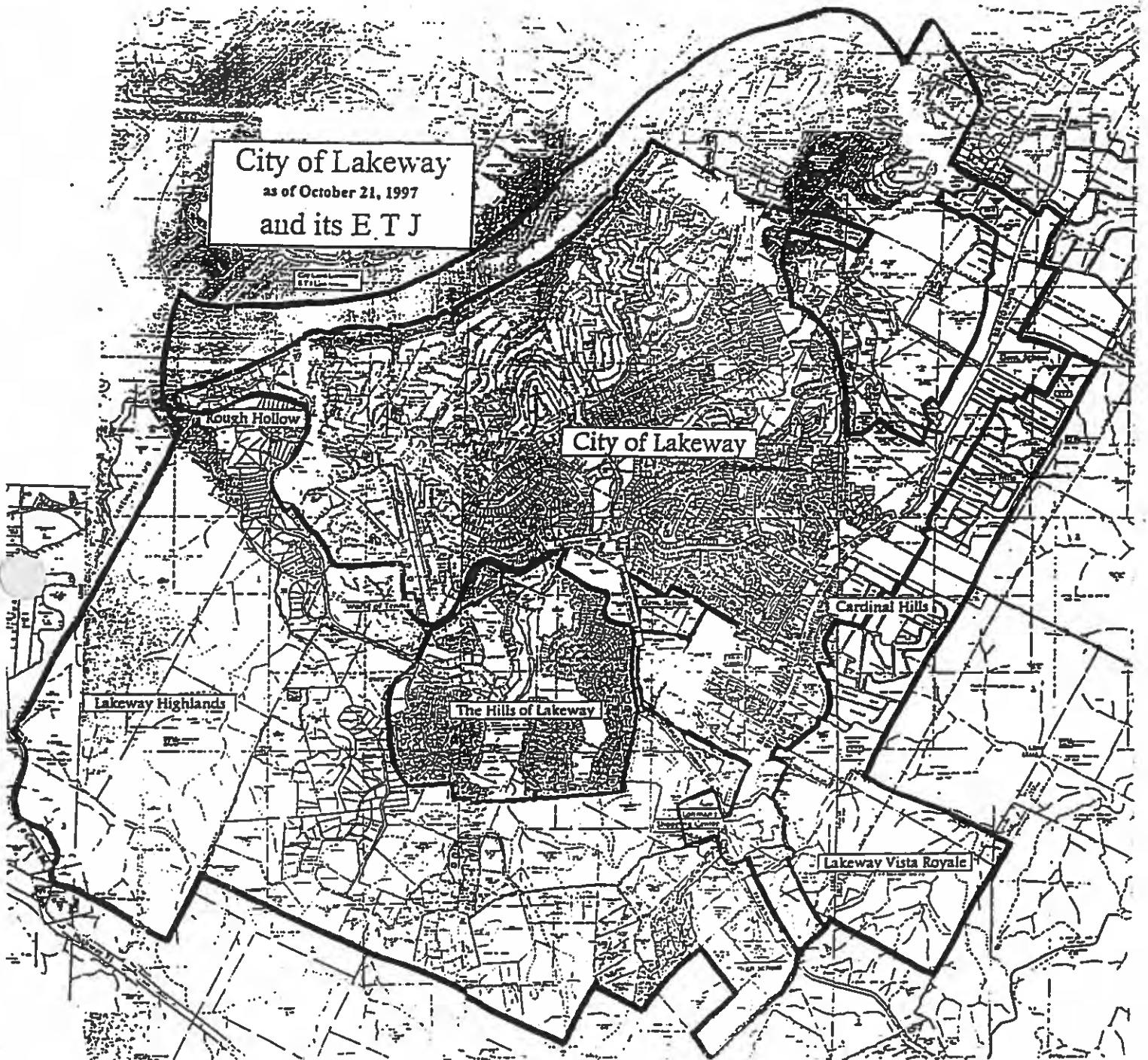
If the producer, provider and/or user fails to comply with the terms of this authorization, the executive director may take enforcement action provided by the Texas Water Code, §§26.019 and 26.136.

XI. STANDARD PROVISIONS:

- (a) This authorization is granted in accordance with the Texas Water Code and the rules and other Orders of the Commission and the laws of the State of Texas.
- (b) Acceptance of this authorization constitutes an acknowledgment and agreement that the provider and user will comply with all the terms, provisions, conditions, limitations and restrictions embodied in this authorization and with the rules and other Orders of the Commission and the laws of the State of Texas. Agreement is a condition precedent to the granting of this authorization.

ATTACHMENT "A"

City of Lakeway
as of October 21, 1997
and its E.T.J.



**RECLAIMED WATER REUSE AGREEMENT BETWEEN
LAKEWAY MUNICIPAL UTILITY DISTRICT AND CITY OF LAKEWAY**

THE STATE OF TEXAS

COUNTY OF TRAVIS

This Reclaimed Water Reuse Agreement (the "Agreement") is entered into this 18th day of July, 2001, by and between City of Lakeway (the "User") and Lakeway Municipal Utility District (the "District"), a political subdivision of the State of Texas operating under Chapters 49 and 54, Texas Water Code.

RECITALS

The District is authorized by the Texas Natural Resource Conservation Commission ("TNRCC") permit #R11495-001, to provide reclaimed water for landscape irrigation (Reclaimed Water"). The User will make beneficial use of such reclaimed water.

AGREEMENT

NOW THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the District and the User agree as follows:

SECTION 1.

**USE OF RECLAIMED WATER FROM THE DISTRICT
FOR LANDSCAPE IRRIGATION**

1.1 Agreement to Supply and Use Reclaimed Water. The District agrees to supply Reclaimed Water to irrigate such areas of landscape that the User deems appropriate. A Reclaimed Water meter and back flow prevention device will be supplied by the District for the User's irrigation system. The actual cost of the piping connection, meter and back flow prevention device will be borne by the User. The User acknowledges that the Lakeway Golf Clubs ("LGC") and the Lakeway Blvd. median have priority for the available Reclaimed Water and that Reclaimed Water shall be supplied subject to the terms and conditions of the Effluent Disposal Agreement between the District and LGC.

1.2 When there is insufficient Reclaimed Water, the District will provide lake water, if available.

1.3 When there is insufficient Reclaimed Water and lake water, the District will provide potable water, if available. Delivery of lake water or potable water shall be through the Reclaimed Water distribution system.

1.4 The District will make Reclaimed Water available to the User, to the extent permitted by the TNRCC reuse rules, pursuant to the following conditions:

- i. The actual connection of the User's irrigation system to the District's Reclaimed Water distribution system shall be at no cost to the District. The District will extend its Reclaimed Water distribution system to the boundaries of User's property, if necessary.

- ii. The User shall be responsible for all costs associated with its irrigation system.
- iii. The User shall comply fully with all TNRCC rules, all provisions of the District's permit #R11495-001 and all rules of the District.
- iv. The User shall not have any responsibility for pumping or other equipment not owned by the User.
- v. The District shall provide Reclaimed Water at the pressure available at the User's connection without modification to the District's supply.
- vi. The User will coordinate irrigation times as needed to coordinate with and be subordinate to the needs of the Live Oak Golf Course irrigation system.

1.5 The User will not be subjected to meeting specific requirements for monthly use of the Reclaimed Water but will agree to year-round watering on a reasonable schedule.

1.6 Notwithstanding anything to the contrary contained herein, pursuant to the TNRCC rules on use of Reclaimed Water, Reclaimed Water transferred from the District to the User shall be done on a demand only basis in order that the water is not provided during times it cannot be beneficially used in accordance with those rules. The User may refuse delivery of such water at any time.

1.7 The User agrees to allow the District to install such signage as required by the TNRCC.

1.8 The User agrees to provide the District a drawing, which shows the details of the User's irrigation system as required by the TNRCC.

1.9 This Agreement will have an initial term of one (1) year beginning on the date of this Agreement and will automatically renew for successive one (1) year terms unless terminated by either party hereto by written notice sent 30 days prior to the end of the then existing one (1) year term. The foregoing notwithstanding, this Agreement may be terminated by either party for cause.

SECTION 2.

CHARGES, BILLING AND MEASUREMENT

2.1 Reclaimed Water Charge. The rate for Reclaimed Water (or lake water, as applicable) provided pursuant to this Agreement shall be \$1 per thousand gallons, which will be billed for and payable in the same manner as the District's billings for potable water. The \$1 per thousand gallons rate shall include the pumping costs. This rate shall remain in effect until June 10, 2002.

2.2 Potable Water Charge. If the District supplies potable water to the User, the User shall pay the District on the basis of the potable water rate in effect, District wide, at that time.

2.3 Rate Determiner. The District shall be the sole determiner of which of these rates is in effect at the time of delivery. The District will determine which rate is in effect from time to time in good faith. These rates will be the rates in effect District wide.

2.4 Meter Calibration. The meter for the Reclaimed Water consumption shall be calibrated to ensure accuracy at the expense of the requester of the calibration.

SECTION 3.

INDEMNITY

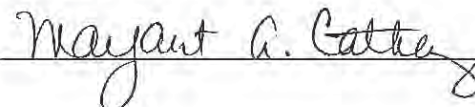
The District does hereby indemnify and hold harmless the User, its agents, officers and employees from any and all liability, action, claim, damage, judgment and attorney's fees arising from or resulting from the District's own negligence with respect to this Agreement. The User does hereby indemnify and hold harmless the District, its agents, officers and employees from any and all liability, action, claim, damage, judgment and attorney's fees arising from or result from the User's own negligence with respect to this Agreement.

Agreed to this day 18th of July, 2001.

LAKEWAY MUNICIPAL UTILITY DISTRICT:

By: 
Richard Eason, General Manager

ATTEST:



CITY OF LAKEWAY

User

By: 
Dave Benson, City Manager

ATTEST:


Cynthia Evans, City Secretary

p:\users\mcland\wastewater\4\210\210 agreement template.doc
City: Admin11\cac\files\Departments\Utilities\LMUD\Final\water reuse agreement.doc



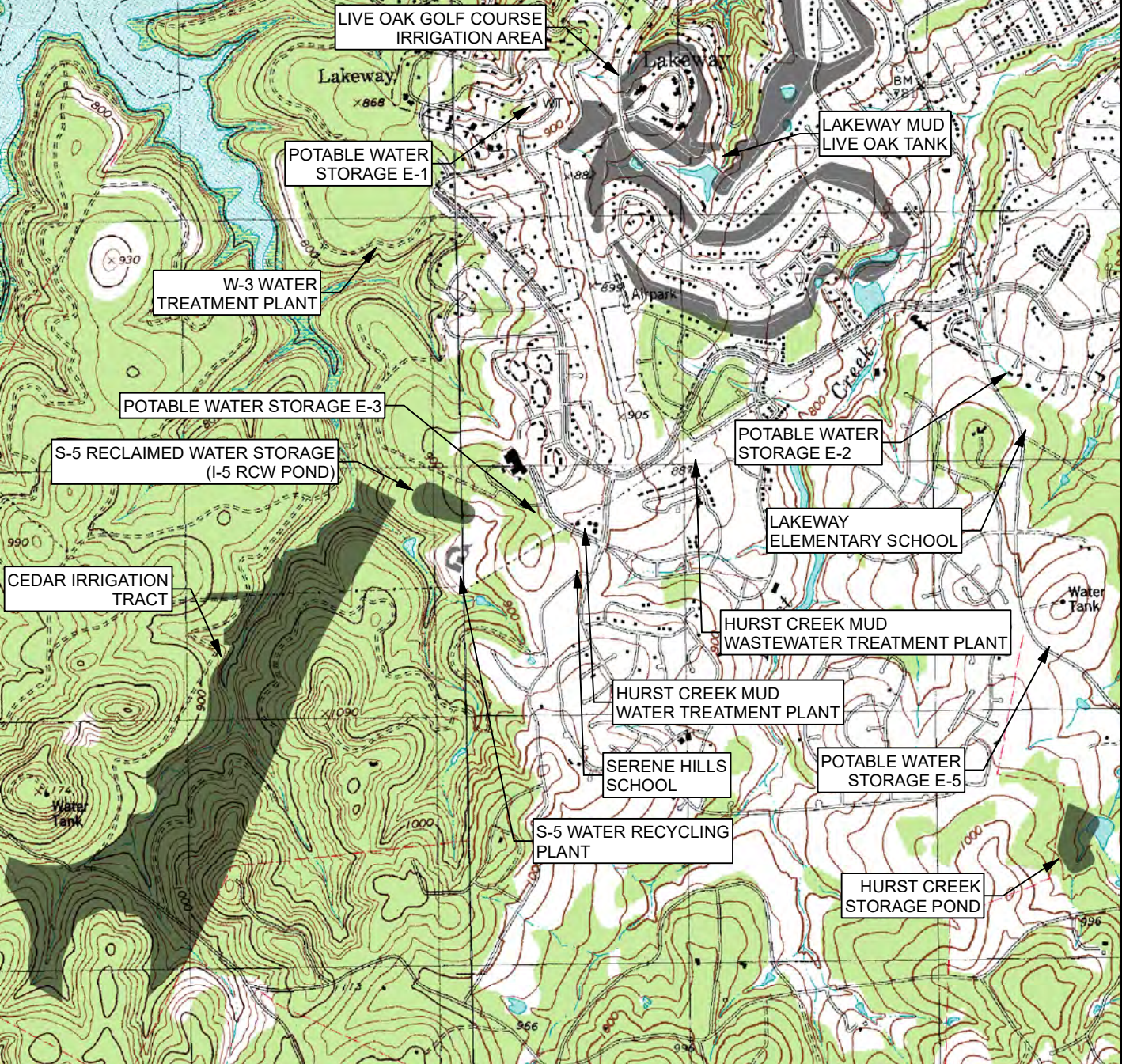
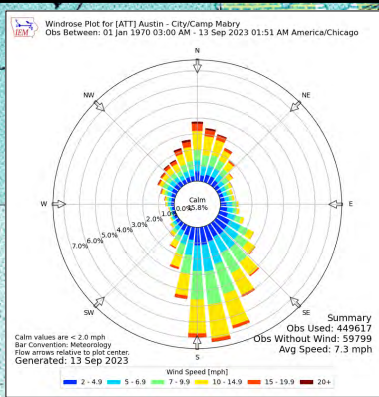
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ATTACHMENT E

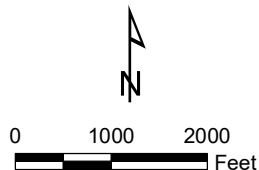
Facilities Location Map with Wind Rose & USGS Quadrangles

*(Administrative Report 1.0, Section 13; Domestic Technical Report 1.0, Section 3;
Domestic Technical Report 1.1, Section 5B)*

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THIS DOCUMENT IS RELEASED
FOR THE PURPOSE OF REVIEW
UNDER THE AUTHORITY OF
CHRISTIANNE CASTLEBERRY
TEXAS P.E. NO. 87259
DATE: FEBRUARY 14, 2024
IT IS NOT TO BE USED FOR
CONSTRUCTION OR ANY
OTHER PURPOSE



LAKEWAY MUD
PERMIT #11495-006
S-5 WATER RECYCLING PLANT
FACILITIES LOCATION MAP

Date
FEB 2024

Attachment No.

E

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Produced by the United States Geological Survey

North American Edition of 1983 (NAJ83)
World Gazetteer System of 1984 (WGS84). Princeton and

This copy is not a legal document. Boundaries may be established by this map alone. Trusts made with a surveyor.

generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Inaugury.....		1867, September
Small.....	18.5	Common

Name: _____ U.S. Census Bureau
 Address: _____
 Phone: _____

Hydrology..... General Hydrology for
Canals..... National Dredge
Boundaries..... Dredge works on inland

Method	Year	Location	Sample Size	Findings
Survey	2001	USA	1,000	...
Survey	2002	USA	1,000	...
Survey	2003	USA	1,000	...
Survey	2004	USA	1,000	...
Survey	2005	USA	1,000	...
Survey	2006	USA	1,000	...
Survey	2007	USA	1,000	...
Survey	2008	USA	1,000	...
Survey	2009	USA	1,000	...
Survey	2010	USA	1,000	...
Survey	2011	USA	1,000	...
Survey	2012	USA	1,000	...
Survey	2013	USA	1,000	...
Survey	2014	USA	1,000	...
Survey	2015	USA	1,000	...
Survey	2016	USA	1,000	...
Survey	2017	USA	1,000	...
Survey	2018	USA	1,000	...
Survey	2019	USA	1,000	...
Survey	2020	USA	1,000	...
Survey	2021	USA	1,000	...
Survey	2022	USA	1,000	...
Survey	2023	USA	1,000	...
Survey	2024	USA	1,000	...
Survey	2025	USA	1,000	...
Survey	2026	USA	1,000	...
Survey	2027	USA	1,000	...
Survey	2028	USA	1,000	...
Survey	2029	USA	1,000	...
Survey	2030	USA	1,000	...
Survey	2031	USA	1,000	...
Survey	2032	USA	1,000	...
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Survey	2081	USA	1,000	...
Survey	2082	USA	1,000	...
Survey	2083	USA	1,000	...
Survey	2084	USA	1,000	...



SCALE 1:24 000



CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was prepared in conformance with the
National Geographic Program U.S. Terrain Product Standards



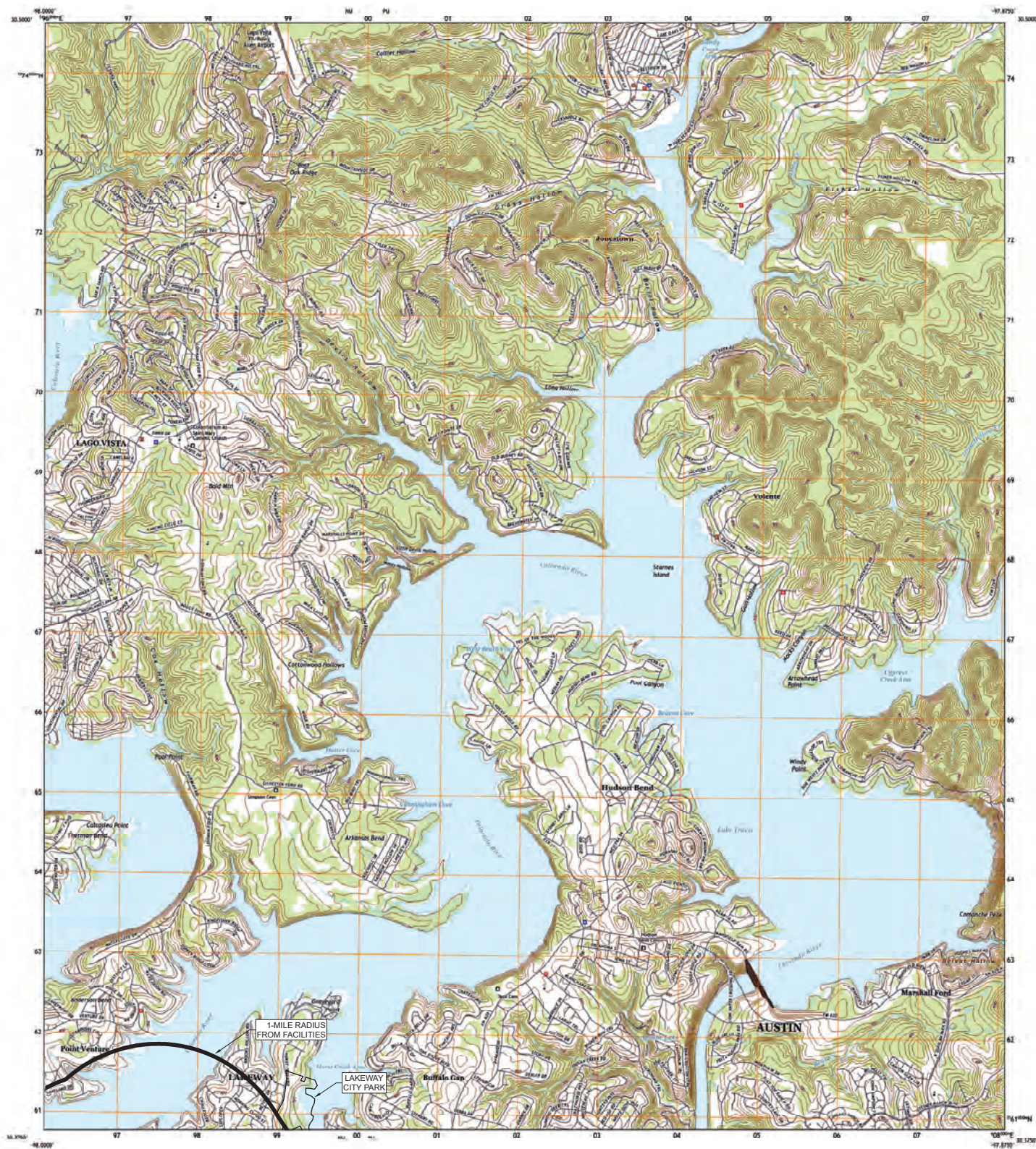
ROAD CLASSIFICATION

Expressway	Local Collector
Secondary Hwy	Local Road
Arterial	Arterial

PAGE BEND, TX
2022



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Produced by the United States Geological Survey

This map is not a legal document. Boundaries may be
misrepresented. For more information, please contact the
National Oceanic and Atmospheric Administration.

generalized to the full class. Many lands within government reservations may not be shown. Check government before.

Brigade _____ MAP 1

Single		Rate, %
Both	0.5	Carotid
None		

Hydrography..... National Hydrographic
Customs..... National

Country	Year	Value
Germany	1990	1.00
Germany	1991	1.00
Germany	1992	1.00
Germany	1993	1.00
Germany	1994	1.00
Germany	1995	1.00
Germany	1996	1.00
Germany	1997	1.00
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Germany	2105	1.00
Germany	2106	1.00
Germany	2107	1.00
Germany	2108	1.00
Germany		

Method	Model	Model	Model
--------	-------	-------	-------



This map was produced in compliance with the
National Geographic Program's Map Producers Standard



ROAD CLASSIFICATION

Expressway	Local Connector
Secondary mty	Local Road
Blvd	400

Legend: Expressway Local Connector Local Road 400

MANSFIELD DAM, TX

2022



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U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY



SHINGLE HILLS QUADRANGLE
TEXAS
7.5-MINUTE SERIES



Produced by the United States Geological Survey

Shingle Hills Quadrangle, Texas, 7.5-Minute Series
This map is a digital product of the USGS National Wetlands Inventory (NWI) and is not a legal document. It is intended for informational purposes only. It is not intended to be used for legal or regulatory purposes. It is not intended to be used for legal or regulatory purposes. It is not intended to be used for legal or regulatory purposes.

Map Date: September 2014
Scale: 1:24,000
Projection: NAD83
Datum: NAD83
Units: Feet
Status: Final



UTM GRID AND 2011 MAGNETIC NORTH
NORTH AMERICAN HORIZONTAL DATUM OF 1983
This map was produced in accordance with the
National Geospatial Program VLS Type Product Standard



ROAD CLASSIFICATION	
Expressway	State Route
Arterial	County Road
Collector	Local Road
Residential	Water Road

SHINGLE HILLS, TX
2012



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U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY



BEE CAVE QUADRANGLE
TEXAS - TRAVIS COUNTY
7.5-MINUTE SERIES

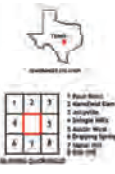


Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84)
This map is not a legal document. Boundary lines are
generalized for this map scale. Private lands within government
reservations may not be shown. Obtain permission before
entering private lands.

Metadata:
Project: BEE CAVE, TEXAS
Date: September 2014
Version: 1.0
Author: [illegible]
Editor: [illegible]
Reviewer: [illegible]
Approvers: [illegible]
Metadata Date: 2014
Metadata Version: 1.0
Metadata Author: [illegible]
Metadata Editor: [illegible]
Metadata Reviewer: [illegible]
Metadata Approver: [illegible]



CONTOUR INTERVAL: 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1983
This map was prepared to conform with the
National Geographic Topographic Map Series.



ROAD CLASSIFICATION

Feederway	Local Road	Interstate
Arterial Road	State Road	US Route
Interstate	State Road	State Road

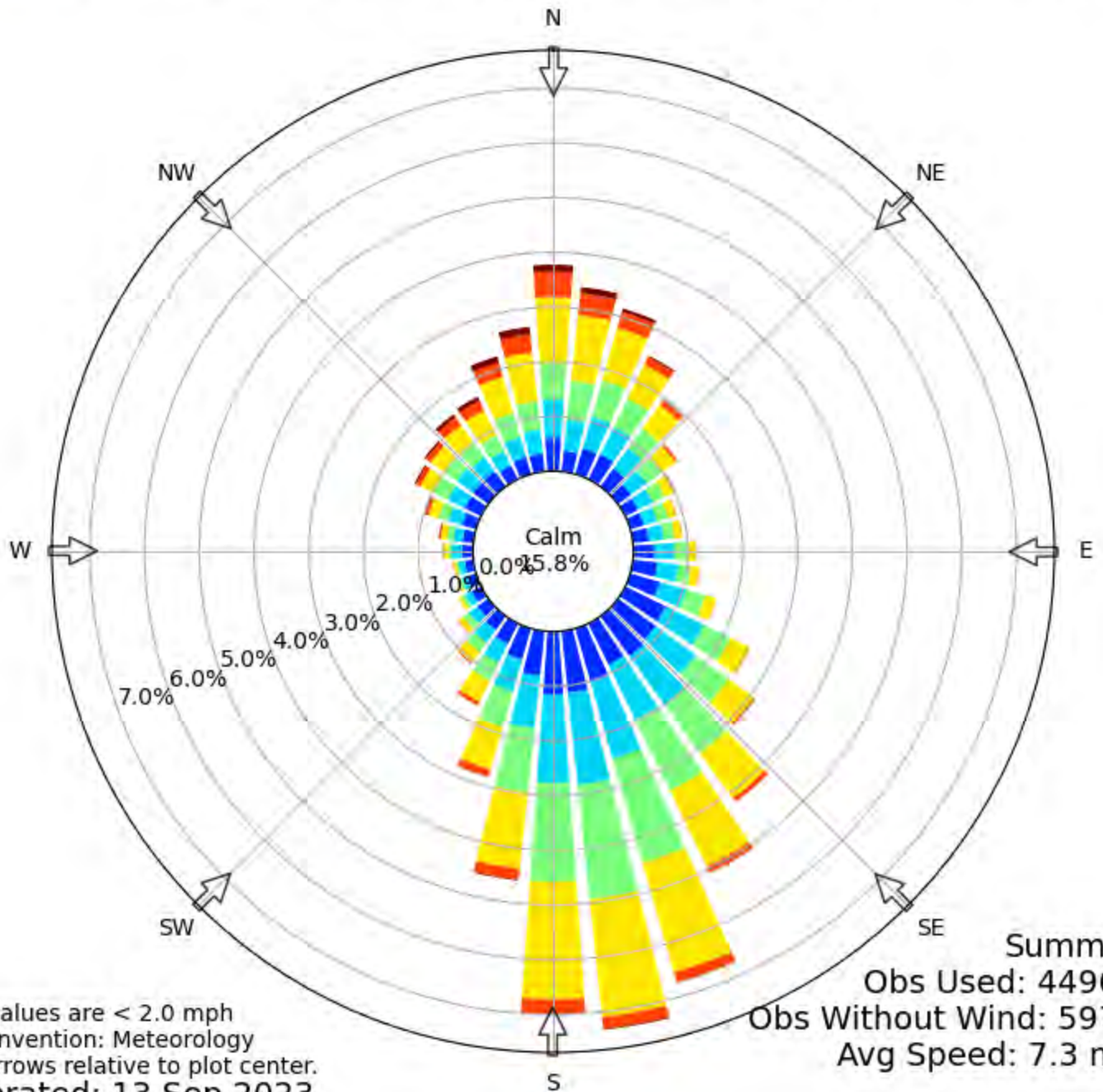
BEE CAVE, TX
2014



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Windrose Plot for [ATT] Austin - City/Camp Mabry
Obs Between: 01 Jan 1970 03:00 AM - 13 Sep 2023 01:51 AM America/Chicago



Calm values are < 2.0 mph
Bar Convention: Meteorology
Flow arrows relative to plot center.
Generated: 13 Sep 2023

Wind Speed [mph]

2 - 4.9 5 - 6.9 7 - 9.9 10 - 14.9 15 - 19.9 20+

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ATTACHMENT F

Affected Landowner Map & Cross-Reference List

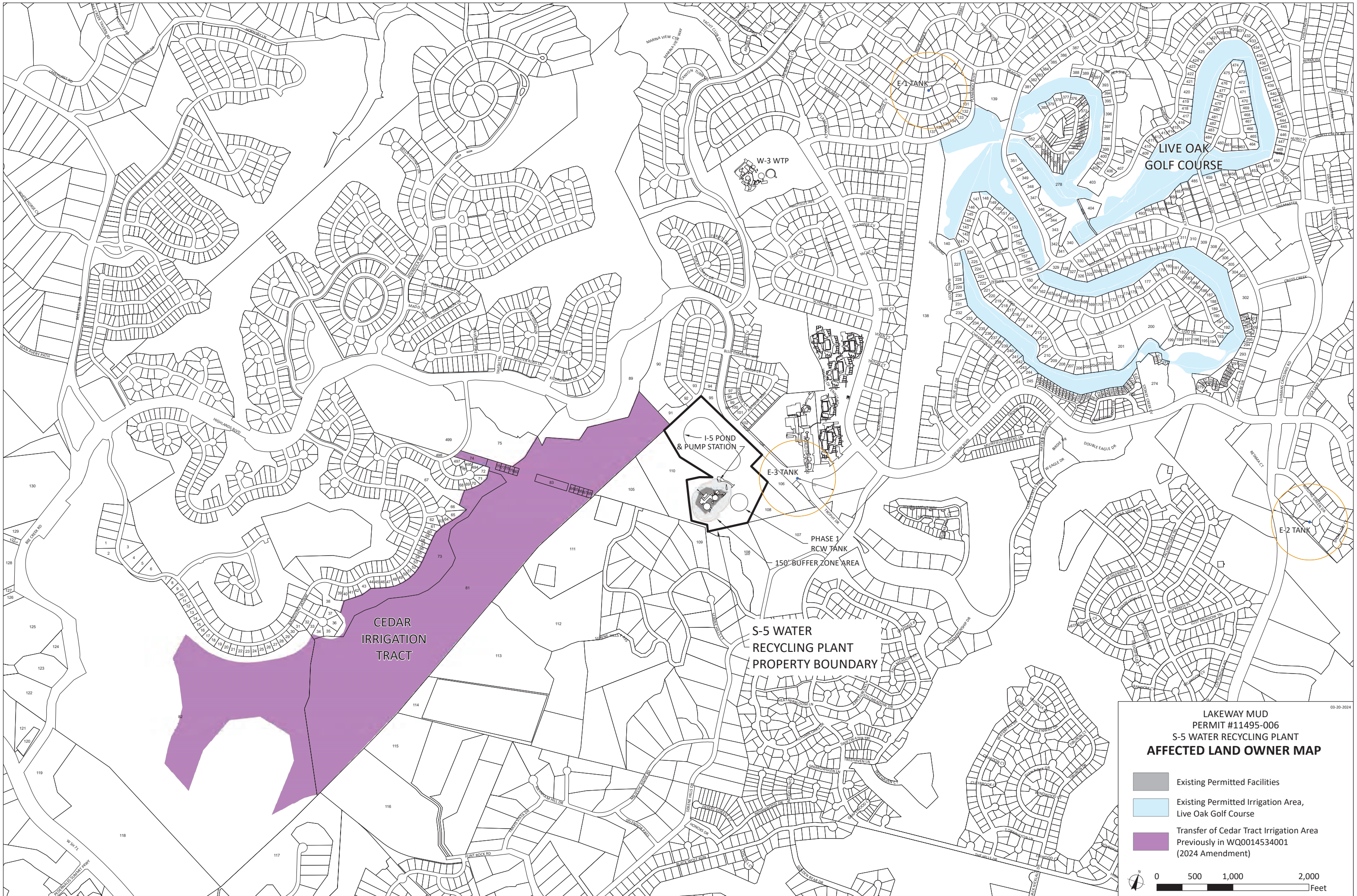
(Domestic Administrative Report 1.1, Section 1)

Contents:

F1. Affected Landowner Map

F2. Affected Landowner Cross-Reference List

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AFFECTED LAND OWNER CROSS-REFERENCE LIST

AFFECTED LAND#	FIRST NAME	LAST NAME	PROPERTY ADDRESS	PROPERTY CITY	PROPERTY STATE	PROPERTY ZIP	MAILING ADDRESS	MAILING CITY	MAILING STATE	MAILING ZIP
1	DREES CUSTOM HOMES LP		108 BALDOVINO SKYWAY	LAKEWAY	TX	78738	11305 FOUR POINTS DR BLDG 1 STE 150	AUSTIN	TX	78726
2	LOAN CAM & SONNY THANH TRAN	HUYNH	110 BALDOVINO SKYWAY	LAKEWAY	TX	78738	110 BALDOVINO SKYWAY	LAKEWAY	TX	78738
3	PIRANHA BALDOVINO LLC		105 BALDOVINO SKYWAY	LAKEWAY	TX	78738	4003 CHAMISA DR	AUSTIN	TX	78730
4	WESTIN HOMES & PROPERTIES LP		107 BALDOVINO SKYWAY	LAKEWAY	TX	78738	2245 TEXAS DR STE 600	SUGAR LAND	TX	77479
5	DAVID I & ESTHER M	SCHWARTZ	109 BALDOVINO SKYWAY	LAKEWAY	TX	78738	109 BALDOVINO SKYWAY	LAKEWAY	TX	78738
6	RICARDO & MAURA A	OROZCO	111 BALDOVINO SKYWAY	LAKEWAY	TX	78738	111 BALDOVINO SKYWAY	LAKEWAY	TX	78738
7	RH LAKEWAY DEVELOPMENT LTD		BALDOVINO SKYWAY	LAKEWAY	TX	78738	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
8	JOSHUA & SHANNON	HANLY	116 BALDOVINO SKYWAY	LAKEWAY	TX	78738	116 BALDOVINO SKYWAY	LAKEWAY	TX	78738
9	LEENA & LALIT	GULATI	118 BALDOVINO SKYWAY	LAKEWAY	TX	78738	118 BALDOVINO SKYWAY	LAKEWAY	TX	78738
10	GABRIEL JOEL & VIVIAN EVE	JOHNSON	120 BALDOVINO SKYWAY	LAKEWAY	TX	78738	120 BALDOVINO SKYWAY	LAKEWAY	TX	78738
11	JUSTIN TODD & LESLIE	ROYER	122 BALDOVINO SKYWAY	LAKEWAY	TX	78738	122 BALDOVINO SKYWAY	LAKEWAY	TX	78738
12	HBF LIVING TRUST		124 BALDOVINO SKYWAY	LAKEWAY	TX	78738	124 BALDOVINO SKYWAY	LAKEWAY	TX	78738
13	JAY A & KELLY L	LINK	126 BALDOVINO SKYWAY	LAKEWAY	TX	78738	126 BALDOVINO SKYWAY	LAKEWAY	TX	78738
14	RAJNEESH	GUPTA	128 BALDOVINO SKYWAY	LAKEWAY	TX	78738	4501 CARYLE CT APT 1206	SANTA CLARA	CA	95054
15	TANYA & DAN	HUTTER	130 BALDOVINO SKYWAY	LAKEWAY	TX	78738	130 BALDOVINO SKWY	LAKEWAY	TX	78738
16	GREGORY & ARMINEH	KAJOIAN	132 BALDOVINO SKYWAY	LAKEWAY	TX	78738	132 BALDOVINO SKWY	LAKEWAY	TX	78738
17	RICHARD LYN	MCCATHRON	134 BALDOVINO SKYWAY	LAKEWAY	TX	78738	PO BOX 163956	AUSTIN	TX	78716
18	SCOTT MICHAEL &	OLSCHEWSKY	136 BALDOVINO SKYWAY	LAKEWAY	TX	78738	136 BALDOVINO SKWY	LAKEWAY	TX	78738
19	WARD & JULIE DIANE	LAWRENCE	138 BALDOVINO SKYWAY	LAKEWAY	TX	78738	138 BALDOVINO SKWY	LAKEWAY	TX	78738
20	KARTIK & LAKSHMI KARTIK	RAMACHANDRAN	140 BALDOVINO SKYWAY	LAKEWAY	TX	78738	140 BALDOVINO SKYWAY	LAKEWAY	TX	78738
21	BRUCE SCOTT & MICHELE ANNE ALCANTARA	THOMPSON	142 BALDOVINO SKYWAY	LAKEWAY	TX	78738	142 BALDOVINO SKWY	LAKEWAY	TX	78738
22	CHARLES E III & PATRICIA ANN LONG	GRAHAM	144 BALDOVINO SKYWAY	LAKEWAY	TX	78738	144 BALDOVINO SKWY	LAKEWAY	TX	78738
23	KURT & KARLA WALTER LIFE ESTATE	WALTER	146 BALDOVINO SKYWAY	LAKEWAY	TX	78738	146 BALDOVINO SKWY	LAKEWAY	TX	78738
24	MICHAEL & JENNIFER C	HUGHES	148 BALDOVINO SKYWAY	LAKEWAY	TX	78738	148 BALDOVINO SKWY	LAKEWAY	TX	78738
25	ANTHONY P	BONADERO	150 BALDOVINO SKYWAY	AUSTIN	TX	78738	150 BALDOVINO SKYWAY	AUSTIN	TX	78738
26	CASS STREET TRUST		152 BALDOVINO SKYWAY	LAKEWAY	TX	78738	152 BALDOVINO SKWY	LAKEWAY	TX	78738
27	TERRICK D	GREEN	154 BALDOVINO SKYWAY	LAKEWAY	TX	78738	154 BALDOVINO SKWY	LAKEWAY	TX	78738
28	GEORGE D & MICHELLE MARIE	EGGERS	156 BALDOVINO SKYWAY	LAKEWAY	TX	78738	156 BALDOVINO SKWY	LAKEWAY	TX	78738
29	JEREMY & YESICA	NASH	158 BALDOVINO SKYWAY	LAKEWAY	TX	78738	158 BALDOVINO SKWY	LAKEWAY	TX	78738
30	MTP BALDOVINO LLC		160 BALDOVINO SKYWAY	LAKEWAY	TX	78738	3839 BEE CAVES RD STE 205	WEST LAKE HILLS	TX	78746
31	TAYLOR C	CHENEY	162 BALDOVINO SKYWAY	LAKEWAY	TX	78738	162 BALDOVINO SKYWAY	LAKEWAY	TX	78738
32	MATTHEW G & SARAH	CLEVE	202 COLCA CV	LAKEWAY	TX	78738	202 COLCA CV	LAKEWAY	TX	78738
33	CHIRIC & NITCELLE	EMANUELS	204 COLCA CV	AUSTIN	TX	78738	204 COLCA CV	AUSTIN	TX	78738
34	JOSHUA NORMAN & LINDSEY LOUISE	LANG	206 COLCA CV	AUSTIN	TX	78738	206 COLCA CV	AUSTIN	TX	78738
35	BRIAN & ANGELA	HYDE	208 COLCA CV	AUSTIN	TX	78738	208 COLCA CV	AUSTIN	TX	78738
36	JACLYN ELIZABETH & CODY RYAN	KELSO	207 COLCA CV	LAKEWAY	TX	78738	207 COLCA CV	LAKEWAY	TX	78738
37	JAMES J	CONNELL	205 COLCA CV	LAKEWAY	TX	78738	205 COLCA CV	LAKEWAY	TX	78738
38	ROUGH HOLLOW SOUTH SHORE II		BALDOVINO SKYWAY	LAKEWAY	TX	78738	901 HIGHLANDS BLVD	LAKEWAY	TX	78738
39	BENJAMIN & BRITTANY HUGHES	FLETCHER	208 BALDOVINO SKYWAY	LAKEWAY	TX	78738	208 BALDOVINO SKYWAY	LAKEWAY	TX	78738
40	JEFFERY A & ALEJANDRAD	SAITAS	210 BALDOVINO SKYWAY	LAKEWAY	TX	78738	6100 CARRY BACK LN	AUSTIN	TX	78746
41	CURTIS A & MELISSA HEEP	FORBES	212 BALDOVINO SKYWAY	LAKEWAY	TX	78738	212 BALDOVINO SKYWAY	LAKEWAY	TX	78738
42	NO CONTACT INFO AVAILABLE PER TCAD		214 BALDOVINO SKYWAY	LAKEWAY	TX	78738	214 BALDOVINO SKYWAY	LAKEWAY	TX	78738
43	RH LAKEWAY DEVELOPMENT LTD		216 BALDOVINO SKYWAY	LAKEWAY	TX	78738	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
44	JOSEPH R & LINDA J	LAMARCA	218 BALDOVINO SKYWAY	LAKEWAY	TX	78738	218 BALDOVINO SKYWAY	LAKEWAY	TX	78738
45	TODD & CLARK GRACE	CLARK	220 BALDOVINO SKYWAY	LAKEWAY	TX	78738	220 BALDOVINO SKYWAY	LAKEWAY	TX	78738
46	CLARK FAMILY 1988 TRUST		222 BALDOVINO SKYWAY	LAKEWAY	TX	78738	STE 504-436 2121 LOHMANS CROSSING RD	LAKEWAY	TX	78734
47	ANDRES J JR & MELINDA F	TREVINO	224 BALDOVINO SKYWAY	LAKEWAY	TX	78738	224 BALDOVINO SKYWAY	LAKEWAY	TX	78738
48	WAYNE FRANCIS & DENISE SHERMAN	IRMITER	226 BALDOVINO SKYWAY	LAKEWAY	TX	78738	226 BALDOVINO SKWY	LAKEWAY	TX	78738
49	JAMES JR & KAREN L	JACKSON	228 BALDOVINO SKYWAY	LAKEWAY	TX	78738	228 BALDOVINO SKYWAY	LAKEWAY	TX	78738
50	JASON M & SUSAN	REAMES	230 BALDOVINO SKYWAY	LAKEWAY	TX	78738	230 BALDOVINO SKYWAY	AUSTIN	TX	78738
51	RITTER FAMILY TRUST		232 BALDOVINO SKYWAY	LAKEWAY	TX	78738	232 BALDOVINO SKYWAY	LAKEWAY	TX	78738
52	MARK & ANGELA	WOODBIDGE	234 BALDOVINO SKYWAY	LAKEWAY	TX	78738	234 BALDOVINO SKYWAY	LAKEWAY	TX	78738
53	CLEVE ALLEN & HOPE	BELLAR	236 BALDOVINO SKYWAY	LAKEWAY	TX	78738	236 BALDOVINO SKWY	LAKEWAY	TX	78738
54	JEFFREY & EMILIA	BROCKMEYER	238 BALDOVINO SKYWAY	LAKEWAY	TX	78738	238 BALDOVINO SKWY	LAKEWAY	TX	78738
55	ROBERT WILLIAM & KATHERINE	CATALANO	240 BALDOVINO SKYWAY	LAKEWAY	TX	78738	240 BALDOVINO SKWY	LAKEWAY	TX	78738
56	XIWEI & YUMENG CHEN	WANG	242 BALDOVINO SKYWAY	LAKEWAY	TX	78738	242 BALDOVINO SKWY	LAKEWAY	TX	78738
57	RICKEY DON & CAREY DENISE	ANDERSON	244 BALDOVINO SKYWAY	LAKEWAY	TX	78738	244 BALDOVINO SKWY	LAKEWAY	TX	78738
58	ENGBLOM VERONICA A 2000 LIVING TRUST		246 BALDOVINO SKYWAY	LAKEWAY	TX	78738	246 BALDOVINO SKYWAY	LAKEWAY	TX	78738

AFFECTED LAND OWNER CROSS-REFERENCE LIST

AFFECTED LAND#	FIRST NAME	LAST NAME	PROPERTY ADDRESS	PROPERTY CITY	PROPERTY STATE	PROPERTY ZIP	MAILING ADDRESS	MAILING CITY	MAILING STATE	MAILING ZIP
59	PRASHANT P & NIKITA	PATEL	248 BALDOVINO SKYWAY	LAKEWAY	TX	78738	248 BALDOVINO SKYWAY	LAKEWAY	TX	78738
60	MICHELLE	FRITSCH	250 BALDOVINO SKYWAY	LAKEWAY	TX	78738	250 BALDOVINO SKYWAY	LAKEWAY	TX	78738
61	PRAKASH & POONAM KUMARI	CHANDRA	252 BALDOVINO SKYWAY	LAKEWAY	TX	78738	252 BALDOVINO SKWY	LAKEWAY	TX	78738
62	ROY C & MITZI L REESE	MULLINS	254 BALDOVINO SKYWAY	LAKEWAY	TX	78738	254 BALDOVINO SKWY	LAKEWAY	TX	78738
63	KEITH & MORAG	EVERILL	402 AUTUMN ROSE CV	LAKEWAY	TX	78738	402 AUTUMN ROSE CV	LAKEWAY	TX	78738
64	NEWMARK HOMES AUSTIN LLC		404 AUTUMN ROSE CV	LAKEWAY	TX	78738	23033 GRAND CIR BLVD #200	KATY	TX	77449
65	LEONARD CHARLES III & CASSANDRA MICHELLE	PAZDERNY	406 AUTUMN ROSE CV	LAKEWAY	TX	78738	406 AUTUMN ROSE CV	LAKEWAY	TX	78738
66	DAVID & ROBIN	WAIDA	405 AUTUMN ROSE CV	AUSTIN	TX	78738	405 AUTUMN ROSE CV	AUSTIN	TX	78738
67	ROUGH HOLLOW SOUTH SHORE II		BALDOVINO SKYWAY	LAKEWAY	TX	78738	901 HIGHLANDS BLVD	LAKEWAY	TX	78738
68	WEST & KALE	ROMBERGER	215 VISTA VILLAGE CV	LAKEWAY	TX	78738	215 VISTA VILLAGE CV	LAKEWAY	TX	78738
69	JOSEPH C & MARY KAY	OSBOURN	217 VISTA VILLAGE CV	LAKEWAY	TX	78738	217 VISTA VILLAGE CV	LAKEWAY	TX	78738
70	JONATHAN MICHAEL & STEVIE MARIAH DOUGLAS	DOUGLAS	219 VISTA VILLAGE CV	LAKEWAY	TX	78738	219 VISTA VLG	LAKEWAY	TX	78738
71	PAMELA A & ANTHONY	VANCE	221 VISTA VILLAGE CV	LAKEWAY	TX	78738	221 VISTA VILLAGE CV	LAKEWAY	TX	78738
72	TREVOR & BROOKE	JACKINS	218 VISTA VILLAGE CV	LAKEWAY	TX	78738	218 VISTA VILLAGE CV	LAKEWAY	TX	78738
73	RH LAKEWAY DEVELOPMENT LTD ETAL		BALDOVINO SKYWAY	LAKEWAY	TX	78738	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
74	ROUGH HOLLOW DEVELOPMENT LTD		HIGHLAND VILLAGE DR	LAKEWAY	TX	78738	2101 LAKEWAY BLVD STE 100	LAKEWAY	TX	78734
75	RH LAKEWAY DEVELOPMENT LTD		HIGHLAND VILLAGE DR	LAKEWAY	TX	78738	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
76	RH LAKEWAY DEVELOPMENT LTD		LAKEWAY BLVD	LAKEWAY	TX	78734	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
77	ROUGH HOLLOW DEVELOPMENT LTD		LAKEWAY BLVD	LAKEWAY	TX	78734	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
78	RH LAKEWAY DEVELOPMENT LTD		LAKEWAY BLVD	LAKEWAY	TX	78734	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
79	RH LAKEWAY DEVELOPMENT LTD		LAKEWAY BLVD	LAKEWAY	TX	78734	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
80	RH LAKEWAY DEVELOPMENT LTD		LAKEWAY BLVD	LAKEWAY	TX	78734	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
81	RH LAKEWAY DEVELOPMENT LTD		1000 HIGHLANDS BLVD	LAKEWAY	TX	78738	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
82	RH LAKEWAY DEVELOPMENT LTD		BEE CREEK RD	LAKEWAY	TX	78669	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
83	RH LAKEWAY DEVELOPMENT LTD		HIGHLANDS BLVD	LAKEWAY	TX	78681	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
84	RH LAKEWAY DEVELOPMENT LTD		LAKEWAY BLVD	LAKEWAY	TX	78734	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
85	RH LAKEWAY DEVELOPMENT LTD		LAKEWAY BLVD	LAKEWAY	TX	78734	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
86	RH LAKEWAY DEVELOPMENT LTD		LAKEWAY BLVD	LAKEWAY	TX	78734	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
87	RH LAKEWAY DEVELOPMENT LTD		LAKEWAY BLVD	LAKEWAY	TX	78734	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
88	RH LAKEWAY DEVELOPMENT LTD		LAKEWAY BLVD	LAKEWAY	TX	78734	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
89	RH LAKEWAY DEVELOPMENT LTD		HIGHLANDS BLVD	LAKEWAY	TX	78738	2101 LAKEWAY BLVD STE 100	AUSTIN	TX	78734
90	LAKEWAY ROUGH HOLLOW		HIGHLANDS BLVD	LAKEWAY	TX	78681	SOUTH COMMUNITY INC 2101 LAKEWAY BLVD ST	LAKEWAY	TX	78734
91	DAVID J & RORY FERESTER	SEWELL	331 BISSET CT	AUSTIN	TX	78738	331 BISSET CT	AUSTIN	TX	78738
92	DYLAN MAURICE & LATITO OODANE DAKKABAR	ROWE	329 BISSET CT	LAKEWAY	TX	78738	329 BISSET CT	LAKEWAY	TX	78738
93	DUPLICATE		329 BISSET CT	LAKEWAY	TX	78738	329 BISSET CT	LAKEWAY	TX	78738
94	CASEY A	CORTESE	105 BISSET CT	LAKEWAY	TX	78738	105 BISSET CT	LAKEWAY	TX	78738
95	SDD GAS COMPANY LLC		301 HIGHLANDS BLVD		TX	78738	602 W 9TH ST	AUSTIN	TX	78701
96	LAKEWAY ROUGH HOLLOW		302 HIGHLANDS BLVD	LAKEWAY	TX	78738	SOUTH COMMUNITY INC 2101 LAKEWAY BLVD ST	LAKEWAY	TX	78734
97	JOHN	ALLRED	407 BONAIRE CT	LAKEWAY	TX	78738	10027 INWOOD DR	HOUSTON	TX	77042
98	NANCY	ZEGARRA	409 BONAIRE CT	LAKEWAY	TX	78738	409 BONAIRE CT	LAKEWAY	TX	78738
99	CARMEN	ZEGARRA	411 BONAIRE CT	LAKEWAY	TX	78738	411 BONAIRE CT	LAKEWAY	TX	78738
100	JAMES E & SABINE G	LAMAR	413 BONAIRE CT	LAKEWAY	TX	78738	413 BONAIRE CT	LAKEWAY	TX	78738
101	BENJAMIN HARPER & YESSSEL DORALI HINOJOSA MARTIN	HULAN	415 BONAIRE CT	LAKEWAY	TX	78738	415 BONAIRE CT	LAKEWAY	TX	78738
102	WILLIAM R & REBECA G	MENEGHAN	101 ANTIGUA WAY	LAKEWAY	TX	78738	101 ANTIGUA WAY	LAKEWAY	TX	78738
103	LAKEWAY ROUGH HOLLOW		HIGHLANDS BLVD	LAKEWAY	TX	78738	SOUTH COMMUNITY INC 2101 LAKEWAY BLVD ST	LAKEWAY	TX	78734
104	LAKEWAY ROUGH HOLLOW		LAKEWAY BLVD	LAKEWAY	TX	78734	SOUTH COMMUNITY INC 2101 LAKEWAY BLVD ST	LAKEWAY	TX	78734
105	LAKEWAY M U D		251 HIGHLANDS BLVD	LAKEWAY	TX	78738	1097 LOHMANS CROSSING RD	LAKEWAY	TX	78734
106	CITY OF LAKEWAY		115 TROPHY DR	LAKEWAY	TX	78738	1102 LOHMANS CROSSING RD	LAKEWAY	TX	78734
107	LAKE TRAVIS ISD		3301 SERENE HILLS DR	LAKEWAY	TX	78738	3322 RANCH ROAD 620 S	AUSTIN	TX	78738
108	CITY OF LAKEWAY		SERENE HILLS DR	AUSTIN	TX	78738	1102 LOHMANS CROSSING RD	LAKEWAY	TX	78734
109	SEVEN CUSTOM HOMES INC		3500 SERENE HILLS PASS	AUSTIN	TX	78738	1921 LOHMANS CROSSING RD STE 100	AUSTIN	TX	78734
110	CITY OF LAKEWAY		3301 SERENE HILLS DR	AUSTIN	TX	78738	1102 LOHMANS CROSSING RD	LAKEWAY	TX	78734
111	AMIE43 & ROSINA53 TRUST		17830 SERENE HILLS PASS	AUSTIN	TX	78738	17830 SERENE HILLS PASS	AUSTIN	TX	78738
112	FRANK BROWN & NANCY B	WORD	17824 SERENE HILLS PASS	AUSTIN	TX	78738	17824 SERENE HILLS PASS	AUSTIN	TX	78738
113	JOHN HICKMAN	BAKER	17804 SERENE HILLS PASS	AUSTIN	TX	78738	2121 LOHMANS CROSSING RD STE 504-373	LAKEWAY	TX	78734
114	LRKGK FAMILY TRUST		17800 SERENE HILLS PASS	AUSTIN	TX	78738	2301 S. CAPITAL OF TEXAS HWY. BUILDING K	AUSTIN	TX	78746
115	KEVIN AND CHRISTINE	BARKER	FLINT ROCK	AUSTIN	TX	78738	1545 SILVER CREEK CIR	ALLEN	TX	75002
116	EASTSIDE LANDINGS DEVELOPMENT		17301 FLINT ROCK RD	AUSTIN	TX	78738	2101 LAKEWAY BLVD STE 130	LAKEWAY	TX	78734

AFFECTED LAND OWNER CROSS-REFERENCE LIST

AFFECTED LAND#	FIRST NAME	LAST NAME	PROPERTY ADDRESS	PROPERTY CITY	PROPERTY STATE	PROPERTY ZIP	MAILING ADDRESS	MAILING CITY	MAILING STATE	MAILING ZIP
117	SERENE HILLS HOMEOWNERS		DUCKHORN PASS	AUSTIN	TX	78738	PO BOX 203310 C/O GOODWIN MANAGEMENT INC	AUSTIN	TX	78720
118	WCID #17		STATE HY 71	LAKEWAY	TX	78669	3812 ECK LN	AUSTIN	TX	78734
119	KIW LAKEWAY VENTURE LLC		5201 BEE CREEK RD	AUSTIN	TX	78738	6710 E CAMELBACK RD STE 100	SCOTTSDALE	AZ	85251
120	LAKEWAY BEE CREEK DEVELOPMENT LLC		5202 STATE HY 71	LAKEWAY	TX	78669	10401 E STATE HIGHWAY 71 UNIT 4	SPICEWOOD	TX	78669
121	LAKEWAY BEE CREEK DEVELOPMENT LLC		5202 STATE HY 71	LAKEWAY	TX	78669	10401 E STATE HIGHWAY 71 UNIT 4	SPICEWOOD	TX	78669
122	LAKEWAY BEE CREEK DEVELOPMENT LLC		5014 BEE CREEK RD	LAKEWAY	TX	78669	10401 E STATE HIGHWAY 71 UNIT 4	SPICEWOOD	TX	78669
123	HORNET CAPITAL LLC		5004 BEE CREEK RD	LAKEWAY	TX	78669	PO BOX 170309	AUSTIN	TX	78717
124	MEAGAN L & DANIEL Y	SCARBOROUGH	4968 BEE CREEK RD	LAKEWAY	TX	78669	410 WILD ELM ST	FRANKLIN	TN	37064
125	ARMFAMINT LLC		4950 BEE CREEK RD	LAKEWAY	TX	78669	PO BOX 92198	AUSTIN	TX	78709
126	BEE CREEK PROJECT LLC		4936 BEE CREEK RD	LAKEWAY	TX	78669	2092 CONCOURSE DR #9	SAN JOSE	CA	95131
127	LAKE TRAVIS INDEPENDENT SCHOOL DISTRICT		4932 BEE CREEK RD	LAKEWAY	TX	78669	3322 RANCH ROAD 620 S	AUSTIN	TX	78738
128	BEE CREEK STABLES L P		4918 BEE CREEK RD	LAKEWAY	TX	78669	4900 BEE CREEK RD	SPICEWOOD	TX	78669
129	A NEW DAY CHILD DEVELOPMENT CENTER LLC		BEE CREEK	LAKEWAY	TX	78669	5014 BEE CREEK RD STE A	SPICEWOOD	TX	78669
130	LAKE TRAVIS INDEPENDENT SCHOOL DISTRICT		4528 BEE CREEK RD	LAKEWAY	TX	78669	1139 CHALLENGER	LAKEWAY	TX	78734
131	RAY MAYO	DAVIDSON	507 FLAMINGO BLVD	LAKEWAY	TX	78734	PO BOX 340190	AUSTIN	TX	78734
132	SCOTT R & KAYLA MCCUTCHEON	HOILAND	509 FLAMINGO BLVD	AUSTIN	TX	78734	509 FLAMINGO BLVD	AUSTIN	TX	78734
133	JOHN & TERRI	WADE	511 FLAMINGO BLVD	LAKEWAY	TX	78734	511 FLAMINGO BLVD	LAKEWAY	TX	78734
134	PETER	SCHMITT	513 FLAMINGO BLVD	LAKEWAY	TX	78734	513 FLAMINGO BLVD	LAKEWAY	TX	78734
135	KEVIN & ALEXANDRIA LINDQUIST	KLAUS	515 FLAMINGO BLVD	LAKEWAY	TX	78734	170 KLAUS LN	RED ROCK	TX	78662
136	NATHAN & EMERY	LINDEMUTH	517 FLAMINGO BLVD	LAKEWAY	TX	78734	517 FLAMINGO BLVD	LAKEWAY	TX	78734
137	JAMES & NANCY	REINERS	519 FLAMINGO BLVD	LAKEWAY	TX	78734	519 FLAMINGO BLVD	LAKEWAY	TX	78734
138	LAKEWAY AIRPARK INC		115 FLYING SCOT ST	LAKEWAY	TX	78734	115 FLYING SCOT ST	LAKEWAY	TX	78734
139	CITY OF LAKEWAY		LAKEWAY DR	LAKEWAY	TX	78734	3030 LBJ FREEWAY SUITE 600	DALLAS	TX	75234
140	THOMAS AND AMY HARPER TRUST		605 VANGUARD	LAKEWAY	TX	78734	605 VANGUARD ST	LAKEWAY	TX	78734
141	ZHONGCHUN & HE ZHU	LIU	601 VANGUARD	LAKEWAY	TX	78734	3103 CREEK EDGE PKWY	AUSTIN	TX	78733
142	THOMAS JOLLY & ELIZABETH THOMAS	MANAYATHARA	736 VANGUARD	LAKEWAY	TX	78734	736 VANGUARD ST	LAKEWAY	TX	78734
143	DON M & GAYLE M	CANADA	734 VANGUARD	LAKEWAY	TX	78734	734 VANGUARD ST	LAKEWAY	TX	78734
144	DENNIS R & PATRICIA E	GAYDOS	732 VANGUARD	LAKEWAY	TX	78734	732 VANGUARD ST	LAKEWAY	TX	78734
145	CLAYTON GUY C & JAMIE L LIFE ESTATE		730 VANGUARD	LAKEWAY	TX	78734	730 VANGUARD ST	LAKEWAY	TX	78734
146	BOBBY JOE & LINDSAY NICOLE IUEN	TURNER	728 VANGUARD	LAKEWAY	TX	78734	728 VANGUARD ST	LAKEWAY	TX	78734
147	CARL A	JUNCO	726 VANGUARD	LAKEWAY	TX	78734	726 VANGUARD ST	LAKEWAY	TX	78734
148	ROBERT C & BONNIE B	SIDDONS	724 VANGUARD	LAKEWAY	TX	78734	724 VANGUARD ST	LAKEWAY	TX	78734
149	KARL & JACKIE	MENTZEL	722 VANGUARD	LAKEWAY	TX	78734	722 VANGUARD ST	LAKEWAY	TX	78734
150	MARK L & JOAN E SMITH	ABDO	720 VANGUARD	LAKEWAY	TX	78734	720 VANGUARD ST	LAKEWAY	TX	78734
151	WINCHESTER ALASTAIR & ALLISON TRUST		718 VANGUARD	LAKEWAY	TX	78734	718 VANGUARD ST	LAKEWAY	TX	78734
152	STEPHEN MILES	HACKERMAN	716 VANGUARD	LAKEWAY	TX	78734	3402 ELLA LEE LN	HOUSTON	TX	77027
153	THOMAS J & SANDRA J	WALSH	714 VANGUARD	LAKEWAY	TX	78734	714 VANGUARD ST	LAKEWAY	TX	78734
154	BARBARA K	BEEBE	712 VANGUARD	LAKEWAY	TX	78734	712 VANGUARD	LAKEWAY	TX	78734
155	ROBERT B & LAURA C	BARNES	710 VANGUARD	LAKEWAY	TX	78734	710 VANGUARD ST	LAKEWAY	TX	78734
156	WILLIAM H & SHIRLEY J	DICKSON	708 VANGUARD	LAKEWAY	TX	78734	708 VANGUARD ST	LAKEWAY	TX	78734
157	WILLIAM H & SHIRLEY J	DICKSON	706 VANGUARD	LAKEWAY	TX	78734	708 VANGUARD ST	LAKEWAY	TX	78734
158	KHOI NGOC & ELENA DELEON	NGUYEN	704 VANGUARD	LAKEWAY	TX	78734	704 VANGUARD	LAKEWAY	TX	78734
159	KING BIANCA LIVING TRUST		702 VANGUARD	LAKEWAY	TX	78734	702 VANGUARD	LAKEWAY	TX	78734
160	DANIELLE & JANTZEN	SLAUGHTER	801 VANGUARD	LAKEWAY	TX	78734	801 VANGUARD ST	LAKEWAY	TX	78734
161	BEVERLY	BANFIELD	803 VANGUARD	LAKEWAY	TX	78734	803 VANGUARD	LAKEWAY	TX	78734
162	CHARLES N & JUDITH L	RENNER	805 VANGUARD	LAKEWAY	TX	78734	805 VANGUARD ST	LAKEWAY	TX	78734
163	PATRICIA A & JAMES S	GRAY	807 VANGUARD	LAKEWAY	TX	78734	807 VANGUARD	LAKEWAY	TX	78734
164	MIKE	STAUFFACHER	809 VANGUARD	LAKEWAY	TX	78734	809 VANGUARD ST	LAKEWAY	TX	78734
165	OVIDIO R & MARCELA R	PINTO	811 VANGUARD	LAKEWAY	TX	78734	811 VANGUARD ST	LAKEWAY	TX	78734
166	EKRE OF TX LLC		813 VANGUARD	LAKEWAY	TX	78734	215 PARK AVENUE S STE 1713	NEW YORK	NY	10003
167	JEFFREY STEPHEN & GARY DAVID STEIN	LUTES	815 VANGUARD	LAKEWAY	TX	78734	815 VANGUARD ST	LAKEWAY	TX	78734
168	SOPHIE & BRIAN MICHAEL FLANNERY	LAMMERS	901 VANGUARD	LAKEWAY	TX	78734	901 VANGUARD ST	LAKEWAY	TX	78734
169	DONALD F & SHANNON V	CORNELL	903 VANGUARD	AUSTIN	TX	78734	903 VANGUARD ST	AUSTIN	TX	78734
170	MIKE & PAULA	ELLIS	905 VANGUARD	LAKEWAY	TX	78734	905 VANGUARD	LAKEWAY	TX	78734
171	EUGENIE S	WHALEN	907 VANGUARD	LAKEWAY	TX	78734	907 VANGUARD ST	LAKEWAY	TX	78734
172	DANIEL CHRISTOPHER	BROWNE	909 VANGUARD	LAKEWAY	TX	78734	909 VANGUARD	LAKEWAY	TX	78734
173	MONICA ANN	LEO	911 VANGUARD	LAKEWAY	TX	78734	911 VANGUARD ST	LAKEWAY	TX	78734
174	DUFFY TIMOTHY & SHARON TRUST		913 VANGUARD	LAKEWAY	TX	78734	913 VANGUARD ST	LAKEWAY	TX	78734

AFFECTED LAND OWNER CROSS-REFERENCE LIST

AFFECTED LAND#	FIRST NAME	LAST NAME	PROPERTY ADDRESS	PROPERTY CITY	PROPERTY STATE	PROPERTY ZIP	MAILING ADDRESS	MAILING CITY	MAILING STATE	MAILING ZIP
175	DAVID B & MELISSA A	ETIENNE	915 VANGUARD	LAKEWAY	TX	78734	915 VANGUARD ST	LAKEWAY	TX	78734
176	OVERLANDER REVOCABLE TRUST		917 VANGUARD	LAKEWAY	TX	78734	917 VANGUARD ST	LAKEWAY	TX	78734
177	RICHARD CHAT & MICHELLE	WYNNE	921 VANGUARD	LAKEWAY	TX	78734	921 VANGUARD ST	LAKEWAY	TX	78734
178	CHRISTOPHER & JENNIFER	LAUREN	923 VANGUARD	LAKEWAY	TX	78734	923 VANGUARD ST	LAKEWAY	TX	78734
179	JOHN A	FLACHE	925 VANGUARD	LAKEWAY	TX	78734	PO BOX 26548	AUSTIN	TX	78755
180	JON & JENNIFER	BARTOSH	927 VANGUARD	LAKEWAY	TX	78734	927 VANGUARD ST	LAKEWAY	TX	78734
181	ROBERT B & MARIE N	COHAN	929 VANGUARD	LAKEWAY	TX	78734	929 VANGUARD ST	LAKEWAY	TX	78734
182	HECKLER DAVID J & JANE M REVOCABLE TRUST		931 VANGUARD	LAKEWAY	TX	78734	2303 RANCH ROAD 620 S, STE 160-232	AUSTIN	TX	78734
183	PATRICK K & SHANON	SUTHERLAND	933 VANGUARD	LAKEWAY	TX	78734	933 VANGUARD ST	LAKEWAY	TX	78734
184	JOHN GEORGE & DEBRA ELAINE	CAPORAL	935 VANGUARD	LAKEWAY	TX	78734	935 VANGUARD ST	LAKEWAY	TX	78734
185	STANLEY J & MEGG E	RAGAN	937 VANGUARD	LAKEWAY	TX	78734	937 VANGUARD	LAKEWAY	TX	78734
186	MICHAEL & JENNIFER	KUBICEK	939 VANGUARD	LAKEWAY	TX	78734	939 VANGUARD ST	LAKEWAY	TX	78734
187	JACK E	LEWIS	941 VANGUARD	LAKEWAY	TX	78734	941 VANGUARD ST	LAKEWAY	TX	78734
188	MICHELLE & ROBERT DUNKERLEY	MOGGIO	943 VANGUARD	LAKEWAY	TX	78734	943 VANGUARD ST	LAKEWAY	TX	78734
189	PHILLIP L & REBECCA B	LANIER	945 VANGUARD	LAKEWAY	TX	78734	945 VANGUARD ST	LAKEWAY	TX	78734
190	SANDERS ROGER JOHN REVOCABLE TRUST		947 VANGUARD	LAKEWAY	TX	78734	947 VANGUARD ST	LAKEWAY	TX	78734
191	JOE D JR & NANCY KAY	BAIN	949 VANGUARD	LAKEWAY	TX	78734	949 VANGUARD ST	LAKEWAY	TX	78734
192	LANE LUAU LIVING TRUST		951 VANGUARD	LAKEWAY	TX	78734	951 VANGUARD	LAKEWAY	TX	78734
193	KEVIN K & DEBBIE LEE	PHILLIPS	1002 VANGUARD	LAKEWAY	TX	78734	1002 VANGUARD ST	LAKEWAY	TX	78734
194	TRACY & ANNA ROCKWELL	ROCKWELL	420 NEW LIDO DR	LAKEWAY	TX	78734	420 NEW LIDO DR	LAKEWAY	TX	78734
195	BOTTA FRANK J & ELIZABETH J TRUST		418 NEW LIDO DR	AUSTIN	TX	78734	418 NEW LIDO DR	AUSTIN	TX	78734
196	ROBERT E & KERRY L TRUS	WALKER	416 NEW LIDO DR	LAKEWAY	TX	78734	416 NEW LIDO DR	LAKEWAY	TX	78734
197	JOSEPH SUNIL & SALLY ANN JOSEPH LIFE ESTATE		414 NEW LIDO DR	LAKEWAY	TX	78734	414 NEW LIDO DR	LAKEWAY	TX	78734
198	STEPHEN M & SANDRA T	PRICE	412 NEW LIDO DR	LAKEWAY	TX	78734	412 NEW LIDO DR	LAKEWAY	TX	78734
199	BILL & MARGER Y	HEDGES	410 NEW LIDO DR	LAKEWAY	TX	78734	410 NEW LIDO DR	LAKEWAY	TX	78734
200	LAKEWAY PATIO HOMES		100 LIDO	LAKEWAY	TX	78734	100 LIDO CIRCLE	LAKEWAY	TX	78734
201	LAKEWAY PATIO HOMES		203-230 LIDO	LAKEWAY	TX	78734	18 B SCHOONER COVE	AUSTIN	TX	78734
202	EDSON JR & JACQUELINE VALLIM JACOBINA	OLIVEIRA	206 LIDO	LAKEWAY	TX	78734	206 LIDO ST	LAKEWAY	TX	78734
203	SCOTT D & WENDY L STEWART	ELY	204 LIDO	LAKEWAY	TX	78734	204 LIDO ST	LAKEWAY	TX	78734
204	MARY LIFE ESTATE	BOHN	202 LIDO	AUSTIN	TX	78734	202 LIDO ST	AUSTIN	TX	78734
205	JOHN & KATHLEEN	HENDRICKS	136 LIDO	LAKEWAY	TX	78734	136 LIDO ST	LAKEWAY	TX	78734
206	SPRAGUE TIDBALL TRUST		134 LIDO	LAKEWAY	TX	78734	134 LIDO ST	LAKEWAY	TX	78734
207	PATRICIA A	JETTON	132 LIDO	LAKEWAY	TX	78734	132 LIDO ST	LAKEWAY	TX	78734
208	MARLENE	KASPER	130 LIDO	AUSTIN	TX	78734	130 LIDO ST	AUSTIN	TX	78734
209	HECTOR M JR	ESTRADA	128 LIDO	LAKEWAY	TX	78734	128 LIDO ST	LAKEWAY	TX	78734
210	WILLIAM JOSEPH	BRANIGIN	126 LIDO	LAKEWAY	TX	78734	10724 MIDSUMMER DR	RESTON	VA	20191
211	LAURA E	BATTLE	124 LIDO	AUSTIN	TX	78734	124 LIDO	AUSTIN	TX	78734
212	R&M BAKER FAMILY TRUST		122 LIDO	LAKEWAY	TX	78734	122 LIDO ST	LAKEWAY	TX	78734
213	KAREN A	HUGHES	120 LIDO	LAKEWAY	TX	78734	120 LIDO ST	LAKEWAY	TX	78734
214	CHRISTOPHER J M & PHIROZA C	SHERBACK	118 LIDO	AUSTIN	TX	78734	118 LIDO ST	AUSTIN	TX	78734
215	WILLIAM W & JOAN D	EWEN	114 LIDO	LAKEWAY	TX	78734	114 LIDO ST	LAKEWAY	TX	78734
216	VICKI MARTIN	FURLONG	112 LIDO	LAKEWAY	TX	78734	112 LIDO ST	LAKEWAY	TX	78734
217	PATTY K & RAY	SITES	110 LIDO	LAKEWAY	TX	78734	110 LIDO ST	LAKEWAY	TX	78734
218	SDIRICTED LLC		108 LIDO	LAKEWAY	TX	78734	108 LIDO ST	LAKEWAY	TX	78734
219	VERA FRANCES	MCELVEEN	106 LIDO	LAKEWAY	TX	78734	106 LIDO ST	LAKEWAY	TX	78734
220	BRYAN & SHERRI	WOOTEN	104 LIDO	LAKEWAY	TX	78734	104 LIDO ST	LAKEWAY	TX	78734
221	THOMAS P & LYNETTE K	FLOWERS	102 LIDO	LAKEWAY	TX	78734	102 LIDO ST	LAKEWAY	TX	78734
222	CURTISS C III	GROVE	615 LIDO	LAKEWAY	TX	78734	615 LIDO ST	LAKEWAY	TX	78734
223	ERWIN & LISA	WOLNIEWITZ	613 LIDO	LAKEWAY	TX	78734	613 LIDO ST	LAKEWAY	TX	78734
224	KEVIN D & CYNTHIA M	OLIVER	611 LIDO	LAKEWAY	TX	78734	1607 FLINT CT	LAKEWAY	TX	78734
225	EDWARD GENE JR	SCHROEDER	609 LIDO	LAKEWAY	TX	78734	609 LIDO ST	LAKEWAY	TX	78734
226	BALDWIN SALLY T TRUST		607 LIDO	LAKEWAY	TX	78734	607 LIDO ST	LAKEWAY	TX	78734
227	WILLIAM R & IMOGENE	STOKES	104 FLYING SCOT ST	LAKEWAY	TX	78734	104 FLYING SCOT ST	LAKEWAY	TX	78734
228	J KEITH & SUE S	DURIO	108 FLYING SCOT ST	LAKEWAY	TX	78734	108 FLYING SCOT ST	LAKEWAY	TX	78734
229	NIELS & JANE E	OLUFSEN	110 FLYING SCOT ST	LAKEWAY	TX	78734	110 FLYING SCOT ST	LAKEWAY	TX	78734
230	NIELS & JANE E	OLUFSEN	112 FLYING SCOT ST	LAKEWAY	TX	78734	110 FLYING SCOT ST	LAKEWAY	TX	78734
231	AARON MITCHELL	CARLSON	114 FLYING SCOT ST	LAKEWAY	TX	78734	114 FLYING SCOT ST	LAKEWAY	TX	78734
232	SEPTEMBER 14 LLC		102 CHAMPION DR	LAKEWAY	TX	78734	790 W SAM HOUSTON PKWY	HOUSTON	TX	77024

AFFECTED LAND OWNER CROSS-REFERENCE LIST

AFFECTED LAND#	FIRST NAME	LAST NAME	PROPERTY ADDRESS	PROPERTY CITY	PROPERTY STATE	PROPERTY ZIP	MAILING ADDRESS	MAILING CITY	MAILING STATE	MAILING ZIP
233	MICHAEL C & JORDAN B	PENNINGTON	104 CHAMPION DR	LAKEWAY	TX	78734	104 CHAMPION DR	LAKEWAY	TX	78734
234	BRUCE LEROY & SUZANNE CARRITHERS	JAMES	106 CHAMPION DR	LAKEWAY	TX	78734	106 CHAMPION DR	LAKEWAY	TX	78734
235	ROGER B & MYRNA F	POWELL	108 CHAMPION DR	LAKEWAY	TX	78734	108 CHAMPION DR	LAKEWAY	TX	78734
236	MARIA TERESA & ERIK L	LOFGREN	200 CHAMPION DR	LAKEWAY	TX	78734	105 WAVERLY SPIRE CT	LAKEWAY	TX	78738
237	ROBERT R & PENNY M	BREWER	202 CHAMPION DR	LAKEWAY	TX	78734	202 CHAMPION DR	LAKEWAY	TX	78734
238	ODABASHIAN LAURA ANN REVOCABLE TRUST		204 CHAMPION DR	LAKEWAY	TX	78734	204 CHAMPION DR	LAKEWAY	TX	78734
239	MELVIN C & JAN C	NEESE	302 CHAMPION DR	LAKEWAY	TX	78734	302 CHAMPION DR	LAKEWAY	TX	78734
240	JING & ALEXANDRU VASILIU	XIE	304 CHAMPION DR	LAKEWAY	TX	78734	304 CHAMPION DR	LAKEWAY	TX	78734
241	DARWIN & EILEEN	MONEYHON	306 CHAMPION DR	LAKEWAY	TX	78734	306 CHAMPION DR	LAKEWAY	TX	78734
242	DONALD P & SUSAN B	WILCOX	308 CHAMPION DR	LAKEWAY	TX	78734	308 CHAMPION DR	LAKEWAY	TX	78734
243	JOHN RICHARD & JENNIFER	ELLIS	310 CHAMPION DR	LAKEWAY	TX	78734	310 CHAMPION DR	LAKEWAY	TX	78734
244	STEVE & SYLVIA	MEIER	312 CHAMPION DR	LAKEWAY	TX	78734	312 CHAMPION DR	LAKEWAY	TX	78734
245	MICHAELYN C	FARMER	2606 LAKEWAY BLVD	AUSTIN	TX	78734	2606 LAKEWAY BLVD	AUSTIN	TX	78734
246	ERIK WILLIAM & KIMBERLY ANN	MULLOY	1 CHAMPION LN	LAKEWAY	TX	78734	121 BLUE JAY	LAKEWAY	TX	78734
247	DONNA	FITZGERALD	2 CHAMPION LN	LAKEWAY	TX	78734	2 CHAMPION LN	LAKEWAY	TX	78734
248	ROBERT W & MAGAN E	LEWIS	3 CHAMPION LN	LAKEWAY	TX	78734	3 CHAMPION LN	LAKEWAY	TX	78734
249	CRAIG P & TERRE L	HELWIG	4 CHAMPION LN	LAKEWAY	TX	78734	4 CHAMPION LN	LAKEWAY	TX	78734
250	TAYLOR R	BETTIS	5 CHAMPION LN	LAKEWAY	TX	78734	5 CHAMPIONS LN	LAKEWAY	TX	78734
251	JUN	HUA	6 CHAMPIONS LN	LAKEWAY	TX	78747	6 CHAMPIONS LANE	LAKEWAY	TX	78734
252	ANGELA PAIGE	OSTLUND	7 CHAMPION LN	LAKEWAY	TX	78734	2900 KATTER CT	AUSTIN	TX	78734
253	DARREN R & MIA	VAUGHN	8 CHAMPION LN	LAKEWAY	TX	78734	8 CHAMPIONS LN	LAKEWAY	TX	78734
254	STANLEY & SHEILA	BUTTERFIELD	9 CHAMPION LN	LAKEWAY	TX	78734	9 CHAMPION LN	LAKEWAY	TX	78734
255	JAMES BETTY 2015 IRREVOCABLE TRUST		10 CHAMPION LN	LAKEWAY	TX	78734	7600 N CAPITAL OF TEXAS HWY #B	AUSTIN	TX	78731
256	RONNIE D	MENARD	11 CHAMPION LN	LAKEWAY	TX	78734	11 PARKSIDE RD	THE HILLS	TX	78738
257	MARILYN	MERRITT	12 CHAMPION LN	LAKEWAY	TX	78734	12 CHAMPION LN	LAKEWAY	TX	78734
258	GREGORY DALE	COLEMAN	13 CHAMPION LN	LAKEWAY	TX	78734	13 CHAMPIONS LN	LAKEWAY	TX	78734
259	JERRY W & PATRICIA ANN	HEARE	14 CHAMPION LN	LAKEWAY	TX	78734	14 CHAMPIONS LN	LAKEWAY	TX	78734
260	WILLIAM K & JOAN C	KENDRICK	15 CHAMPION LN	LAKEWAY	TX	78734	15 CHAMPIONS LN	LAKEWAY	TX	78734
261	CRIFE FAMILY TRUST		12 PRESTONWOOD CIR	LAKEWAY	TX	78734	12 PRESTONWOOD CIR	LAKEWAY	TX	78734
262	CYRUS F III & DEIRDRE H	RICHARDS	11 PRESTONWOOD CIR	LAKEWAY	TX	78734	11 PRESTONWOOD CIR	LAKEWAY	TX	78734
263	EVELYN S	DUNLAP	10 PRESTONWOOD CIR	LAKEWAY	TX	78734	10 PRESTONWOOD CIR	LAKEWAY	TX	78734
264	JOHN & MADELINE NANCE	WILLHITE	9 PRESTONWOOD CIR	LAKEWAY	TX	78734	9 PRESTONWOOD CIR	LAKEWAY	TX	78734
265	KILLION TERRY L & JOELLEN REVOCABLE TRUST		8 PRESTONWOOD CIR	LAKEWAY	TX	78734	8 PRESTONWOOD CIR	LAKEWAY	TX	78734
266	ROBERT S	SWINNEY	7 PRESTONWOOD CIR	LAKEWAY	TX	78734	7 PRESTONWOOD CIR	LAKEWAY	TX	78734
267	LUCINDA & CARLETON	BATES	6 PRESTONWOOD CIR	LAKEWAY	TX	78734	6 PRESTONWOOD CIR	LAKEWAY	TX	78734
268	PATSY & AUGUST	PETERSEN	5 PRESTONWOOD CIR	LAKEWAY	TX	78734	5 PRESTONWOOD CIR	LAKEWAY	TX	78734
269	BOULEVARD AT LAKEWAY HOA THE		38 PRESTONWOOD CIR	LAKEWAY	TX	78734	700 MARKET ST. BLDG 3	CEDAR PARK	TX	78613
270	ROBERT M & SANDRA J	WENINGER	4 PRESTONWOOD CV	LAKEWOOD	TX	78734	4 PRESTONWOOD CV	LAKEWOOD	TX	78734
271	RAGAN T	ALTIZER	3 PRESTONWOOD CV	LAKEWAY	TX	78734	3 PRESTONWOOD CIR	LAKEWAY	TX	78734
272	DEREK JON & KARI ANNE	HALL	2 PRESTONWOOD CV	LAKEWAY	TX	78734	3801 N CAPITAL OF TEXAS HWY	AUSTIN	TX	78746
273	GORDON A & ELLEN N	PHILLIPSON	1 PRESTONWOOD CV	LAKEWAY	TX	78734	1 PRESTONWOOD CIR	LAKEWAY	TX	78734
274	STONE CREEK VILLAS HOMEOWNERS		1-28 STONEY CREEK CV	LAKEWAY	TX	78734	1-28 STONEY CREEK CV	LAKEWAY	TX	78734
275	MARY M & JEFFREY R SCHNEIDER	MCCANN	102 STONEY CREEK CV	LAKEWAY	TX	78734	102 STONEY CREEK CV	LAKEWAY	TX	78734
276	DAVID KO YEN	TSAI	101 STONEY CREEK CV	LAKEWAY	TX	78734	101 STONEY CREEK CV	LAKEWAY	TX	78734
277	LAKEWAY M U D		30 STONEY CREEK CV	LAKEWAY	TX	78734	1097 LOHMANS CROSSING RD	LAKEWAY	TX	78734
278	CLUBCORP GOLF OF TEXAS L P		LAKEWAY BLVD	LAKEWAY	TX	78734	PO BOX 790830	SAN ANTONIO	TX	78279
279	THOMAS C & DEBORAH J TRUST	CONNORS	29 CHANDON LN	AUSTIN	TX	78734	29 CHANDON LN	AUSTIN	TX	78734
280	AURICH FAMILY TRUST		27 CHANDON LN	LAKEWAY	TX	78734	969 ADELLA AVE	CORONADO	CA	92118
281	THEODORE H JR & BARBARA J	HEINSOHN	25 CHANDON LN	LAKEWAY	TX	78738	43 AMBLESIDE CRESCENT DR	SUGAR LAND	TX	77479
282	JAMES MICHAEL	PENNINGTON	23 CHANDON LN	LAKEWAY	TX	78734	P O BOX 340400	LAKEWAY	TX	78734
283	DAVID K	BROWN	21 CHANDON LN	LAKEWAY	TX	78734	21 CHANDON LN	LAKEWAY	TX	78734
284	DAVID LEE & MARY SQUIER	WEILER	19 CHANDON LN	LAKEWAY	TX	78738	19 CHANDON LN	LAKEWAY	TX	78734
285	PATRICIO DANIEL & MARY NELL	ALVAREZ	17 CHANDON LN	AUSTIN	TX	78738	17 CHANDON LN	AUSTIN	TX	78734
286	AUSTIN	WIGHAMAN	15 CHANDON LN	LAKEWAY	TX	78734	15 CHANDON LN	LAKEWAY	TX	78734
287	MITCHELL L	WELCH	13 CHANDON LN	LAKEWAY	TX	78734	204 DASHER DR	LAKEWAY	TX	78734
288	HAMMES FAMILY TRUST		11 CHANDON LN	AUSTIN	TX	78734	11 CHANDON LN	AUSTIN	TX	78734
289	CONNIE J BELLINGHAUSEN	PAYNE	9 CHANDON LN	AUSTIN	TX	78734	9 CHANDON LN	AUSTIN	TX	78734
290	MARY E	HUBBELL	7 CHANDON LN	LAKEWAY	TX	78734	7 CHANDON LN	LAKEWAY	TX	78734

AFFECTED LAND OWNER CROSS-REFERENCE LIST

AFFECTED LAND#	FIRST NAME	LAST NAME	PROPERTY ADDRESS	PROPERTY CITY	PROPERTY STATE	PROPERTY ZIP	MAILING ADDRESS	MAILING CITY	MAILING STATE	MAILING ZIP
291	R ANDERS	ROSENDAHL	3 CHANDON LN	AUSTIN	TX	78734	3 CHANDON LN	AUSTIN	TX	78734
292	DAVID L & JUDY	BOWEN	1 CHANDON LN	LAKEWAY	TX	78734	16806 FOREST WAY	AUSTIN	TX	78734
293	DICKIE ARNOLD	HARGRAVE	1415 LAKEWAY DR	LAKEWAY	TX	78734	1415 LAKEWAY DR	LAKEWAY	TX	78734
294	ELIZABETH PAGE	GIBSON	1413 LAKEWAY DR	LAKEWAY	TX	78734	909 E 43RD ST	AUSTIN	TX	78751
295	GREGORY & JACQUELYN	BILBRO	1411 LAKEWAY DR	LAKEWAY	TX	78734	6513 SANS SOUCI CV	AUSTIN	TX	78759
296	JACK & JIN	DABBAH	1409 LAKEWAY DR	LAKEWAY	TX	78734	1409 LAKEWAY DR	LAKEWAY	TX	78734
297	WILLIAM W & MARY ELIZABETH	MANSELL	1407 LAKEWAY DR	LAKEWAY	TX	78734	1407 LAKEWAY DR	LAKEWAY	TX	78734
298	JAMES H & MARIAN KATHLEEN	PARRIS	1405 LAKEWAY DR	LAKEWAY	TX	78734	1405 LAKEWAY DR	LAKEWAY	TX	78734
299	RICHARD ARLOE & DEBRA DAVIS	MINCHER	1403 LAKEWAY DR	LAKEWAY	TX	78734	4503 SMALL DR	AUSTIN	TX	78731
300	FAIRWAY VILLAS HOA OF LAKEWAY INC		LAKEWAY DR	LAKEWAY	TX	78734	1407 LAKEWAY DR	LAKEWAY	TX	78734
301	D NEIL & SUSANNAH	BREEN	1401 LAKEWAY DR	LAKEWAY	TX	78734	1401 LAKEWAY DR	LAKEWAY	TX	78734
302	FAIRLAKE CONDOMINIUMS (COMMON AREA)		202-218 FAIRLAKE CIR	LAKEWAY	TX	78734	PO BOX 9190	AUSTIN	TX	78766
303	EVA BETZABEL	VALDES	1215 LAKEWAY DR	LAKEWAY	TX	78734	1215 LAKEWAY DR	LAKEWAY	TX	78734
304	EERLIGH FAMILY TRUST		1213 LAKEWAY DR	LAKEWAY	TX	78734	1213 LAKEWAY DR	LAKEWAY	TX	78734
305	MICHAEL & BARBARA	WHITE	1211 LAKEWAY DR	LAKEWAY	TX	78734	6401 RIALTO BLVD	AUSTIN	TX	78735
306	2006 LOPES FAMILY TRUST		1209 LAKEWAY DR	LAKEWAY	TX	78734	1209 LAKEWAY DR	LAKEWAY	TX	78734
307	FRANCISCO EDUARDO & MARTHA ADRIANA	BARRERO	1207 LAKEWAY DR	LAKEWAY	TX	78734	1207 LAKEWAY DR	LAKEWAY	TX	78734
308	STEVEN C & ANN KIVISILD	SMITH	1205 LAKEWAY DR	LAKEWAY	TX	78734	1205 LAKEWAY DR	LAKEWAY	TX	78734
309	ANN G	NEIGHBORS	1201 LAKEWAY DR	LAKEWAY	TX	78734	1201 LAKEWAY DR	LAKEWAY	TX	78734
310	JEN	MCGAHAN	1101 LAKEWAY DR	LAKEWAY	TX	78734	1101 LAKEWAY DR A	LAKEWAY	TX	78734
311	BRUCE	KAPOSTA	933 BISCAYNE	LAKEWAY	TX	78734	933 BISCAYNE	LAKEWAY	TX	78734
312	KEVIN L & TERESA I	BROWN	931 BISCAYNE	LAKEWAY	TX	78734	931 BISCAYNE	LAKEWAY	TX	78734
313	RUSSELL L & SHERYL A	DAVIS	929 BISCAYNE	LAKEWAY	TX	78734	929 BISCAYNE	LAKEWAY	TX	78734
314	RANDALL L & SHARON PITTMAN-PITTS	PITTS	927 BISCAYNE	LAKEWAY	TX	78734	927 BISCAYNE	LAKEWAY	TX	78734
315	GAYE WILLIS	NELMS	925 BISCAYNE	LAKEWAY	TX	78734	925 BISCAYNE	LAKEWAY	TX	78734
316	DENNIS P & VIRGINIA	MURPHY	923 BISCAYNE	LAKEWAY	TX	78734	923 BISCAYNE	LAKEWAY	TX	78734
317	CHUCK W & ANNE M	COLBURN	921 BISCAYNE	LAKEWAY	TX	78734	921 BISCAYNE	LAKEWAY	TX	78734
318	LI FAMILY REVOCABLE TRUST		919 BISCAYNE	LAKEWAY	TX	78734	919 BISCAYNE	LAKEWAY	TX	78734
319	JOSIAH & KATIE	BOGUE	917 BISCAYNE	LAKEWAY	TX	78734	917 BISCAYNE	LAKEWAY	TX	78734
320	GABRIEL	CHRISTENSEN	915 BISCAYNE	LAKEWAY	TX	78734	915 BISCAYNE	LAKEWAY	TX	78734
321	MARK & DEWANA	FERGUSON	913 BISCAYNE	LAKEWAY	TX	78734	913 BISCAYNE	LAKEWAY	TX	78734
322	MACKENZIE M & KATHLEEN	FRAZIER	911 BISCAYNE	LAKEWAY	TX	78734	911 BISCAYNE	LAKEWAY	TX	78734
323	SUSAN & CHARLES KEVIN CONBOY	SHANNON	909 BISCAYNE	LAKEWAY	TX	78734	507 RONAY DR N	SPICEWOOD	TX	78669
324	DARRIN WAYNE & LISA R BOOMER	COON	907 BISCAYNE	LAKEWAY	TX	78734	907 BISCAYNE	LAKEWAY	TX	78734
325	HEATHER & JOSH	KIGHT	905 BISCAYNE	LAKEWAY	TX	78734	905 BISCAYNE	LAKEWAY	TX	78734
326	PATSY O	VANDERFORD	903 BISCAYNE	LAKEWAY	TX	78734	903 BISCAYNE	LAKEWAY	TX	78734
327	RYAN & KATHERINE MARIE	KRAFT	901 BISCAYNE	LAKEWAY	TX	78734	901 BISCAYNE	LAKEWAY	TX	78734
328	JOHN MICHAEL JR	WAPPLER	803 LAKEWAY DR	AUSTIN	TX	78734	803 LAKEWAY DR	AUSTIN	TX	78734
329	MARYLYNNE & MARTY	GIBBS	402 ZEPHYR	LAKEWAY	TX	78734	402 ZEPHYR ST	LAKEWAY	TX	78734
330	JAMES C & KATHY A	FRY	902 BISCAYNE	LAKEWAY	TX	78734	902 BISCAYNE	LAKEWAY	TX	78734
331	KELLY DONALD	HENRY	904 BISCAYNE	LAKEWAY	TX	78734	904 BISCAYNE	LAKEWAY	TX	78734
332	IGNACIO & MARIEKE MARIA KOOPMAN	VIVANCOS	906 BISCAYNE	LAKEWAY	TX	78734	906 BISCAYNE	AUSTIN	TX	78734
333	TIFFANY	DURHAM	908 BISCAYNE	LAKEWAY	TX	78734	908 BISCAYNE	LAKEWAY	TX	78734
334	ROMERO SAMUEL AND CLARE W REVOCABLE TRUST		909 LAKEWAY DR	LAKEWAY	TX	78734	921 5TH ST	LAS VEGAS	NM	87701
335	BJORN & STACY	AANNESTAD	912 BISCAYNE	LAKEWAY	TX	78734	912 BISCAYNE	LAKEWAY	TX	78734
336	KIM & THOMAS CARROLL	CARROLL	914 BISCAYNE	LAKEWAY	TX	78734	461 CREEKSIDE DR	LEAGUE CITY	TX	77573
337	ROBERT E III & ROBERT E MORSE JR FAMILY TRUST	MORSE	916 BISCAYNE	LAKEWAY	TX	78734	447 WILCHESTER BLVD	HOUSTON	TX	77079
338	AUSTIN FLIPSTERS PORTFOLIO 1 LLC		917 LAKEWAY DR	LAKEWAY	TX	78734	3901 S LAMAR BLVD STE 130	AUSTIN	TX	78704
339	MALUR AJI & SHIVANN RAMNATH-CADAN	NARAYAN	919 LAKEWAY DR	LAKEWAY	TX	78734	919 LAKEWAY BLVD	LAKEWAY	TX	78734
340	FELICE ZIMMERMAN & PATRICK MURRAY CARMICHAEL	WOODS	902 LAKEWAY DR	LAKEWAY	TX	78734	902 LAKEWAY DR	LAKEWAY	TX	78734
341	CRAZY HORSE VENTURES LLC		LAKEWAY DR	LAKEWAY	TX	78734	14601 RUNNING DEER TRL	AUSTIN	TX	78734
342	J MARSHALL	WILLIS	710 LAKEWAY DR	LAKEWAY	TX	78734	710 LAKEWAY DR	LAKEWAY	TX	78734
343	JOHN & JUDITH E	SCHIRO	708 LAKEWAY DR	LAKEWAY	TX	78734	708 LAKEWAY DR	LAKEWAY	TX	78734
344	ROLAND & ELIZABETH	SLEDGE	706 LAKEWAY DR	LAKEWAY	TX	78734	3620 SUNSET BLVD	HOUSTON	TX	77005
345	ALAN & MURIEL	TOMSON	704 LAKEWAY DR	LAKEWAY	TX	78734	3406 KIAMESHA DR	MISSOURI CITY	TX	77459
346	WENDY S	HAYNER	702 LAKEWAY DR	LAKEWAY	TX	78734	702 LAKEWAY DR	LAKEWAY	TX	78734
347	KING CHARLES H & LYNDA M LIVING TRUST		610 LAKEWAY DR	LAKEWAY	TX	78734	610 LAKEWAY DR	LAKEWAY	TX	78734
348	CRYSTAL	OGLE	608 LAKEWAY DR	LAKEWAY	TX	78734	PO BOX 161086	AUSTIN	TX	78716

AFFECTED LAND OWNER CROSS-REFERENCE LIST

AFFECTED LAND#	FIRST NAME	LAST NAME	PROPERTY ADDRESS	PROPERTY CITY	PROPERTY STATE	PROPERTY ZIP	MAILING ADDRESS	MAILING CITY	MAILING STATE	MAILING ZIP
349	PATRICIA	GOLEMI	606 LAKEWAY DR	LAKEWAY	TX	78734	606 LAKEWAY DR	LAKEWAY	TX	78734
350	MARK F & ANNE S	HUTSON	604 LAKEWAY DR	LAKEWAY	TX	78734	604 LAKEWAY DR	LAKEWAY	TX	78734
351	JORDEN MICHAEL A & MARCIA LENTZ LIVING TRUST		602 LAKEWAY DR	LAKEWAY	TX	78734	602 LAKEWAY DR	LAKEWAY	TX	78734
352	CRYSTAL & GLENN THOMPSON	LAMB	448 SEAWIND	LAKEWAY	TX	78734	448 SEAWIND	LAKEWAY	TX	78734
353	VASUDHA & GOPI KRISHNA EDUPULAPATI	RALLA	446 SEAWIND	LAKEWAY	TX	78704	446 SEAWIND	LAKEWAY	TX	78734
354	GEORGE EDWARD	STARK	444 SEAWIND	LAKEWAY	TX	78734	444 SEAWIND ST	LAKEWAY	TX	78734
355	JULIE	HAYNES	442 SEAWIND	LAKEWAY	TX	78734	442 SEAWIND	LAKEWAY	TX	78734
356	TODD DENESE W LIVING TRUST		440 SEAWIND	LAKEWAY	TX	78734	440 SEAWIND	LAKEWAY	TX	78734
357	LEONARD H & MARGARET ANN SCOTT	BERGER	438 SEAWIND	LAKEWAY	TX	78734	438 SEAWIND	LAKEWAY	TX	78734
358	BARBARA ANN & RANDALL	SERGI	436 SEAWIND	LAKEWAY	TX	78734	436 SEAWIND	LAKEWAY	TX	78734
359	JENNIFER J	LYSSY	434 SEAWIND	LAKEWAY	TX	78734	434 SEAWIND	LAKEWAY	TX	78734
360	GREGG & SUMMER BANKSTON	PORTER	432 SEAWIND	LAKEWAY	TX	78734	432 SEAWIND	LAKEWAY	TX	78734
361	KENNETH D & SUSAN M	PARKER	430 SEAWIND	LAKEWAY	TX	78734	430 SEAWIND	LAKEWAY	TX	78734
362	THECREDITDOCS INC		428 SEAWIND	LAKEWAY	TX	78734	301 AGUJA CT	AUSTIN	TX	78738
363	THECREDITDOCS INC		426 SEAWIND	LAKEWAY	TX	78734	301 AGUJA CT	AUSTIN	TX	78738
364	BAKALIS PETER REVOCABLE LIVING TRUST		424 SEAWIND	LAKEWAY	TX	78734	16291 W 14 MILE RD 20	BEVERLY HILLS	MI	48025
365	RUB GROUP LLC		422 SEAWIND	LAKEWAY	TX	78734	412 HURST CREEK RD	LAKEWAY	TX	78734
366	RUB GROUP LLC		420 SEAWIND	LAKEWAY	TX	78734	412 HURST CREEK RD	LAKEWAY	TX	78734
367	RUB GROUP LLC		418 SEAWIND	LAKEWAY	TX	78734	412 HURST CREEK RD	LAKEWAY	TX	78734
368	DIANNE RASMUSSEN	GREENE	416 SEAWIND	LAKEWAY	TX	78734	416 SEAWIND	LAKEWAY	TX	78734
369	LYNNE M	LEMON	414 SEAWIND	LAKEWAY	TX	78734	PO BOX 341811	AUSTIN	TX	78734
370	DONALD N	KAHN	412 SEAWIND	LAKEWAY	TX	78734	331 STORY DR	BUDA	TX	78610
371	HALL DANIEL I & DIANA V TRUSTEES		410 SEAWIND	LAKEWAY	TX	78734	410 SEAWIND	LAKEWAY	TX	78734
372	MARYANN & ANTHONY	DELL'ABATE	408 SEAWIND	LAKEWAY	TX	78734	408 SEAWIND	LAKEWAY	TX	78734
373	MARYANN & ANTHONY	DELL'ABATE	406 SEAWIND	LAKEWAY	TX	78734	408 SEAWIND	LAKEWAY	TX	78734
374	ADDANARI	REILLY	404 SEAWIND	LAKEWAY	TX	78734	105 MORNING CLOUD CV	LAKEWAY	TX	78734
375	NICOLE RENAE	POPOV	402 SEAWIND	LAKEWAY	TX	78734	402 SEAWIND	LAKEWAY	TX	78734
376	JUNQING & SHU GAO	SHAO	308 SEAWIND	LAKEWAY	TX	78734	515 CHERRY BLOSSOM LN	CAMPBELL	CA	95008
377	DAVID W & PAMELA V	CLARY	306 SEAWIND	LAKEWAY	TX	78734	304 SEAWIND	LAKEWAY	TX	78734
378	DAVID W & PAMELA V	CLARY	304 SEAWIND	LAKEWAY	TX	78734	304 SEAWIND ST	LAKEWAY	TX	78734
379	GORODEZKY SYLVIA MIRSKY	DE	302 SEAWIND	AUSTIN	TX	78734	302 SEAWIND	AUSTIN	TX	78734
380	BABIN ALAN R JR RESIDENCE TRUST		300 SEAWIND	LAKEWAY	TX	78734	300 SEAWIND	LAKEWAY	TX	78734
381	MARK B & LYNN P	ZWERN	502 LAKEWAY DR	LAKEWAY	TX	78734	502 LAKEWAY DR	LAKEWAY	TX	78734
382	STEPHEN & VICKIE	WAGH	414 LAKEWAY DR	LAKEWAY	TX	78704	2007 LAKEWAY BLVD	LAKEWAY	TX	78734
383	ROBIN R	DAVIS	412 LAKEWAY DR	LAKEWAY	TX	78734	PO BOX 340785	AUSTIN	TX	78734
384	KAY L	MUESSIG	410 LAKEWAY DR	LAKEWAY	TX	78734	410 LAKEWAY DR	LAKEWAY	TX	78734
385	TOM	FINK	408 LAKEWAY DR	LAKEWAY	TX	78734	408 LAKEWAY DR	LAKEWAY	TX	78734
386	STUART	MAXWELL	404 LAKEWAY DR	LAKEWAY	TX	78734	326 MCGEE TRL	KINGSLAND	TX	78639
387	THEODORE & TARA MUNJEE	GIOIA	402 LAKEWAY DR	LAKEWAY	TX	78734	402 LAKEWAY DR	LAKEWAY	TX	78734
388	TRAVIS ALEX & VANESSA ARIAS	GIPSON	305 SUNFISH	LAKEWAY	TX	78734	911 E LAKE HIGHLANDS DR	DALLAS	TX	75218
389	DONALD G & MARY LEE	BAKER	309 SUNFISH	LAKEWAY	TX	78734	309 SUNFISH ST	LAKEWAY	TX	78734
390	JULIE J	AGEE	311 SUNFISH	LAKEWAY	TX	78734	311 SUNFISH ST	LAKEWAY	TX	78734
391	JAY H JR	PLOTKIN	313 SUNFISH	LAKEWAY	TX	78734	313 SUNFISH ST	LAKEWAY	TX	78734
392	JAY H JR	PLOTKIN	315 SUNFISH	LAKEWAY	TX	78734	313 SUNFISH ST	LAKEWAY	TX	78734
393	THOMAS JOHN & ASHLIE TOLER	MCQUILKEN	401 SUNFISH	LAKEWAY	TX	78734	401 SUNFISH ST	LAKEWAY	TX	78734
394	LACEY REVOCABLE TRUST		403 SUNFISH	LAKEWAY	TX	78734	403 SUNFISH ST	LAKEWAY	TX	78734
395	GRAHAM LEGACY LLC		405 SUNFISH	LAKEWAY	TX	78734	4400 POST OAK PKWY STE 2800	HOUSTON	TX	77027
396	ANTHONY B & TESSA	TILFORD	407 SUNFISH	LAKEWAY	TX	78734	407 SUNFISH ST	LAKEWAY	TX	78734
397	THERESA	PAGE	413 SUNFISH	LAKEWAY	TX	78734	413 SUNFISH ST	LAKEWAY	TX	78734
398	COSWAY MARK A & DAYLE E LIFE ESTATE		417 SUNFISH	LAKEWAY	TX	78734	417 SUNFISH ST	LAKEWAY	TX	78734
399	ELIZABETH	JAMES	419 SUNFISH	AUSTIN	TX	78734	419 SUNFISH ST	AUSTIN	TX	78734
400	JOHN T JR	DYER	421 SUNFISH	LAKEWAY	TX	78734	421 SUNFISH ST	LAKEWAY	TX	78734
401	TORI & THOMAS T III	CLEMENTS	423 SUNFISH	AUSTIN	TX	78734	423 SUNFISH ST	AUSTIN	TX	78734
402	JAY B & BARBARA A	ZOERN	425 SUNFISH	LAKEWAY	TX	78734	425 SUNFISH ST	LAKEWAY	TX	78734
403	GREG & MARY HOYT	GUNWALL	429 SUNFISH	LAKEWAY	TX	78734	429 SUNFISH ST	LAKEWAY	TX	78734
404	LAKEWAY M U D		908 LAKEWAY DR	LAKEWAY	TX	78734	1097 LOHMANS CROSSING RD	LAKEWAY	TX	78734
405	COMMERCIAL LAKEWAY		LAKEWAY BLVD	LAKEWAY	TX	78734	107 RANCH ROAD 620 S STE 300	LAKEWAY	TX	78734
406	JUDSON C & MICHELE K	WYATT	428 SUNFISH	LAKEWAY	TX	78734	428 SUNFISH ST	LAKEWAY	TX	78734

AFFECTED LAND OWNER CROSS-REFERENCE LIST

AFFECTED LAND#	FIRST NAME	LAST NAME	PROPERTY ADDRESS	PROPERTY CITY	PROPERTY STATE	PROPERTY ZIP	MAILING ADDRESS	MAILING CITY	MAILING STATE	MAILING ZIP
407	THOMAS R	HOLMAN	502 SUNFISH	LAKEWAY	TX	78734	502 SUNFISH ST	LAKEWAY	TX	78734
408	THOMAS C & ANNE T	HILBERT	504 SUNFISH	LAKEWAY	TX	78734	424 SUNFISH ST	LAKEWAY	TX	78734
409	FULTON THERESA ANN TRUSTEE		521 SUNFISH	LAKEWAY	TX	78734	521 SUNFISH ST	LAKEWAY	TX	78734
410	STEVEN M	CROCE	523 SUNFISH	LAKEWAY	TX	78734	523 SUNFISH ST	LAKEWAY	TX	78734
411	JAMES L & DONNA M	LINN	525 SUNFISH	LAKEWAY	TX	78734	525 SUNFISH ST	LAKEWAY	TX	78734
412	DOMINY REAL ESTATE INVESTORS LLC		601 SUNFISH	LAKEWAY	TX	78734	16430 CLARA VAN	AUSTIN	TX	78734
413	HEATHER G	WAKEFIELD	603 SUNFISH	LAKEWAY	TX	78734	402 SUNFISH	LAKEWAY	TX	78734
414	OWEN DOUGLAS & BEVERLY NUTE	HORNE	605 SUNFISH	LAKEWAY	TX	78734	605 SUNFISH ST	LAKEWAY	TX	78734
415	SEAN R & MICHELLE C	STICKLER	607 SUNFISH	LAKEWAY	TX	78734	607 SUNFISH ST	LAKEWAY	TX	78734
416	ERIC W	BROWN	609 SUNFISH	LAKEWAY	TX	78734	609 FLAMINGO BLVD	LAKEWAY	TX	78734
417	MARIA N & MARK A	BRADLEY	611 SUNFISH	LAKEWAY	TX	78734	611 SUNFISH ST	LAKEWAY	TX	78734
418	SUSAN KAY	HART	613 SUNFISH	LAKEWAY	TX	78734	613 SUNFISH ST	LAKEWAY	TX	78734
419	DAVID A & SALLY A	GREIS	615 SUNFISH	LAKEWAY	TX	78734	615 SUNFISH ST	LAKEWAY	TX	78734
420	MUCK TRUST		617 SUNFISH	LAKEWAY	TX	78734	617 SUNFISH ST	LAKEWAY	TX	78734
421	MUCK TRUST		621 SUNFISH	LAKEWAY	TX	78734	617 SUNFISH ST	LAKEWAY	TX	78734
422	HUNDL WILBERT & PAULA TRUST		623 SUNFISH	LAKEWAY	TX	78734	623 SUNFISH ST	LAKEWAY	TX	78734
423	TANA	ANDERSON	625 SUNFISH	LAKEWAY	TX	78734	625 SUNFISH ST	LAKEWAY	TX	78734
424	JAMES WESLEY JR	NEWMYER	701 SUNFISH	LAKEWAY	TX	78734	701 SUNFISH ST	LAKEWAY	TX	78734
425	WESLEY M & MARY BETTY	DOUGLAS	705 SUNFISH	LAKEWAY	TX	78734	705 SUNFISH ST	LAKEWAY	TX	78734
426	MICHAEL L & SUSAN BETH	LONGWELL	707 SUNFISH	LAKEWAY	TX	78734	707 SUNFISH ST	LAKEWAY	TX	78734
427	PROVIDENT TRUST GROUP LLC		709 SUNFISH	LAKEWAY	TX	78734	330 WYCLIFFE DR	HOUSTON	TX	77079
428	RC LUXURY HOMES LLC		711 SUNFISH	LAKEWAY	TX	78734	611 LADIN LN	LAKEWAY	TX	78734
429	DON L & LYNN M	MCINTIRE	713 SUNFISH	LAKEWAY	TX	78734	713 SUNFISH ST	LAKEWAY	TX	78734
430	JOHN W & PATTI L	PURCELL	715 SUNFISH	LAKEWAY	TX	78734	715 SUNFISH ST	LAKEWAY	TX	78734
431	JAMES & TANA	ANDERSON	801 SUNFISH	LAKEWAY	TX	78734	625 SUNFISH ST	LAKEWAY	TX	78734
432	PHILIP W JR	VOLTZ	803 SUNFISH	LAKEWAY	TX	78734	200 CHATTINGTON CT	SAN ANTONIO	TX	78213
433	SCHERTZ TERRY GOUGH TRUST		805 SUNFISH	LAKEWAY	TX	78734	805 SUNFISH ST	LAKEWAY	TX	78734
434	CHRISTOPHER RUDOLPH	PEARSON	807 SUNFISH	LAKEWAY	TX	78734	807 SUNFISH ST	LAKEWAY	TX	78734
435	KAREL OELAND	MCGUIRT	809 SUNFISH	LAKEWAY	TX	78734	809 SUNFISH ST	LAKEWAY	TX	78734
436	JOHN & ANTHONY FRAELLO	SWIGER	811 SUNFISH	LAKEWAY	TX	78734	811 SUNFISH ST	LAKEWAY	TX	78734
437	MARK EDWIN & LORI NELSON	MCQUILKIN	813 SUNFISH	LAKEWAY	TX	78734	813 SUNFISH ST	LAKEWAY	TX	78734
438	BRIAN & LAURA	BROWN	815 SUNFISH	LAKEWAY	TX	78734	815 SUNFISH ST	LAKEWAY	TX	78734
439	JAMES PETER	FULBRIGHT	817 SUNFISH	LAKEWAY	TX	78734	817 SUNFISH	LAKEWAY	TX	78734
440	ALLEN PAULA J & ROBERT J ALLEN FAMILY TRUST		819 SUNFISH	LAKEWAY	TX	78734	819 SUNFISH ST	LAKEWAY	TX	78734
441	SABRINA & CHRISTINE	YUN	821 SUNFISH	AUSTIN	TX	78734	821 SUNFISH ST	LAKEWAY	TX	78734
442	ALLISON & JEFFREY	NITTO	823 SUNFISH	LAKEWAY	TX	78734	823 SUNFISH ST	LAKEWAY	TX	78734
443	JESSICA D	MIXON	825 SUNFISH	AUSTIN	TX	78734	825 SUNFISH ST	AUSTIN	TX	78734
444	EUGENIA	BARR	827 SUNFISH	LAKEWAY	TX	78734	827 SUNFISH ST	LAKEWAY	TX	78734
445	MARGARET S	TABB	829 SUNFISH	LAKEWAY	TX	78734	829 SUNFISH ST	LAKEWAY	TX	78734
446	STEVEN & LYNN BLACK	JACKSON	831 SUNFISH	LAKEWAY	TX	78734	831 SUNFISH	AUSTIN	TX	78734
447	RICKEY H & GINA A	ROGERS	833 SUNFISH	LAKEWAY	TX	78734	833 SUNFISH ST	LAKEWAY	TX	78734
448	ANTHONY & SHAN DAVIS	BARATTA	835 SUNFISH	LAKEWAY	TX	78734	835 SUNFISH ST	LAKEWAY	TX	78734
449	CITY OF LAKEWAY		837 SUNFISH	LAKEWAY	TX	78734	1102 LOHMANS CROSSING RD	LAKEWAY	TX	78734
450	ANN F	FREEMAN	839 SUNFISH	LAKEWAY	TX	78734	839 SUNFISH ST	LAKEWAY	TX	78734
451	KRISTIN J & TIMOTHY J DUFFY II	ZWIENER	841 SUNFISH	LAKEWAY	TX	78734	841 SUNFISH	LAKEWAY	TX	78734
452	MORGAN J & LAURA	MILLER	843 SUNFISH	LAKEWAY	TX	78734	PO BOX 181693	CORONADO	CA	92178
453	ISIDORE J JR & VALORIE C	BELLACI	845 SUNFISH	LAKEWAY	TX	78734	845 SUNFISH ST	LAKEWAY	TX	78734
454	DAVID W	ATCHLEY	847 SUNFISH	LAKEWAY	TX	78734	847 SUNFISH ST	LAKEWAY	TX	78734
455	GARY STUART	RAE	1010 CORSAIRE	LAKEWAY	TX	78734	1010 CORSAIRE ST	LAKEWAY	TX	78734
456	ROBERT & MICHELLE MOGGIO	DUNKERLEY	1012 CORSAIRE	LAKEWAY	TX	78734	1012 CORSAIRE ST	LAKEWAY	TX	78734
457	BLAINE ERIC & MARILN HITOMI	JOHNSON	1011 CORSAIRE	LAKEWAY	TX	78734	1101 CORAIRE ST	LAKEWAY	TX	78734
458	CHARLES T JR & CAMILLE N	GOODMAN	1009 CORSAIRE	LAKEWAY	TX	78734	957 W BRIDGE ST	NEW BRAUNFELS	TX	78130
459	MOSES DANIEL T & LYNN M MOSES LIFE ESTATE		1014 PORPOISE	LAKEWAY	TX	78734	1014 PORPOISE ST	LAKEWAY	TX	78734
460	C PATRICK & ROBIN G	HARGADON	902 PORPOISE	LAKEWAY	TX	78734	902 PORPOISE ST	LAKEWAY	TX	78734
461	SEYMORELL PROPERTIES LLC		904 PORPOISE	LAKEWAY	TX	78734	207 SUMALT GAP WAY	AUSTIN	TX	78738
462	ANNETTE H	BROWN	906 PORPOISE	LAKEWAY	TX	78734	111 OUTCROP VIEW LN	AUSTIN	TX	78738
463	STAGE 94 REAL ESTATE LLC		908 PORPOISE	AUSTIN	TX	78734	6900 DANIELS PKWY # 29-156	FORT MYERS	FL	33912
464	GERALD L & SARAH J	AVERILL	910 PORPOISE	LAKEWAY	TX	78734	910 PORPOISE ST	LAKEWAY	TX	78734

AFFECTED LAND OWNER CROSS-REFERENCE LIST

AFFECTED LAND#	FIRST NAME	LAST NAME	PROPERTY ADDRESS	PROPERTY CITY	PROPERTY STATE	PROPERTY ZIP	MAILING ADDRESS	MAILING CITY	MAILING STATE	MAILING ZIP
465	SAMANTHA W & THOMAS P	CONNELL	912 PORPOISE	LAKEWAY	TX	78734	6227 VALLEY FORGE DR	HOUSTON	TX	77057
466	JULIE ANN	BONNER	914 PORPOISE	LAKEWAY	TX	78734	914 PORPOISE ST	LAKEWAY	TX	78734
467	MICHAEL JAMES & SOLOMON H &	OSBORNE	916 PORPOISE	LAKEWAY	TX	78734	916 PORPOISE ST	LAKEWAY	TX	78734
468	EDWIN R & SHARON K	LALONE	918 PORPOISE	LAKEWAY	TX	78734	918 PORPOISE ST	LAKEWAY	TX	78734
469	MICHAEL W & SARA B	JONES	920 PORPOISE	LAKEWAY	TX	78734	920 PORPOISE ST	LAKEWAY	TX	78734
470	LAYNE N & PAMELA J	THOMAS	922 PORPOISE	LAKEWAY	TX	78734	922 PORPOISE ST	LAKEWAY	TX	78734
471	BRYAN & AMANDA	RUSSELL	924 PORPOISE	LAKEWAY	TX	78734	924 PORPOISE ST	LAKEWAY	TX	78734
472	JAY H JR & KRISTI J	PLOTKIN	928 PORPOISE	LAKEWAY	TX	78734	928 PORPOISE ST	LAKEWAY	TX	78734
473	SONYA	BATCHELOR	930 PORPOISE	LAKEWAY	TX	78734	930 PORPOISE ST	LAKEWAY	TX	78734
474	ADOXIA LIVING TRUST		923 PORPOISE	LAKEWAY	TX	78734	923 PORPOISE ST	LAKEWAY	TX	78734
475	THORNTON GARY JACK LIFE ESTATE		919 PORPOISE	LAKEWAY	TX	78734	919 PORPOISE ST	LAKEWAY	TX	78734
476	CRAIG ROBERT & BRIGITTE L	WESTEMEIER	917 PORPOISE	LAKEWAY	TX	78734	917 PORPOISE ST	LAKEWAY	TX	78734
477	CLIFFORD W JR & BILLYE B	WHEELER	915 PORPOISE	LAKEWAY	TX	78734	915 PORPOISE	LAKEWAY	TX	78734
478	DORRIE GORDON & ALEX	RETIVOV	913 PORPOISE	LAKEWAY	TX	78734	913 PORPOISE ST	LAKEWAY	TX	78734
479	DENNIS EDWARD VIGEE LIVING TRUST		911 PORPOISE	LAKEWAY	TX	78734	911 PORPOISE ST	LAKEWAY	TX	78734
480	KILGORE FAMILY TRUST		909 PORPOISE	LAKEWAY	TX	78734	1041 HAWKS BILL DR	GREENSBORO	GA	30642
481	JOSEPH A	STALLONE	907 PORPOISE	LAKEWAY	TX	78734	907 PORPOISE ST	LAKEWAY	TX	78734
482	R MURRAY & KATHLEEN A	WELLS	905 PORPOISE	LAKEWAY	TX	78734	905 PORPOISE ST	LAKEWAY	TX	78734
483	MAYFLOWER TRUST		903 PORPOISE	LAKEWAY	TX	78734	903 PORPOISE ST	LAKEWAY	TX	78734
484	WILLIAM & KARINA REVOCABLE TRUST	WILLIAMS	901 PORPOISE	AUSTIN	TX	78734	901 PORPOISE ST	AUSTIN	TX	78734
485	VALKENBURGH	VAN	1013 PORPOISE	LAKEWAY	TX	78734	1013 PORPOISE ST	LAKEWAY	TX	78734
486	WILLIAM S	ROSE	1010 BISCAYNE	LAKEWAY	TX	78734	1604 WESTOVER RD	AUSTIN	TX	78703
487	WILLIAM S	ROSE	1012 BISCAYNE CV	LAKEWAY	TX	78734	1604 WESTOVER RD	AUSTIN	TX	78703
488	GEORGE T & JENIFER	EARNSHAW	1007 BISCAYNE	LAKEWAY	TX	78734	1007 BISCAYNE CV	LAKEWAY	TX	78734
489	EDWARD J II	HEAD	1005 BISCAYNE	LAKEWAY	TX	78734	1005 BISCAYNE CV	LAKEWAY	TX	78734
490	SMITH FAMILY TRUST		926 LAKEWAY DR	LAKEWAY	TX	78734	926 LAKEWAY DR	LAKEWAY	TX	78734
491	RICHARD ALBERT	SALINAS	924 LAKEWAY DR	LAKEWAY	TX	78734	924 LAKEWAY DR	LAKEWAY	TX	78734
492	SHAWN E & VICTORIA JEAN	WAITE	922 LAKEWAY DR	LAKEWAY	TX	78734	922 LAKEWAY DR	LAKEWAY	TX	78734
493	PETER	MORA	920 LAKEWAY DR	LAKEWAY	TX	78734	920 LAKEWAY DR	LAKEWAY	TX	78734
494	ALAN CHUMLEY & MARIA ANDRADE	FUENTES	216 VISTA VILLAGE CV	LAKEWAY	TX	78738	216 VISTA VILLAGE CV	LAKEWAY	TX	78738
495	WENDY	HOWELL	214 VISTA VILLAGE CV	LAKEWAY	TX	78738	214 VISTA VILLAGE CV	LAKEWAY	TX	78738
496	NICHOLAS H & AMY R	BOYLE	212 VISTA VILLAGE CV	LAKEWAY	TX	78738	212 VISTA VILLAGE CV	LAKEWAY	TX	78738
497	ROUGH HOLLOW DEVELOPMENT LTD		202 HIGHLAND VILLAGE DR	LAKEWAY	TX	78738	5316 W US HWY 290 SERVICE ROAD SUITE 100	AUSTIN	TX	78735
498	ROUGH HOLLOW DEVELOPMENT LTD		HIGHLAND VILLAGE DR	LAKEWAY	TX	78738	5317 W US HWY 290 SERVICE ROAD SUITE 100	AUSTIN	TX	78735
499	LENNAR HOMES OF TEXAS		HIGHLAND VILLAGE DR	LAKEWAY	TX	78738	760 NW 107TH AVE STE 300	MIAMI	FL	33172-3157

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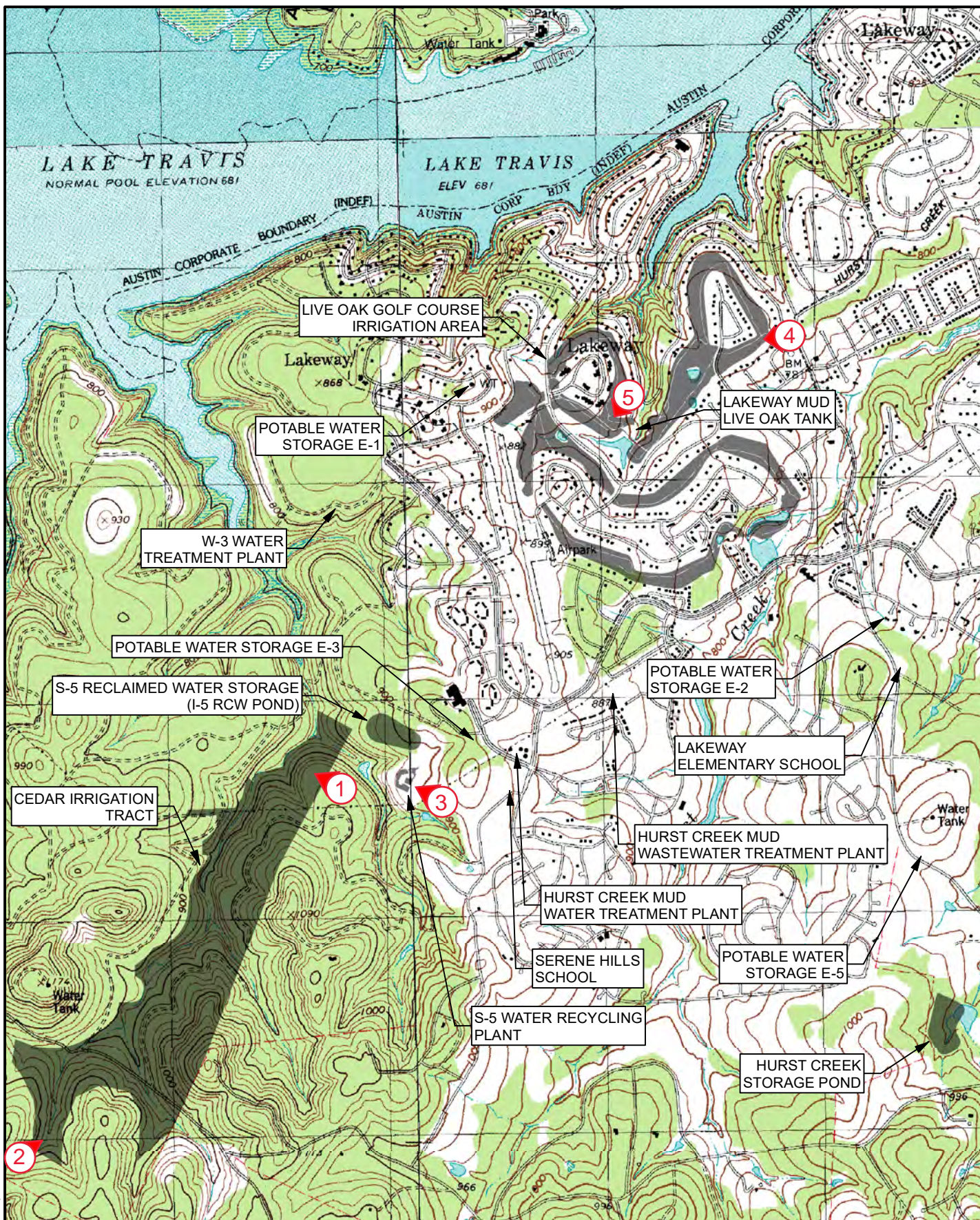
ATTACHMENT G

Original Photographs with Map Key

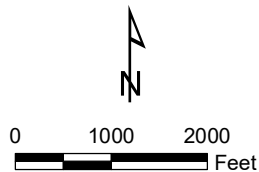
(Domestic Administrative Report 1.1, Section 2)

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UNDER THE AUTHORITY OF
CHRISTIANNE CASTLEBERRY
TEXAS P.E. NO. 87259
DATE: April 2024
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CONSTRUCTION OR ANY
OTHER PURPOSE



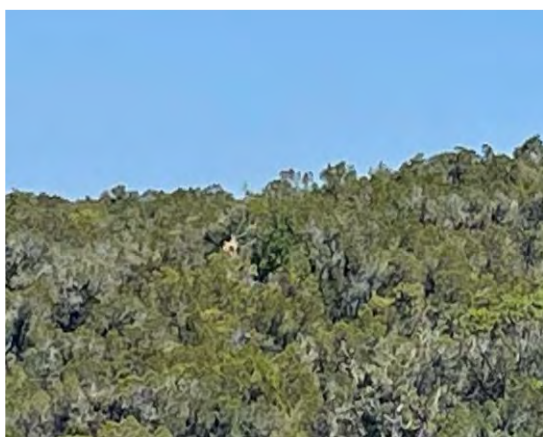
LAKEWAY MUD
PERMIT #11495-006
S-5 WATER RECYCLING PLANT
ORIGINAL PHOTOS KEY

Date	April 2024
Attachment No.	G

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Photograph #1: Cedar Tract Effluent Disposal Site -Typical Irrigation Area and Tract Vegetation



Photographs #2: Cedar Tract Irrigation Area
(further back perspective)





Photograph #3: Expanded Treatment Unit Location (to be located on opposing side of screen from existing treatment unit, in the foreground grassy area)



Photograph #4: Existing Effluent Disposal Site - Live Oak Golf Course



Photograph #5: Existing Effluent Disposal Site - Live Oak Golf Course

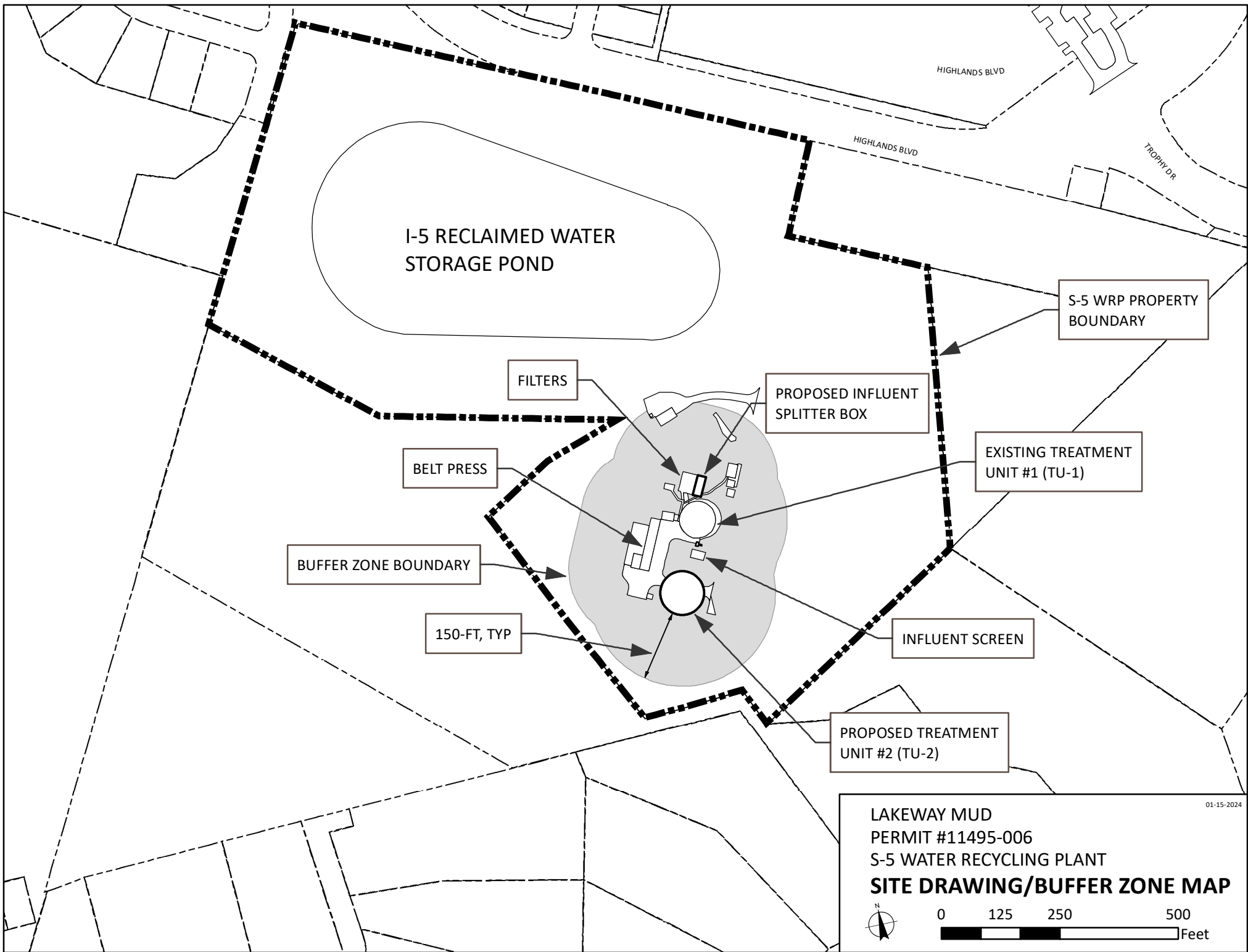
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ATTACHMENT H

S-5 Water Recycling Plant Site Drawing/Buffer Zone Map

(Domestic Administrative Report 1.1, Section 3; Domestic Technical Report 1.0, Section 3)

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ATTACHMENT I

Treatment Process Description/Dimensions

(Technical Report 1.0, Section 2, Items A & B)

The S-5 Water Recycling Plant is an activated sludge plant that includes nitrification and is constructed in a bullseye treatment unit configuration with effluent filters.

Flow to the plant is screened through a rotating drum fine screen, the screened flow goes to aeration basins with an anoxic section, then to a clarifier, then to traveling bridge filters, then to a chlorine contact tank.

Waste sludge is digested and then conveyed to a belt press. Chlorinated effluent flows to an effluent storage pond from which it is pumped to a reclaimed water distribution system. Design calculations are included as Attachment K.

Unit sizes for the S-5 facility for the current Existing/Interim I Phase (0.4 MGD), proposed Interim II Phase (0.8 MGD) and Final Phase (1.2 MGD) of operation are shown in Table I-1 of this attachment (next page). Projected peak month flow increase in the Final Phase is 0.23 MGD for a total permitted flow of 1.03 MGD. However, the Final Phase design is based on 0.4 MGD expansion (same as Existing and Interim II) for conservatism and operational flexibility.

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Table 1. S-5 Water Recycling Plant Treatment Unit Information

Unit/Parameter	Existing/Interim I Phase (TU-1) 0.4 MGD Daily Ave Flow			Interim II Phase (TU1 + TU2) 0.8 MGD Daily Ave Flow				Final Phase ¹ (TU1 + TU2 + TU3) 1.03 MGD Permitted; 1.2 MGD Design			
	Number of Units	Capacity, Each Unit	Dimensions (L x W x D)	Number of Units	Capacity, Each Unit	Capacity, Total	Dimensions (L x W x D)	Number of Units	Capacity, Each Unit	Capacity, Total	Dimensions (L x W x D)
Screen Mechanical rotating drum fine screen	1	5 MGD	42 IN Dia. x 72 IN Length	1	5 MGD	5 MGD	42 IN Diam by 72 IN Length	1	5 MGD	5MGD	42 IN Diam by 72 IN Length
Anoxic Basin	1	5,570 CuFt	16 FT SWD	2 (1 in each of 2 Trains)	5,570 CuFt	11,140 CuFt	TU1 – ID 44.5 FT, OD 73.5 FT, 14% of Circle (Approx.) TU2 – ID 44.5 FT, OD 86.5 FT, 8% of Circle (Approx.) 16 FT SWD.	3 (1 in each of 3 Trains)	TU1/TU2/TU3 = 5,570 CuFt Ea	16,710 CuFt	TU1 – ID 44.5 FT, OD 73.5 FT, 14% of Circle (Approx.) TU2 – ID 44.5 FT, OD 86.5 FT, 8% of Circle (Approx.) TU3 – ID 44.5 FT, OD 81 FT, 10% of Circle (Approx.) 16 FT SWD.
Aeration Basin	2	15,405 CuFt	16 FT SWD	6 (3 sections in each of 2 Trains)	9,532 CuFt	57,190 CuFt	Approx. Equal Split btwn each Train Annular Config. TU1 – ID 44.5 FT, OD 73.5 FT, 69% of Circle (Approx.) TU2 – ID 44.5 FT, OD 86.5 FT, 42 % of Circle (Approx.) 16 FT SWD	3	TU1+TU2=57,190 CuFt TU3 =28,595 CuFt	85,785 CuFt	TU1 – ID 44.5 FT, OD 73.5 FT, 69% of Circle (Approx.) TU2 – ID 44.5 FT, OD 86.5 FT, 42 % of Circle (Approx.) TU3 – ID 44.5 FT, OD 81 FT, 50% of Circle (Approx.) 16 FT SWD.
Final Clarifier Surface Area	1	1,385 SqFt	42 FT dia.	2	1,385 SqFt	2,770 SqFt	TU1/TU2 = 42 FT Diam Both 12.5 FT min SWD	3	TU1/TU2/TU3 = 1,385 SqFt Ea	4,155 SqFt	TU1/TU2/TU3 = 42 FT Diam All 12.5 FT min SWD
Volume	1	18,050 CuFt	12.5 FT min. SWD	2	18,050 CuFt	36,100 CuFt		3	TU1/TU2/TU3 = 18,050 CuFt Ea	54,150 CuFt	
Aerobic Digester	1 (2 sections)	13,198 CuFt		1 (3 sections)	11,910 CuFt	35,730 CuFt	Digesters will be in TU2; Annular Configuration ID 44.5 FT, OD 86.5 FT 51% of Circle	5 (3 in TU-2; 2 in TU-3)	TU2 =35,730 CuFt TU3 =17,865 CF	53,595 CuFt	TU2 – ID 44.5 FT, OD 86.5 FT, 51% of Circle (Approx.) TU3 – ID 44.5 FT, OD 81 FT, 31% of Circle (Approx.) 16 FT depth
Est. Total Blower Capacity ²	3	1,483 SCFM		4	1,483 SCFM	4,440 SCFM Firm	Discharge pressure 7.6 psi +/-	5	1,483 SCFM	5,930 SCFM Firm	Discharge pressure 7.6 psi +/-
Chlorine Contact Basin Volume	1	4,090 CuFt		1	6,127 CuFt		Existing TU1 Annular Configuration Modified: ID 44.5 FT, OD 73.5 FT, D 9.75 FT 18% of Circle (Approx)	2	Existing TU2 =6,127 CuFt TU3 =3,064 CuFt	9,191 CuFt	TU1 – ID 44.5 FT, OD 73.5 FT, 18% of Circle (Approx.) TU3 – ID 44.5 FT, OD 81 FT, 9% of Circle (Approx.) D 9.75 FT.
Filter Steel Traveling Bridge with air scour	2	400,000 GPD		3	400,000 GPD	1.2 MGD	Each Filter: Peak Q= 2.5Q=2.5(278 gpm) = 695 gpm; Filter bed area=140 SqFt; Tank size 29'L x 8.5'W x 6'H.	4	400,000 GPD	1.6 MGD	Each Filter: Peak Q= 2.5Q=2.5(278 gpm) = 695 gpm; Filter bed area=140 SqFt; Tank size 29'L x 8.5'W x 6'H.
Belt Press	1	1 Meter Unit		1	1 Meter Unit	1 Meter Unit		1	1 Meter Unit	1 Meter Unit	
<p>1. Projected peak month flow increase in Final Phase is 0.23 MGD for a total permitted flow of 1.03 MGD. However, Final Phase design is based on 0.4 MGD (same as Existing and Interim II) for conservatism and operational flexibility.</p> <p>2. Estimated blower capacity includes aeration requirements for activated sludge and digester aeration plus a 5% allowance for ancillary air requirements including return sludge air lift pumps and chlorine contact basin mixing.</p> <p>Acronyms: TU1= Treatment Unit 1 (Existing), TU2= Treatment Unit 2 (Proposed Interim II Addition), SqFt= Square feet, CuFt= Cubic feet, MGD= Million gallons per day, GPD= Gallons per day, SCFM= Standard cubic feet per minute, Ft= Feet, SWD= Side water depth</p>											

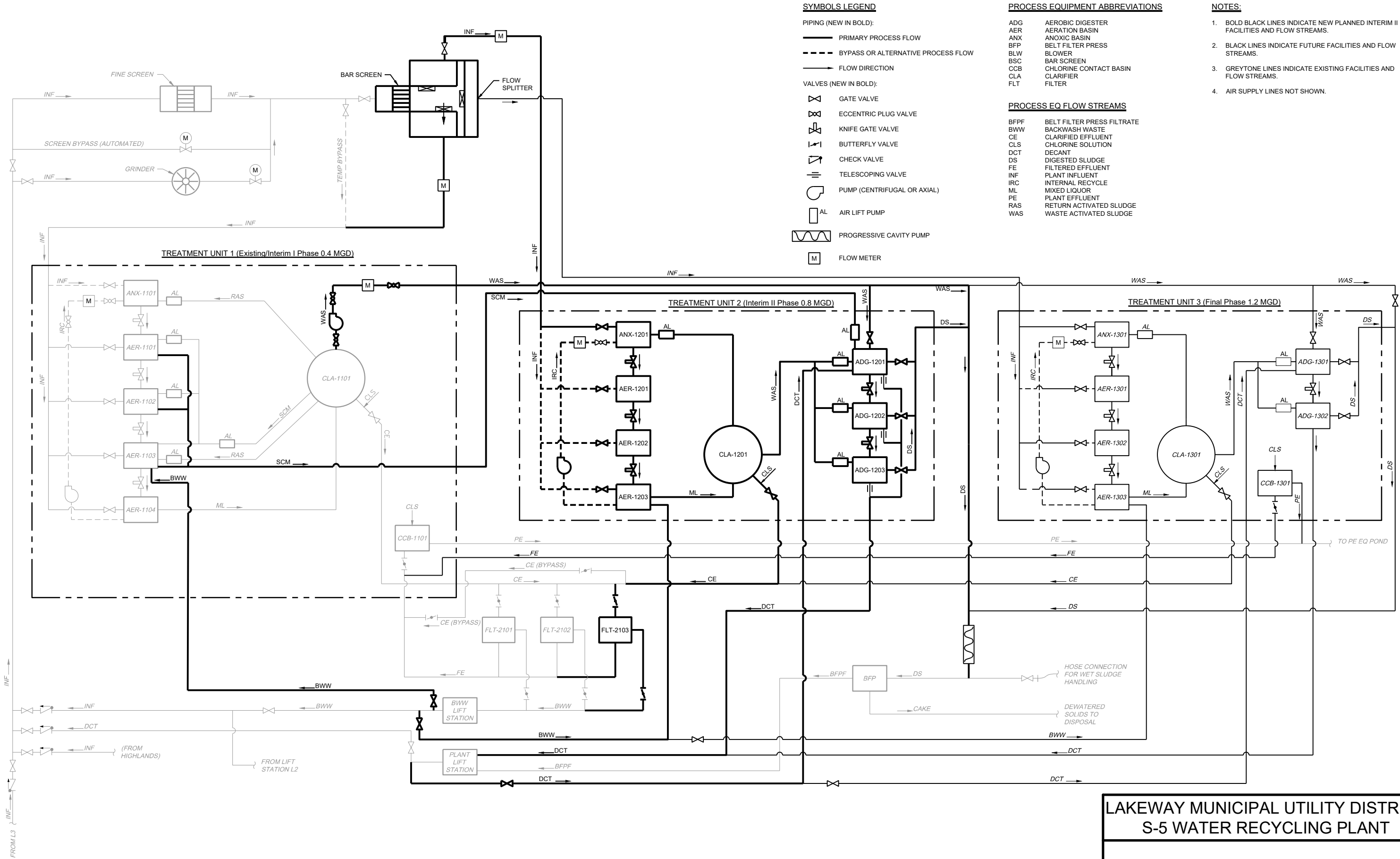
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ATTACHMENT J

Flow Diagram

(Technical Report 1.0, Section 2, Item C)

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LAKEWAY MUNICIPAL UTILITY DISTRICT
S-5 WATER RECYCLING PLANT

PROCESS FLOW DIAGRAM

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ATTACHMENT K

Plant Design Calculations

(Technical Report 1.1, Section 4)

This attachment presents information regarding flow rate to be treated, characteristics of the influent, effluent standards, treatment processes and unit sizes. Information is generally presented in tabular form. Treatment unit sizes will be sized based on TCEQ allowable loadings at the permitted flow for Existing/Interim I (0.4 MGD) and Interim II (0.8 MGD) phases. The planned Final Phase permitted flow will be 1.03 MGD (a 0.23 MGD increase above the Interim II Phase), but the additional facilities in the Final phase will be designed for 0.4 MGD to match the individual Interim I and Interim II phase capacities. Designing the Final Phase improvements to match the capacities of the Interim I and Interim II phases will provide a conservative facility and will increase operational flexibility.

Influent Flow, Characteristics, Effluent Requirements, and Treatment Information

Table 1
Influent Quality Characteristics

Parameter	Concentration
BOD	300 mg/l
TSS	250 mg/l
NH ₃	50 mg/l

Table 2
Influent Flow

Phase	Permitted (Peak Month) Flow, MGD	Peak 2 Hour Flow, MGD
Existing/Interim I	0.4 ⁽¹⁾	1.32 ⁽²⁾
Interim II Phase	0.8	2.64
Final Phase	1.03	3.40
<i>1. Peak month flow to average month flow ratio of 1.2.</i>		
<i>2. Peak Month Flow to Average Flow ratio of 4 for Treatment Capacity.</i>		

Table 3**Loadings for Interim II and Final Phase Flow**

Parameter	Interim II Phase	Final Phase	
		Permitted (1.03 MGD)	Actual Design (1.2 MGD)
BOD	2,002 Lbs/Day	2,577 Lbs/Day	3,002 Lbs/Day
TSS	1,668 Lbs/Day	2,148 Lbs/Day	2,502 Lbs/Day
NH ₃	333 Lbs/Day	429 Lbs/Day	500 Lbs/Day

The S-5 Water Recycling Plant (S-5 WRP) has a no discharge permit and all effluent from the plant is used for irrigation of the Live Oak Golf Course, road medians, and other authorized Chapter 210 beneficial reuse areas. Expansion of the plant beyond the Existing/Interim I Phase will incorporate addition of a cedar tree irrigation tract. The existing permit effluent limits include BOD and TSS limits of 20 mg/l, but effluent from the plant complies with TCEQ criteria for Type 1 reclaimed water. Selected reclaimed water parameters are listed in Table 4.

Table 4**Effluent Quality Requirements**

Parameters	Reclaimed Water Quality Requirements
BOD	≤ 5 mg/l
Turbidity	≤ 3 NTU ⁽¹⁾
Fecal coliform or E. coli	≤ 20 CFU/100 ml ^(2,3)
Fecal coliform or E. coli	≤ 75 CFU/100 ml ⁽⁴⁾
Enterocci	≤ CFU/100 ml ⁽³⁾
Enterocci	≤ CFU/100 ml ⁽⁴⁾
1. NTU – Nephelometric turbidity unit 2. CFU – colony forming unit 3. 30-day geometric unit 4. Maximum single grab unit	

The plant uses the conventional plug flow activated sludge process with slight modifications followed by filtration and chlorination to treat flow. A drum screen at the head of the plant provides fine screening of influent. An anoxic zone is included ahead of aeration, and internal recirculation capability from the final aeration basin is included. Effluent is disinfected by chlorination.

Mixed liquor suspended solids (MLSS) are typically in the 2,000 to 3,000 range. Waste sludge is treated in a thickener and digester at present prior to being dewatered using a belt press, with dewatered sludge trucked to a sanitary landfill. The Interim II Phase expansion will eliminate the thickening process and sludge digesters will be decanted prior to conveying waste sludge to the belt press.

A 38-million-gallon (MG) storage pond adjacent to the plant provides storage of treated effluent prior to being pumped to the reclaimed water distribution system. The pond storage is more than adequate to handle the Existing/Interim I Phase, but an addition of a 20 MG ground storage tank will be added for the proposed Interim II Phase flow (see storage evaluation and water balance information included in this application).

Treatment Unit Sizes and Information for Interim II Phase Expansion

Screen – Interim II Phase

The existing screen is a rotating drum fine screen that was installed in 2021. The screen has a nominal capacity of 5 MGD which is adequate for currently proposed plant expansions. If a problem occurs with the screen, a bypass valve is automatically actuated to route flow to a treatment unit. An automatically controlled stand by generator is installed at the plant in the event of a power failure.

Aeration and Anoxic Basins – Interim II Phase

There is currently one bullseye treatment unit (labeled TU1) at the plant that includes anoxic, aeration, digestion, clarification, thickening, and chlorine contact basins. The Interim II Phase project will convert the thickener and digester to aeration and anoxic basins, and digestion will be accomplished in digesters included in the proposed TU2 treatment unit incorporated into the project. Information regarding the aeration and anoxic basins is listed in Table 5. The anoxic and aeration volumes required would be close to equally split between the existing treatment unit (TU1) and the Interim II Phase unit addition (TU2).

Table 5**Aeration and Anoxic Basins – Interim II Phase**

Basin	Design Loading or Detention Time		Volume (CF)
	TCEQ	Design	
Anoxic	NA	2.5 Hrs	11,140 ⁽¹⁾
Aeration	35 Lbs/1000 CF-Day	35 Lbs/1000 CF-Day	57,190 Proposed ⁽²⁾
1. Anoxic volume will be split between TU1 (existing) and TU2 (proposed) 2. Total volume will be provided by existing aeration basins, conversion of existing digesters and thickener to aeration, and new aeration in TU2. TU1 and TU2 will have essentially equal aeration volumes.			

Final Clarifiers – Interim II Phase

Information regarding the existing clarifier and a proposed clarifier is listed in Table 6. The existing and proposed clarifiers will be the same diameter and depth. Peak flow to each clarifier will be 1.65 MGD, and each clarifier will have a diameter of 42 FT and a minimum SWD of 12.5 FT.

Table 6**Final Clarifier Information Interim II Phase**

Design Item	TCEQ Requirement	Provided
Surface Loading – Peak Flow, GPD/FT ²	≤1,200 GPD/SF	952 GPD/FT
Detention Time – Peak Flow, Hrs	1.8 Hrs	1.96 Hrs ⁽¹⁾
Side Water Depth	>10 FT	>12.5 FT
Weir Length	NA	264 FT ⁽²⁾
Weir Loading	<20,000 GPD/FT	12,500 GPD/FT ⁽³⁾
Clarifier Surface Area	NA	2,770 SF ⁽²⁾
Clarifier Volume	NA	36,100 CF ⁽¹⁾⁽²⁾
1. Based on 13 FT depth. 2. Quantities are for a total of 2 identical clarifiers. 3. Based on a peaking factor of 5.		

Sludge Handling – Interim II Phase

All waste sludge from the S-5 WRP will go to the aerobic digesters. Sludge thickened in the digesters by decanting will be dewatered using a belt press, and dewatered sludge will be trucked to a sanitary landfill for disposal. Sludge production is estimated to be 0.9 LBS solids per LB of BOD.

Solids retention time (SRT) in the plant will be 40 days, with 10 days provided through the aeration basin. Table 7 provides information regarding the digesters.

Dewatered sludge is transported by Sheridan Environmental LLC (3600 N FM 973, Austin, TX 78725) to the J-V Dirt + Loam Facility located at 3600 N FM 973, Austin, TX 78725.

Table 7
Digester Information – Interim II Phase

Parameter	Design Factor	TCEQ Requirement	Provided
Average Flow	0.66 MGD	-	-
BOD	300 mg/l	-	-
Sludge Production	0.9 LBs Solid/LB BOD	-	1,486 LBs/Day
Waste Sludge MLSS	0.5%	-	-
Average Waste Sludge Rate	4,770 CF/Day	-	-
SRT in Plant	40 Days	15 Days	10 Days in Aeration Basins + 30 days in Digesters
Digester Solids Concentration	2 %	-	-
Decant	-	-	0.33 of Waste Sludge Rate and 1 % in Decant
Digester Volume			35,730 CF

Chlorine Contact Chamber – Interim II Phase

Information regarding the chlorine contact tank is listed in Table 8. The existing chlorine contact tank is in the existing bullseye treatment unit (TU1). Additional contact volume will be required for the expansion and the volume in TU1 will be increased as part of the expansion to provide chlorine contact for both TU1 and TU2. Detention time is based on hydraulic peak flow (5 times average – 3.30 MGD).

Table 8
Chlorine Contact Tank Interim II Phase

	TCEQ Req'd, Minutes	Proposed
Detention Time	20	20
Volume, CF	6,127	6,127

Air Requirements – Interim II Phase

Aeration

Fine bubble diffusers are proposed in the aeration basins. The diffusers will provide 10 percent or more transfer efficiency, and 10 percent was used to calculate air flow. Estimated air required and blower firm capacity listed in Table 9 were calculated from an equation that included a 1.2 factor times the influent BOD and a 4.3 factor (stoichiometric) times the influent NH_3 concentration.

TABLE 9
Oxygen Requirements Interim II Phase

Item	TCEQ Req'd	Proposed
Oxygen Req'd per LB BOD	2.2 LBs/LB BOD	1.2 LBs per LB BOD Plus 4.3 LBs/LB NH_3
Oxygen Req'd, LBs/day	4,403 LBs/day	3,840 LBs/day Calculated
Firm Air Supply (SCFM)	3,200 CFM per LB of BOD/day	4 Blowers 3 Existing at 1480 CFM 1 This Project at 1480 CFM Firm Capacity 4,440 CFM
Aeration Plus Digester Air Required	3,907 CFM	4,440 CFM Firm

Digester – Interim II Phase

The digester area in TU2 is divided into three areas and provides a total volume of 35,730 CF. Digesters can be operated in series or individually. Information is listed in Table 10.

Table 10
Digester Air – Interim II Phase

Item	TCEQ Req'd	Proposed
Digester Volume	NA. Sludge is landfilled. 30-day detention time is provided in plant.	35,730 CF
Digester Air	20 CFM/1,000 CF	20 CFM
Air Required	715 CFM	715 CFM

Treatment Unit Sizes and Information for Final Phase

The Final Phase as currently planned involves a 0.4 MGD increase in treatment capacity from the Interim II capacity, for a total design capacity of 1.2 MGD. The additional capacity will be provided in a third treatment train (TU3). Increases in treatment unit capacities are listed in Table 11 on the following page. Additional anoxic, aeration clarification, digestion, and chlorine contact volume will be required to handle the Final Phase flows. As indicated previously, the Final Phase addition will be sized larger than the proposed 0.23 MGD increase in permitted capacity (for a total permitted Final Phase of 1.03 MGD).

The existing chlorine contact for TU1 and TU2 is provided in the outer periphery of existing TU1. The Final Phase contact will be provided in the outer periphery of TU3.

Interim II and Final Phases both add 0.4 MGD capacity, and the anoxic, aeration, digestion, and clarifiers, and capacities of these treatment units will be the same size in the two phases. TU2 has no digesters as TU1 has digesters that serve both TU1 and TU2.

Screening – Final Phase

The existing screen has adequate capacity to handle Final Phase flows. No improvements are required.

Anoxic and Aeration – Final Phase

The additional volumes of the anoxic and aeration units that will be required for the Final Phase are shown in Table 11. Sizing will be in accordance with TCEQ standards.

Table 11
Aeration and Anoxic Basins – Final Phase

Basin	Design Loading or Detention Time		Volume (Cubic Ft)	
	TCEQ	Design	Interim II	Final
Anoxic	NA	2.5 Hrs	11,140	16,710
Aeration	35 LBs BOD/1,000 CF/Day	35 LBs BOD/1,000 CF/Day	57,190	85,785

Final Clarifiers – Final Phase

The Final Phase final clarifier will match the TU2 and TU2 clarifiers. The information in Table 6 for the Interim II Phase is applicable to the Final Phase clarifier. The Final Phase clarifier will be 42 FT diameter with minimum 12.5 FT SWD.

Sludge Handling – Final Phase

Sludge handling in the Final Phase will be the same as sludge handling in Interim Phase II. Waste sludge will be aerobically digested, thickened by decanting, dewatered on a belt press, and transported to a landfill for disposal.

The belt press operational schedule will be adjusted as necessary to handle the increased sludge quantity. Five digester basins will be available to provide flexibility in sludge wasting and decanting operations.

The Final Phase will increase plant capacity by 50 percent and sludge production will increase proportionately. The digester volume implemented in the Final Phase will be half of the volume calculated for the Interim II phase.

Chlorine Contact – Final Phase

Chlorine contact for TU1 and TU2 is located in the annular ring of TU1 and cannot be expanded. Chlorine contact for TU3 will be located in the annular ring of TU3 in a similar manner to TU1. Twenty minutes contact (TCEQ standard) will be provided for the anticipated peak flow for hydraulics of 1.65 MGD. Contact volume will be 3,064 CF.

Air Requirements – Final Phase

The calculated Final Phase air requirements will be more than the firm air capacity provided by the four blowers that will be installed following implementation of Interim Phase II improvements. One additional blower is required in the Final Phase improvements. Design of the Final Phase improvements will include review of the blower requirements to verify air and blower requirements and the size of the fifth blower.

Summary – Final Phase Table 12 includes a summary of the Final Phase treatment units required.

Table 12
Final Phase Treatment Units Required

Unit/Parameter	Final Phase ¹ (TU1 + TU2 + TU3) <i>1.03 MGD Permitted; 1.2 MGD Design</i>			
	Number of Units	Capacity, Each Unit	Capacity, Total	Dimensions (L x W x D)
Screen Mechanical drum fine screen	1	5 MGD	5MGD	42 IN Diam by 72 IN Length
Anoxic Basin	3 (1 in each of 3 Trains)	TU1/TU2/TU3 = 5,570 CuFt Ea	16,710 CuFt	TU1 – ID 44.5 FT, OD 73.5 FT, 14% of Circle TU2 – ID 44.5 FT, OD 86.5 FT, 8% of Circle TU3 – ID 44.5 FT, OD 81 FT, 10% of Circle 16 FT SWD.
Aeration Basin	3	TU1+TU2=57,190 CuFt TU3 =28,595 CuFt	85,785 CuFt	TU1 – ID 44.5 FT, OD 73.5 FT, 69% of Circle TU2 – ID 44.5 FT, OD 86.5 FT, 42 % of Circle TU3 – ID 44.5 FT, OD 81 FT, 50% of Circle 16 FT SWD.
Final Clarifier Surface Area	3	TU1/TU2/TU3 = 1,385 SqFt Ea	4,155 SqFt	TU1/TU2/TU3 = 42 FT Diam All 12.5 FT min SWD
Volume	3	TU1/TU2/TU3 = 18,050 CuFt Ea	54,150 CuFt	
Aerobic Digester	5 (3 in TU-2; 2 in TU-3)	TU2 =35,730 Cu Ft TU3 =17,865 CF	53,595 CuFt	TU2 – ID 44.5 FT, OD 86.5 FT, 51% of Circle TU3 – ID 44.5 FT, OD 81 FT, 31% of Circle 16 FT depth
Est. Total Blower Capacity ²	5	1,483 SCFM	5,930 CFM Firm Capacity	Discharge pressure 7.6 psi +/-
Chlorine Contact Basin Volume	2	Existing TU2 =6,127 CuFt TU3 =3,064 CF	9,191 CuFt	TU1 – ID 44.5 FT, OD 73.5 FT, 18% of Circle TU3 – ID 44.5 FT, OD 81 FT, 9% of Circle 9.75 FT depth
Filter Steel Traveling Bridge w/air scour	4	400,000 GPD	1.6 MGD	<i>Each Filter:</i> Peak Q= 2.5Q=2.5(278 gpm) = 695 gpm; Filter bed area=140 SqFt; Tank size 29'L x 8.5'W x 6'H.
Belt Press	1	1 Meter Unit	1 Meter Unit	
<p>1. Projected peak month flow increase in Final Phase is 0.23 MGD for a total permitted flow of 1.03 MGD. However, Final Phase design is based on 0.4 MGD (same as Existing and Interim II) for conservatism and operational flexibility.</p> <p>2. Estimated blower capacity includes aeration requirements for activated sludge and digester aeration plus a 5% allowance for ancillary air requirements including return sludge air lift pumps and chlorine contact basin mixing.</p> <p>Acronyms: TU1= Treatment Unit 1 (Existing), TU2= Treatment Unit 2 (Proposed Interim II Addition), SqFt= Square feet, CuFt= Cubic feet, MGD= Million gallons per day, GPD= Gallons per day, SCFM= Standard cubic feet per minute, Ft= Feet, SWD= Side water depth</p>				

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ATTACHMENT L

Project Location & Service Area Map

(Technical Report 1.0, Section 3)

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(SCALE IS APPROXIMATE)



LAKE TRAVIS






LAKEWAY MUD

LAKEWAY MUD

LAKEWAY MUD

LAKEWAY

LEGEND

-  S-5 WRP Service Area (In-District, Existing)
-  S-5 WRP Service Area (Out-of-District Existing and Phase 1 Expansion)
-  S-5 WRP Service Area (Out-of-District Future Phase Expansion)
-  Outer Boundary of Area to be added to LMUD Wastewater System by Phase 1 & Future Out-of-District Wastewater Projects (Includes S-4 WRP and S-5 WRP Service Areas)
-  TCMUD No.11, 12, & 13 Wholesale Wastewater

**S-5 WATER RECYCLING
PLANT (WRP)**

**LAKEWAY MUNICIPAL UTILITY DISTRICT
S-5 WRP EXPANSION**

**PROJECT LOCATION
& SERVICE AREA MAP**

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ATTACHMENT M

Solids Management Plan

(Technical Report 1.1, Section 7)

Existing/Interim I Phase

Influent Design Flow	0.4 MGD
Influent BOD Concentration	300 mg/l
Digester Volume	13,198 CF
Aeration Basin MLSS	1,500 to 3,000 mg/l

Solids Generated/Day	100% Flow	75% Flow	50% Flow	25% Flow
Pounds Influent BOD	1,001	751	500	250
Pounds of Dry Sludge Produced ⁽¹⁾	400	300	200	100
Pounds of Wet Sludge Produced ⁽²⁾	20,016	15,012	10,000	5,000
Gallons of Wet Sludge Produced	2,400	1,800	1,199	600

1. Based on 0.4 LBs of digested sludge produced per pound of BOD removed.
2. Based on 2% solids concentration in sludge.

Interim II Phase

Influent Design Flow	0.8 MGD
Influent BOD Concentration	300 mg/l
Digester Volume	35,726 CF
Aeration Basin MLSS	1,500 to 3,000 mg/l

Solids Generated/Day	100% Flow	75% Flow	50% Flow	25% Flow
Pounds Influent BOD	2,002	1,501	1,001	500
Pounds of Dry Sludge Produced ⁽¹⁾	801	600	400	200
Pounds of Wet Sludge Produced ⁽²⁾	40,032	30,024	20,016	10,008
Gallons of Wet Sludge Produced	4,800	3,600	2,400	1,200

1. Based on 0.4 LBs of digested sludge produced per pound of BOD removed.
2. Based on 2% solids concentration in sludge.

Final Phase

Influent Design Flow	1.2 MGD*
Influent BOD Concentration	300 mg/l
Digester Volume	53,589 CF
Aeration Basin MLSS	1,500 to 3,000 mg/l

**Note that permit Final Phase capacity will be 1.03 MGD, but facility improvements to be designed for 1.2 MGD for conservatism and operational flexibility.*

Solids Generated/Day	100% Flow	75% Flow	50% Flow	25% Flow
Pounds Influent BOD	3,002	2,252	1,501	751
Pounds of Dry Sludge Produced ⁽¹⁾	1,201	901	600	300
Pounds of Wet Sludge Produced ⁽²⁾	60,048	45,036	30,024	15,012
Gallons of Wet Sludge Produced	7,200	5,400	3,600	1,800

1. Based on 0.4 LBs of digested sludge produced per pound of BOD removed.
2. Based on 2% solids concentration in sludge.

Sludge will be wasted to the digester by routing flow from the return sludge pumps to the digester. Sludge will be wasted as necessary to maintain the desired MLSS range in the aeration basins. Supernatant from the digester will be routed to the head of the plant when the digester is decanted prior to routing sludge to the belt press.

The calculated solids retention time in the digester is 30 days at design (100%) flow. Dewatered sludge will be transported to a sanitary landfill for disposal. Information regarding the sludge transporter and the landfill is listed below.

Transporter	Sheridan Environmental LLC	TCEQ Hauler# 24220
Sanitary Landfill	J-V Dirt + Loam Composting Facility	TCEQ Reg.# 2310

ATTACHMENT N

Crop System and Irrigation Operations

(Domestic Worksheet 3.0, Sections 2 and 5)

Contents:

N1. Cedar Tree Irrigation Cropping Plan

N2. Turf Grass Irrigation Cropping Plan

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ATTACHMENT N1

N1. Cedar Tree Irrigation Cropping Plan

(Domestic Worksheet 3.0, Sections 2 and 5)

Following is a copy of the original permit submittal for the cedar tree irrigation area, given that the primary purpose of this permit amendment is to reflect the complete transfer of the existing wastewater permit WQ0014534001, previously maintained by Travis County Municipal Utility District No. 12 (TCMUD 12; RN 104372941) to the existing permit WQ0011495006, which will continue to be maintained by Lakeway Municipal Utility District (LMUD; RN 101714996).

The intent is to combine and maintain all previously approved and permitted Final permit conditions for the cedar tract and Live Oak Golf Course irrigation disposal sites (hence why the past approved cropping plan for the cedar tract follows). See Attachment B for further details.

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CROPPING PLAN

TRAVIS COUNTY MUD 12 IRRIGATION SYSTEM

COVER CROP

An irrigation system is proposed for effluent disposal by the Travis County MUD No. 12. A total irrigation tract area of 346.55 acres has been designated, but not all of the tract will be used for irrigation in the early stages of development. For the first phase of development, approximately 51.1 acres of the tract will be used for irrigation of up to 0.175 MGD of effluent. The proposed cover "crop" on the site will be juniper trees, hardwood trees, and native grasses and shrubs on rangeland. The proposed system will be based upon tree canopy irrigation, instead of a conventional land-based consumptive use system. With the innovative tree canopy application system, the majority of water loss will occur via evaporation from leaf surfaces within the canopy. Because the primary loss mechanism is evaporation, the system will be operational year round. The primary growing season of the mixed tree canopy is roughly March through October, and more water can be applied under those conditions.

NUTRIENTS

The nitrogen uptake of the mixed juniper/vegetated area is not well documented. Further, for the proposed canopy irrigation system, only a relatively small fraction of the applied effluent is expected to actually reach the ground surface. For the present analysis, it has been estimated that the nitrogen uptake will be approximately 134 lbs N/acre/year, with volatilization raising that to 160.8 lbs N/acre/year. It is further assumed that all of the nitrogen consumed by the vegetation will be provided by the nitrogen content in the effluent only, and no additional fertilizer will be practiced.

WATERING

Treated municipal wastewater effluent will be applied to the rangeland irrigation site. The effluent application rate for the rangeland cover is projected to be 3.83 acre-feet/acre-year or less. Since this is not a conventional crop-growing operation with associated water demands, no additional irrigation water is expected to be necessary. Additional details regarding the spray application are provided in a separate report, Supplemental Technical Report for Irrigation Disposal.

HARVESTING

The effluent will be sprayed on the tree canopy, and most of the applied effluent will be lost via evaporation from leaf surfaces (expected to be approximately 80% of applied effluent). Since some of the applied water will eventually reach the ground, it is expected that the health of the tree/vegetated cover will be improved over typical nonirrigated conditions. At the present time, it is not expected that harvest will be a regular occurrence. The only situation where harvest may be mandated is if the canopy grows to a height sufficient to block the sprayed effluent. If that situation does occur, the top branches of the canopy will be removed (or, the spray height will be increased).

SOILS

The principal soils group on the native rangeland irrigation tract is the Brackett Association. The soils present are predominantly categorized as Brackett-Rock Outcrop, with slopes of 1-60 percent. There are also present soils of the Tarrant-Rock Outcrop Association, with slopes of 18-50 percent. Slope is not an operational constraint as it is with a conventional application system, since the proposed application will be canopy spray. The soils are predominantly gravelly clay loam, clay loam, gravelly clay loam, and stony clay and are slowly permeable. Soils on the existing irrigation sites are described in more detail in a separate soils report.

SALT TOLERANCES

The primarily juniper vegetation is expected to be relatively tolerant of high salt loadings in irrigation water, but it is not well documented. Since most of the applied water will be lost via evaporation, salt loading is not expected to be problematic. Some of the applied irrigation water will reach the ground, and normal rainfall will reach the ground, so there will be some leaching which will help preclude any potential problems with salt concentration in the root zone.

APPLICATION METHOD

At the present time, the tree canopy irrigation application system has been designed at only a conceptual level. At a conceptual level, the tract will be irrigated with fixed-head sprinklers mounted on towers above the tree canopy. Effluent application will be targeted for a relatively low rate, 0.2 inches or less over a prescribed time period, in order to maximize the evaporation loss.

ATTACHMENT N2

Turf Grass Irrigation Cropping Plan

(Domestic Worksheet 3.0, Sections 2 and 5)

Crop System, Application Areas & Rates

Type 1 reclaimed water, per 30 TAC §210.33, from the S-5 Water Recycling Plant is beneficially reused by spray irrigation to current permitted acreages. All turf areas associated with irrigation are existing and have been utilized for effluent disposal for well over 25 years.

The crop system used for this practice, for the current through Final Phase (0.4 MGD portion) of this permit, consists of high-performance turf grasses located in landscaped/manicured areas. Soil maps showing the irrigation areas are shown in Attachment Q2.

The application area is the Live Oak Golf Course, of which only 117 acres of the total contract available acreage of up to 135 acres are irrigated under the permit. Golf course slopes are typically 4 percent but can be up to 16% around golf course features. The golf course area consists of turf grasses of both summer and winter varieties. These grasses are Bermuda grass and Ryegrass, respectively. Each of the summer and winter grasses are grown on the full acreage to achieve a year-round application area. The current permitted effluent application rate of 3.8 ft/ac/yr will be maintained.

Tail Water Controls

Tailwater controls are normally used to control run-off that occurs due to flood-type irrigation systems. Since spray irrigation is utilized to apply effluent, tail water controls are not needed at the sites identified in this permit application. Instead, runoff is prevented by not operating the irrigation systems excessively or during or after significant rainfall events and by controlling irrigation rates and timing to ensure that the permeability and available water capacity of the soils is not exceeded.

Growing Seasons

Grass seasons are dependent on climatological conditions but generally Bermuda grass is active April through October while Ryegrass is active October through May.

Nutrient Requirements

The annual nutrient uptake rates for these grasses and nutrient loading from effluent are summarized in the following tables.

Annual Nutrient Uptake Rates by Overseeded Turf (lb./acre)			
	Nitrogen-N	Phosphorus-P	Potassium-K
Bermudagrass	280	40	201
Ryegrass	280	76	290
17% Reduction for common season	(95)	(20)	(83)
Annual Nutrient Uptake	465	96	408
*Turf uptake rates were adapted from the Texas Agricultural Extension Service Publication L-1533 and EPA publication 625/1-81-013.			

A portion of the nutrient requirements will be met from nutrients in the effluent used for irrigation. Application rates of nutrients from effluent are shown in the table below.

Application Rates*			(lb/acre/yr) or (lb/ac/day)			
	Flow (mgd)	Application Area (ac)	Nitrogen**	Phosphorus	Potassium	BOD ₅
Effluent Concentration			13.2 mg/l	3.8 mg/l	11.1 mg/l	20mg/l
Final Phase (<i>Turf</i>)						
<i>Annual</i>	0.400	117	137	40	116	208
<i>Daily</i>			0.38	0.11	0.32	0.57
* Annual application rate= {flow rate} x 8.34 x (nutrient concentration in effluent) x 365 days/(application area) Daily application rate= {flow rate} x 8.34 x (nutrient concentration in effluent)/(application area)						
**Values are design. Actual lab analysis indicates lower effluent concentrations.						

Nitrogen Balance

Given the annual nitrogen requirement of 465 lb/ac, a nitrogen balance can be computed according to:

$$\text{Demand before 20\% volatilization} = N = 465 / (1.00 - 0.20) = 581 \text{ lb/ac}$$

$$L = N / (0.225 C_e)$$

Where:

L = annual liquid loading limit in inches per acre

N = total nitrogen demand

C_e = Nitrogen concentration in effluent (13.2 mg/l)

Crop	Annual Nutrient Uptake (lb/acre)	Total Nitrogen Demand (lb/acre)	Effluent Nitrogen Concentration (mg/l)	Annual Liquid Loading Limit (in/yr/acre)
Turf	465	581	13.2	196

The annual liquid loading limit due to nitrogen of 196 inches is well over the maximum amount that would be applied at the permitted rate of 3.8 ft/ac/yr (See Attachment T). Therefore, nitrogen does not appear to be a limiting factor.

Supplemental Watering Requirements

The maximum water application rate is approximately 60 in/ac/yr or 4.98 ac-ft/ac-yr of which approximately 5 in/yr is required for leaching.

The permitted application rate of effluent is 3.83 ac-ft/ac-yr leaves 4.98-3.83 = 1.15 ac- ft/ac-yr supplemental watering requirement. Supplemental water is pumped from Lake Travis. Actual supplemental water needs are determined by crop stress and water availability, but the proposed application rate of 3.83 will not meet the total water demands of the vegetation.

Salt Tolerances

Bermuda grass is a salt tolerant grass that can respond well to soil salinity of up to 8 mmhos/cm. However, Ryegrass is a cool season grass and may be severely injured by soil salinity levels over 4 mmhos/cm¹. Therefore, for overseeded turf areas, the Ryegrass' greater sensitivity to salinity is the limiting factor on allowable soil salinity.

Harvesting Methods and Number of Harvests

The application area is the Live Oak Golf Course. Harvesting consists of mowing weekly or when grass reaches 1 1/2 inches of blade height on fairways. Greens may be mowed daily. Grass clippings are left on the turf unless windrowed by the mower.

¹ Dubie, Richard L., Professional Turf Maintenance Program Guide, Texscape, Inc., 1973, pg 637.

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ATTACHMENT O

Pond Liner Certification & Reclaimed Water Storage

(Domestic Worksheet 3.0, Section 3)

Contents:

O1. I-5 Pond Liner Certification

O2. S-5 Water Recycling Plant Reclaimed Water Storage Evaluation

This report evaluates provision of additional reclaimed water storage for expansion of the S-5 Water Recycling Plant beyond the current 0.4 MGD design capacity and existing 38-million-gallon (MG) I-5 Pond located onsite. Construction of a 20-MG ground storage tank for Interim II Phase (0.8 MGD), with addition of a 30-MG tank in the future is recommended. This would provide a total of 88-MG of reclaimed water storage, which exceeds the total minimum value of 76 MG as required by the Final Phase merging of existing permits (LMUD WQ0011495006 & TCMUD 12 WQ0014534001). See below and Attachment B for more details.

Table 1. Merged Existing Permits

Entity (Permit No.)	Capacity	Storage		Irrigation Disposal	
	Total MGD	Total MG	Total AF	Total Acres	Crop
LMUD (WQ0011495006)	0.4	38.0	117	117	golf course (GC)
TCMUD 12 (WQ0014534001)	0.63	37.8	116	184	cedar tract (CT)
Combined Final Phase(s)	1.03	75.8	233	301	GC & CT

Note that MG= million gallons, MGD= million gallons per day, AF= acre-feet.

Table 2. Requested Amendment Application Permit Conditions

Permit Phase	Capacity		Storage				Irrigation Disposal		
	Add'l MGD	Total MGD	Add'l MG	Total MG	Add'l AF	Total AF	Add'l Acres	Total Acres	Crop
Interim I (Existing)	-	0.4	-	38.0	-	117	-	117	golf course (GC)
Interim II	+0.40	0.8	+20.0	58.0	+61	178	+117	234	+cedar tract (CT)
Final	+0.23	1.03	+17.8	75.8	+55	233	+67	301	+cedar tract (CT)
Total Final Phase	-	1.03	-	75.8	-	233	-	301	GC & CT

Note that MG= million gallons, MGD= million gallons per day, AF= acre-feet.

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March 27, 2024

Texas Commission on Environmental Quality Region 11 Office
MC R11
PO Box 13087
Austin, TX 78711-3087

**RE: Lakeway Municipal Water District Reclaimed Water System TCEQ Permit No. WQ0011495006
Certification of Membrane Liner for I-5 Pond**

To Whom It May Concern:

With this letter, I am providing certification that the Lakeway Municipal Water District's reclaimed water storage pond referred to as I-5 was constructed with a flexible membrane liner system that exceeds the minimum requirements of the above referenced permit and the requirements of TAC Ch. 210.23. Although I was not directly involved in the design or construction of these liner systems, I have completed the due diligence to verify that the liner systems meet the minimum thickness requirements and were installed as specified.

In order to make this certification, I retrieved from off-site storage the original construction documents, and shop drawings where available. The I-5 pond was constructed in 2000 with a 60 mil HDPE geomembrane liner supplied and installed by Midessa Industrial Vinyl Co. and manufactured by Solmax International. I visited the site and verified that the pond had a liner system that appears to be installed per the requirements of the construction contract documents.

Please contact me at 512.751.9272 if you have any questions regarding this issue.

Sincerely,

Castleberry Engineering & Consulting



Christianne Castleberry, P.E.
District Engineer



cc: Mr. Earl Foster, General Manager

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LAKEWAY MUNICIPAL UTILITY DISTRICT



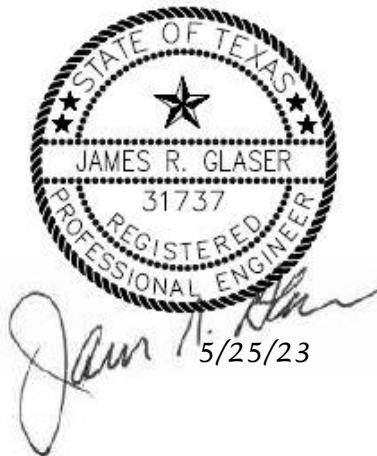
**S-5 WATER RECYCLING PLANT
RECLAIMED WATER STORAGE
EVALUATION**

PRELIMINARY ENGINEERING REPORT

May 2023

This report was prepared for Lakeway Municipal Utility District by:

James R. Glaser, P.E. Engineering and Consulting, P.L.L.C., TX Registered Firm No. F-16693



Castleberry Engineering & Consulting, P.L.L.C., TX Registered Firm No. F-10084



TABLE OF CONTENTS

Section 1 - Introduction	1
1.1 General	1
Section 2 - Additional Reclaimed Water Storage	4
2.1 Construction of Ground Storage Tanks.....	4
2.2 Construction of a Storage Pond Southwest of the S-5 WRP Site	6
2.3 Increase Depth of I-5 Pond.....	10
Section 3 – Summary and Estimated Costs	11
3.1 Summary	11
3.2 Estimated Costs	12

LIST OF FIGURES

Figure 1 – LMUD Reclaimed Water System.....	2
Figure 2 – S-5 WRP Expansion Reclaimed Water Storage Tanks Site Plan.....	5
Figure 3 – Reclaimed Water Storage Pond, Option 2.....	7
Figure 4 – Drainage Area to Storage Pond	9

LIST OF TABLES

Table 1 – Reclaimed Water System Information - Existing.....	1
Table 2 – S-5 WRP RCW Storage Information.....	3
Table 3 – Potential RCW Pond Properties.....	8
Table 4 – Summary of Estimated Costs.....	12

LIST OF APPENDICES

Appendix A – Preliminary Pond Options

- Figure A-1. OPTION 1A – Earthen Pond (32.7 MG) Plan
- Figure A-2. OPTION 1A – Earthen Pond (32.7 MG) Sections
- Figure A-3. OPTION 1B – Earthen Pond (23.7 MG) Plan
- Figure A-4. OPTION 1B – Earthen Pond (23.7 MG) Sections
- Figure A-5. OPTION 2 – NW Concrete Wall (35.1 MG) Plan
- Figure A-6. OPTION 2 – NW Concrete Wall (35.1 MG) Sections

Appendix B – Preliminary Opinion of Probable Construction Cost

Section 1 - Introduction

1.1 General

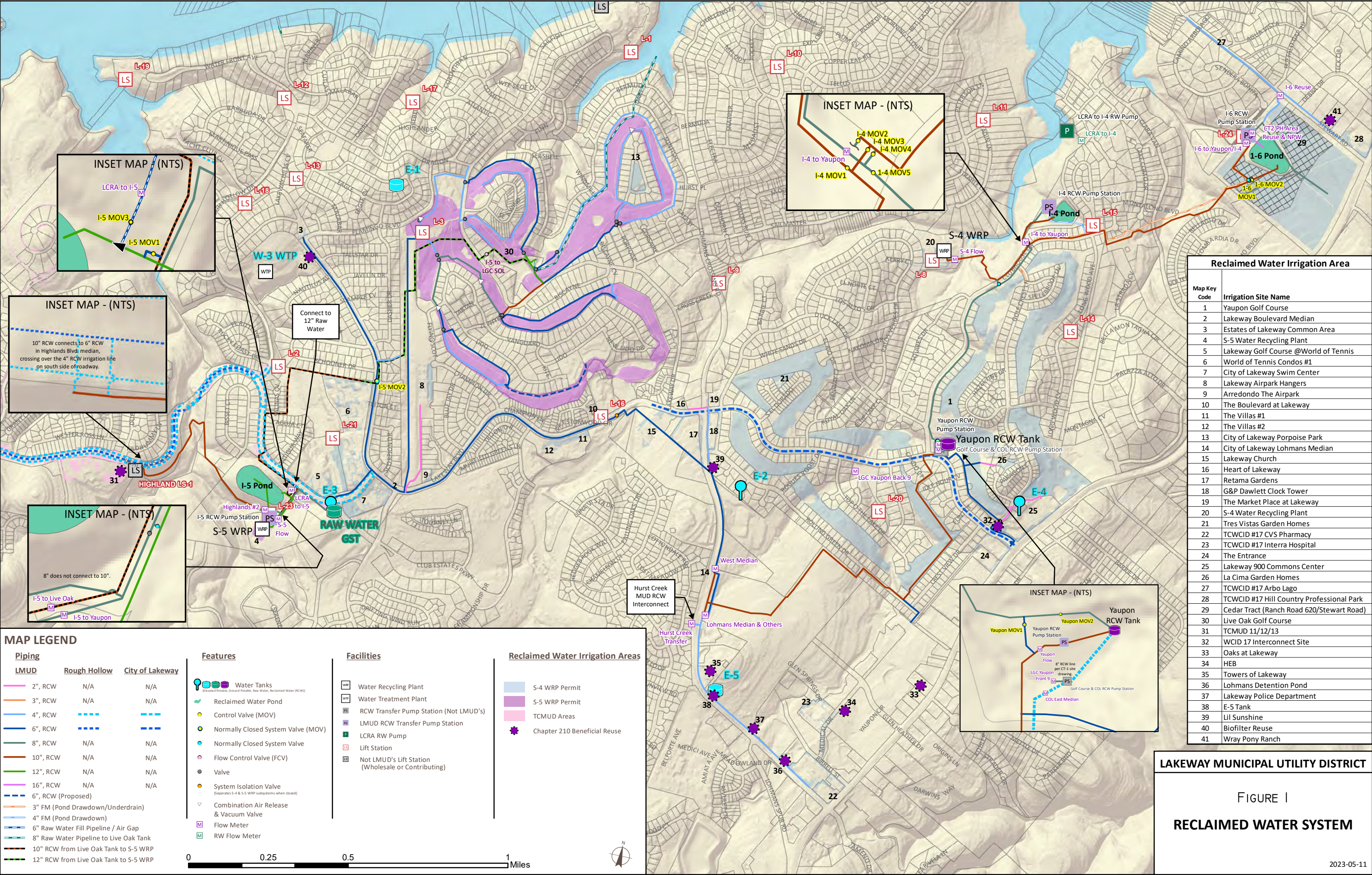
LMUD operates two Water Recycling Plants (S-4 and S-5 WRPs) and discharges all treated water from the plants to storage ponds. Water from the storage ponds is used for irrigation so that the S-4 and S-5 WRP systems operate and are permitted by the Texas Commission on Environmental Quality (TCEQ) as no-discharge systems with a Texas Land Application Permit (TLAP). Both plants are permitted for and produce an effluent complying with TCEQ Type 1 quality requirements (unrestricted access).

The plant locations are shown on Figure 1. The current S-5 WRP permitted capacity is 0.4 million gallons per day (MGD), and the S-4 WRP permitted capacity is an annual average flow not to exceed 0.81 MGD. Expansions of both plants are in the planning stage, with construction of an S-5 WRP expansion to 0.8 MGD expected to begin later this year. Ultimately, an additional future expansion is anticipated for the S-5 WRP to a total buildout capacity of 1.2 MGD.

Reclaimed water (RCW) storage is provided in the I-4, the I-5, and the I-6 reclaimed water storage ponds. The locations of the ponds are shown on Figure 1. Pond volumes in millions of gallons (MG) are shown in Table 1.

Table 1
Reclaimed Water System Information - Existing

WRP	Average Annual Permitted Capacity
S-4	0.81 MGD
S-5	0.40 MGD
Total¹	1.21 MGD
<i>¹ 0.4 MGD Expansion of S-5 WRP is anticipated in late 2023.</i>	
Ponds	Volume
I-4	17.4 MG
I-5	38.0 MG
I-6	40.3 MG
Total²	57.7 MG
<i>² Storage Expansion Plan Development in Progress</i>	



The increases in capacities of the S-4 and S-5 WRPs are being addressed in current planning and design projects separate from this study. This preliminary report focuses on plant effluent, which is identified as RCW, and the storage requirements for no-discharge operation. RCW storage and irrigation area requirements are codependent, and the required volume and area is determined through development of a water balance that includes historical rainfall data, pond evaporation, plant evapotranspiration information, crop area, and type of crop. A final water balance has not been conducted in this study, but will have to be done when permit amendments are submitted to the TCEQ for permitted flow increases. Storage increases considered in this study are based on preliminary water balance calculations.

Preliminary planning estimates of ultimate treatment and storage requirements for the S-5 WRP indicate a potential need for 1.2 MGD treatment capacity and an additional 50 MG storage capacity. Initially as indicated in Table 1, the S-5 WRP will be expanded to 0.8 MGD. Preliminary water balance calculations indicate that roughly an additional 15 MG of storage will be required for a permitted flow of 0.8 MGD and that another 35 MG (in addition to the 15 MG) of storage would be required for a permitted flow of 1.2 MGD.

Preliminary information regarding treatment and storage for the S-5 WRP and service area is summarized in Table 2.

Table 2
S-5 WRP RCW Storage Information

Treatment Capacity, MGD	Storage, MG		
	Existing	Required ⁽¹⁾	Additional Required, MG
0.4 Existing	38.0	27.9	None
0.8 (Phase 1, 2024)	38.0	52.2	14.2
1.2 (Future)	38.0	87.9	49.9
¹ Based on daily water balance calculations.			

Initial increased storage options under consideration are listed below.

- Install ground storage tanks at the S-5 WRP site (a City of Lakeway tract adjacent to the S-5 WRP site would be acquired by LMUD to expand the area available for storage).
- Construct a pond southwest of the S-5 WRP site (a City of Lakeway tract adjacent to the S-5 WRP would be acquired by LMUD to expand the area available for storage).
- Raise the operating level in the I-5 Pond.
- Possibly some combination of the three above items.

Section 2 - Additional Reclaimed Water Storage

2.1 Construction of Ground Storage Tanks

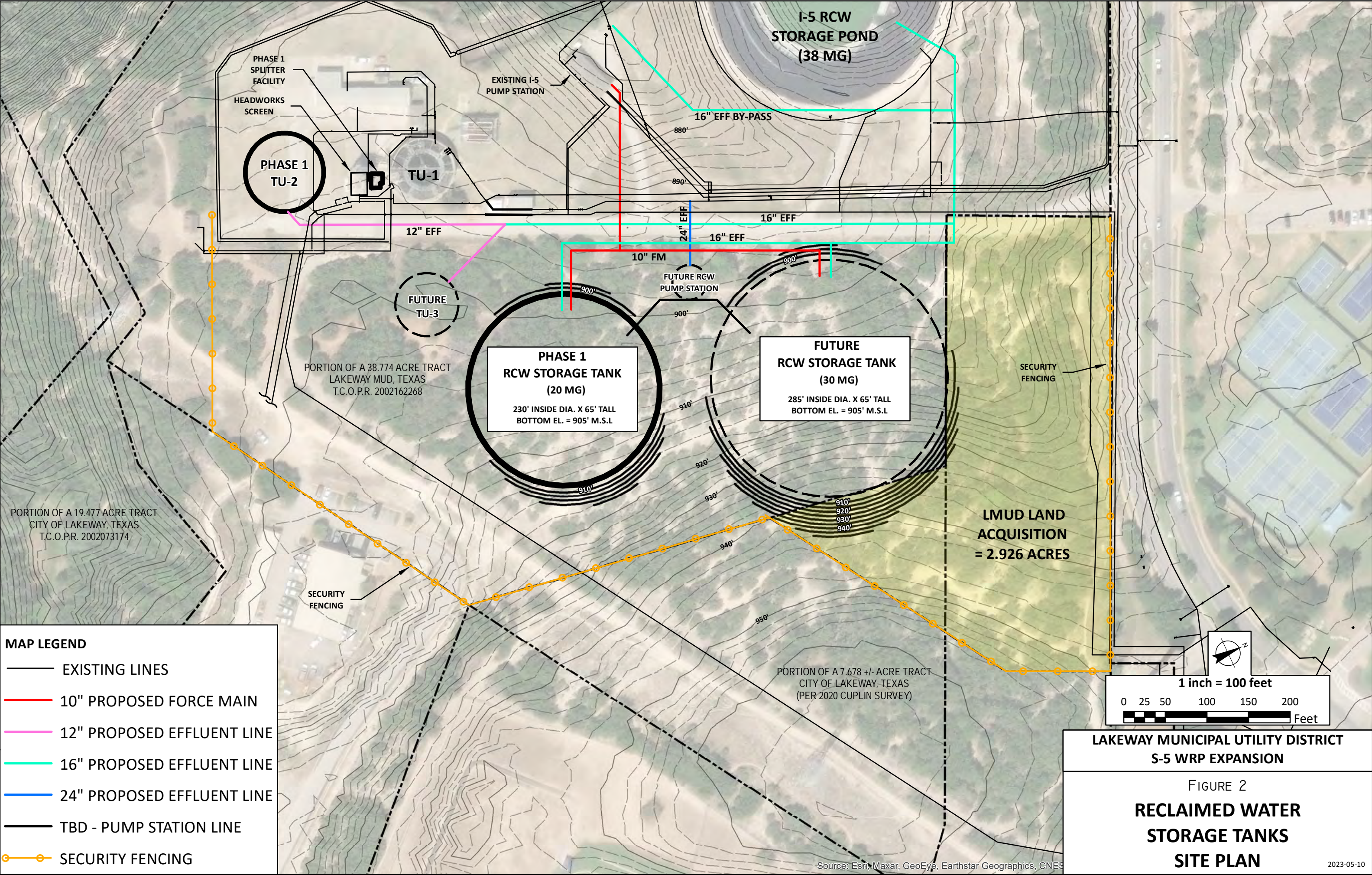
The tract of land that LMUD is acquiring from the City of Lakeway is adjacent to the east side of the S-5 WRP site and increases the area available for construction of RCW storage tanks. The S-5 WRP site, including the City of Lakeway tract being acquired, is shown on Figure 2.

Figure 2 also shows the location of two possible RCW storage tanks. One 20 MG tank would be constructed initially to provide slightly more storage capacity (existing plus new) than required by the preliminary water balance for a total S-5 WRP RCW flow of 0.8 MGD. A second tank would be constructed when justified in the future by RCW flow and would likely be 30 MG to provide storage required for a total S-5 WRP RCW flow of 1.2 MGD. The size of the second tank could vary based on actual development and flow patterns.

The available space for the tanks is relatively tight. With the steep natural slope of the site, it may be necessary to provide slope restraint during construction around the southeast side of the tank locations. Alternately, a temporary construction easement might be obtained from within the LCRA transmission line easement area.

A pump station would be required to pump RCW into the tanks. S-5 WRP drawings indicate that the I-5 Pond bottom is at elevation 873 FT and maximum water level is at elevation 898 FT MSL. Preliminary information indicates that the floor of the tanks would be at approximate elevation 905 FT MSL and the height would be approximately 65 FT. Previous planning for storage tanks proposed a discharge into the tanks at the mid-tank level (approximately 937 FT MSL), which would result in a maximum elevation head difference on the pumps of about 32 FT. Pump selections were not considered in this study, but pumps with a curve that can handle a 32 FT discharge elevation difference are likely available (it would also be possible to change the discharge elevation if a change would improve pump selection).

For the initial Phase 1 expansion capacity, the pump station to pump RCW from the plant to the storage tanks should have a firm capacity equal to the projected peak flow at an average annual flow of 0.8 MGD, which is approximately 3.2 MGD. All flow would not normally go to the tanks, but having the capacity to pump the entire flow to the tanks would allow the I-5 Pond to be taken out of service when necessary for maintenance, which would not be frequent, but would occur. Plant and RCW distribution piping does allow RCW to be conveyed to storage facilities in the S-4 WRP service area, so the tanks would not be the only options if the I-5 Pond needed to be taken out of service for maintenance. The pumping station should be designed to ease future expansion to handle the projected peak flow when the plant is expanded to allow permitting at a design flow of 1.2 MGD (an average annual flow of approximately 1 MGD).



Flow control to the pond and tanks will need to allow flow to be split in desired ratios. Normally, it would not matter how much flow went to the pond and the tanks, but flow meters and control valves should be included to allow the flow split to be controlled if determined to be advantageous.

The capacity of the pumping facilities to pump RCW from the tanks and the I-5 Pond into the distribution system should be determined during design by reviewing pumping and flow records for all three ponds to provide an indication as to peak RCW demand. The RCW system is undergoing expansion to serve more residential customers and historical RCW flow information will need to be adjusted to project future RCW demand and pumping capacity to meet peak demands.

As indicated previously, plans involve setting a bid date for an expansion project for S-5 WRP in mid-to-late 2023. The expansion is expected to be completed by the end of 2024. The permitted flow for the expanded plant cannot be permitted, though, until additional storage is available (see Table 2).

Construction of a ground storage tank can be accomplished faster than a pond could be constructed and is recommended to meet storage requirements for a permitted S-5 WRP capacity of 0.8 MGD.

2.2 Construction of a Storage Pond Southwest of the S-5 WRP Site

LMUD owns a tract that is located southwest of the S-5 WRP site, separated by an abutting parcel between that is owned by the City of Lakeway and could serve as a potential pond site, if acquired by LMUD. A natural drainage way runs generally from southeast to northwest through the site.

Figure 3 indicates the location of the potential pond site, with pond Option 2 included on the figure because the volume provided by that option results in it being the preferred option.

Various pond configurations were considered. Configurations considered grading three sides (north, east, and south) of the pond site and construction of an embankment on the fourth (northwest) side, which is the outlet for drainage from the site. A portion of the south side (location of drainage currently into pond site) would also require a partial embankment. Construction of an embankment on the northwest side reduces the volume that can be attained due to property and maximum water level constraints, which led to consideration of a dam across the northwest side of the pond.

Pond properties are listed in Table 3, and pond layouts are included in Appendix A. Note that Figures for Options 1A and 1B are included in Appendix A because preliminary examination of the options indicated that they were not the best option, while Figure 3 includes the layout of Option 2. A contoured layout and profile for Option 2 is also included in Appendix A. Preliminary investigation of the site indicates that the storage capacities listed in Table 3 could be provided at the site if the high-water level were 815 FT MSL EL. A water level of 815 FT MSL EL could be contained around three sides of the pond by grading, but a concrete dam would be required along the northwest (downstream) side of the dam. The bottom elevation of the pond would be approximately 775 FT EL. The dam would be relatively short and on the order of 45 FT high.

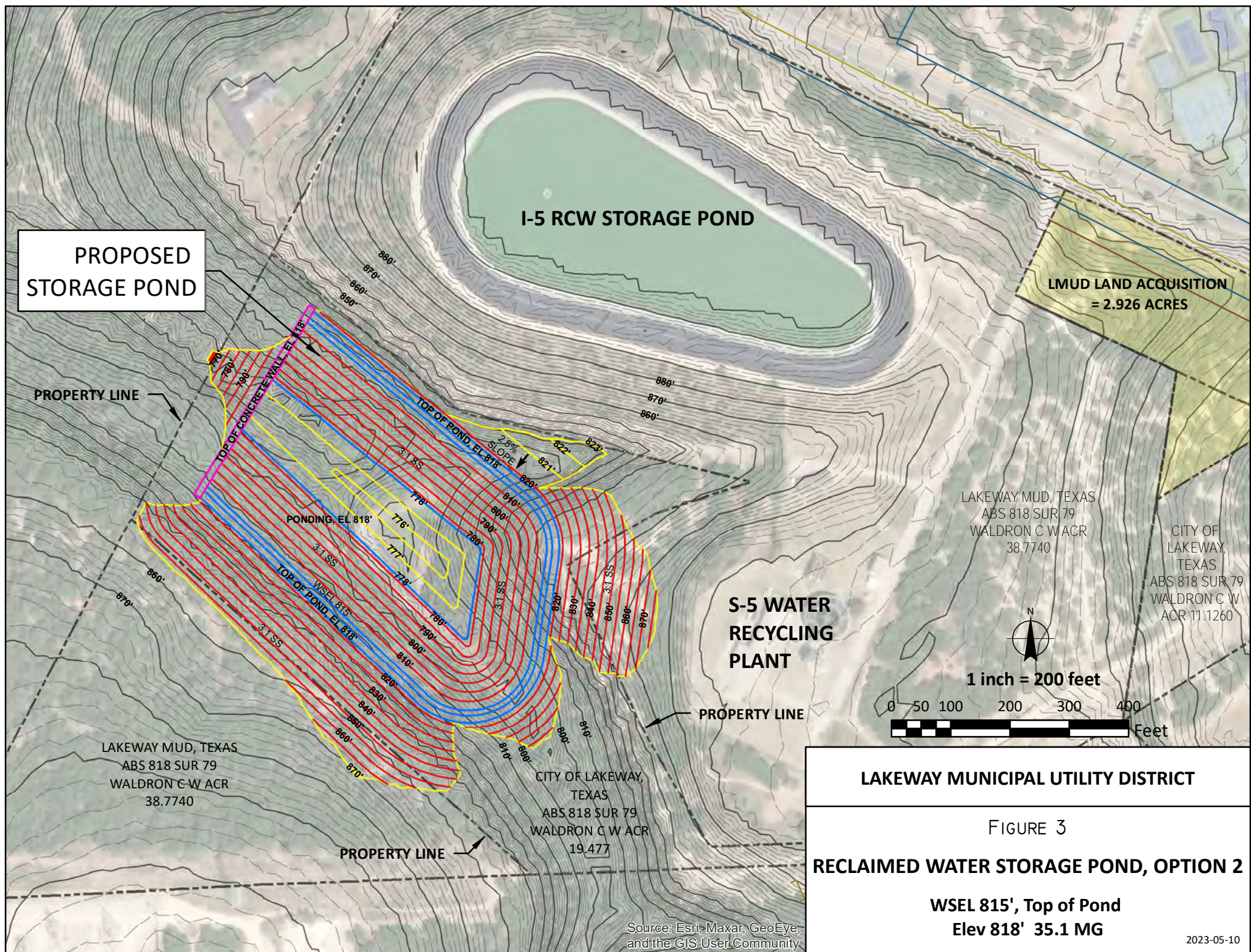
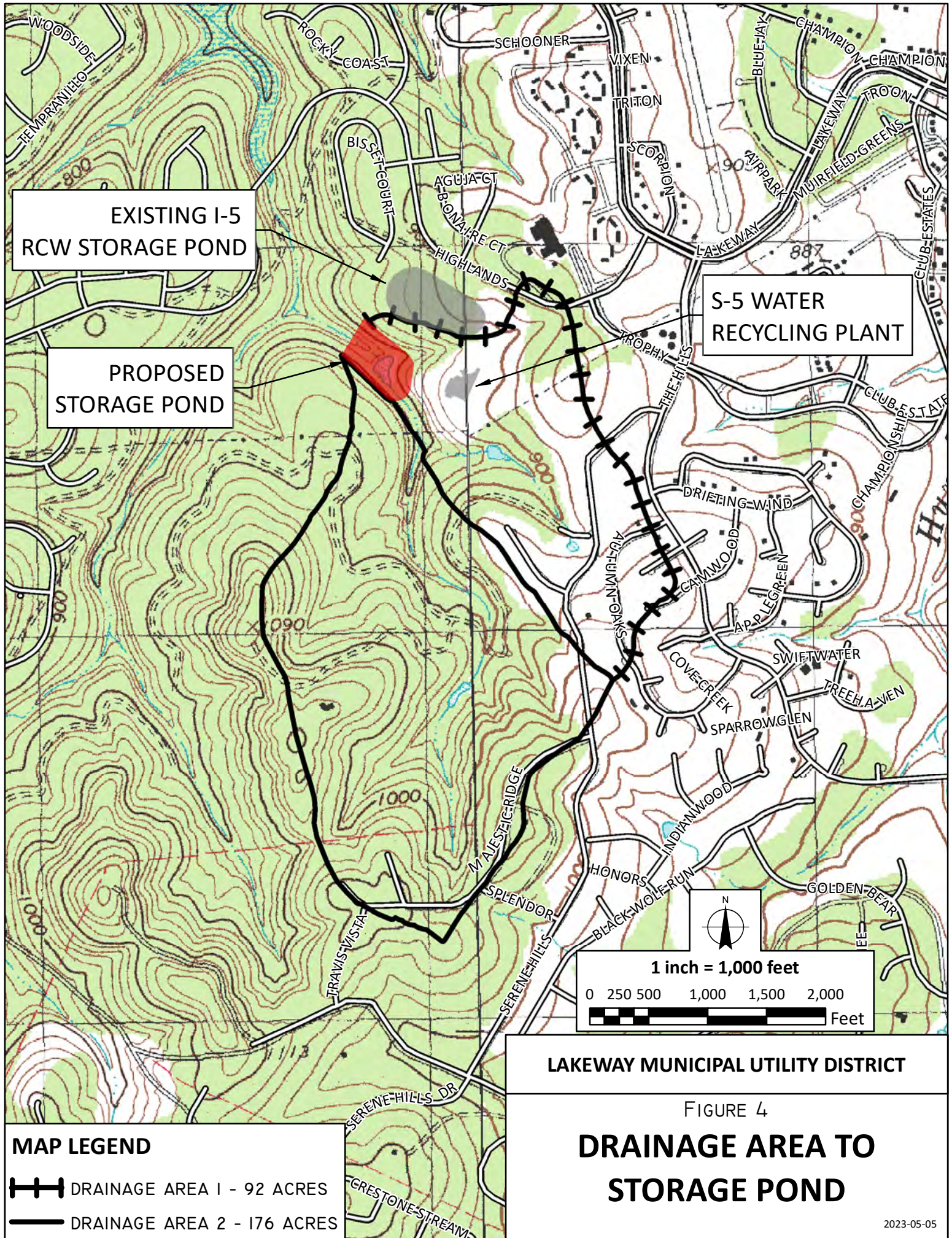


Table 3
Potential RCW Pond Properties

Pond Option	Excavation Quantity, CY			Volume, MG	Comments
	Cut	Fill	Excess Cut ⁽¹⁾		
1A	194,804	111,365	83,439	32.7	<ul style="list-style-type: none"> • Drainage across site is an issue. • Grading encroaches on I-5 Pond and existing force main piping on southwest side of I-5 Pond. • See Figure in Appendix A.
1B	92,103	68,340	23,763	23.7	<ul style="list-style-type: none"> • Drainage across site is an issue. • Somewhat limited capacity compared to Option 2. • See Figure in Appendix A.
2	105,300	38,010	67,290	35.1	<ul style="list-style-type: none"> • Drainage across site is an issue. • Includes a dam at the north end of the pond. • Dam cost and regulatory issues may be issues. • See Figure in Appendix A.
¹ Shrinkage losses not included in quantity.					

Comments regarding the site are listed below.

- Provisions would need to be made to route drainage around the pond and will be a major issue with cost implications.
- Possibilities include relatively long and deep concrete culverts or tunnels, or a storm water pumping station. The area draining to the pond site is delineated on Figure 4. The drainage area to the pond site totals approximately 268 acres, with approximately 92 acres draining towards the pond from the east and approximately 176 acres draining towards the pond from the west.
- Flow to be handled needs to be conservatively estimated based on projected ultimate use of land in the drainage area. Total flow to the area that would need to be handled though is expected to be several hundred cubic feet per second (CFS). Not all of the flow would be at the upstream end of the pond, as runoff would reach the east and west sides of the pond.
- Drainage could be handled by construction of a culvert under the pond site from the upstream end of the pond to far enough beyond the downstream end of the pond to daylight the culvert.
- Though culverts are relatively maintenance free, a culvert under the pond is not ideal because any issues with the culvert would likely require that the pond be taken out of service.
- Drainage to the sides of the pond could be routed to the upstream and downstream ends of the pond via concrete swales or ditches. Flow routed to the upstream end of the pond would be conveyed to the downstream end of the pond through the culvert under the pond. Environmental issues or questions may be raised by construction of the pond.
- A new RCW pumping station would be required to pump RCW water from the pumping station to distribution. (RCW pumping would be required from a ground storage tank, also.)



EXISTING I-5
RCW STORAGE POND

S-5 WATER
RECYCLING PLANT

PROPOSED
STORAGE POND

MAP LEGEND
[Thick black line with cross-ticks] DRAINAGE AREA 1 - 92 ACRES
[Solid black line] DRAINAGE AREA 2 - 176 ACRES

LAKEWAY MUNICIPAL UTILITY DISTRICT

FIGURE 4

**DRAINAGE AREA TO
STORAGE POND**

2023-05-05

The site does not provide the total capacity required for projected needs (Phase 1, plus Future), but a pond could be a part of meeting future storage needs. Implementation of additional storage will be required prior to the time that an additional pond could be planned and constructed, so incorporation of a pond in the system should be considered an option for a future storage expansion. An additional advantage of a pond to a tank is the added surface area for evaporation that would be incorporated into the water balance for the TLAP. The existing I-5 Pond and S-5 WRP water balance accounts for 2% loss solely due to pond evaporation. Evaluation and consideration of a pond at the location shown in Figure 3 would involve a geotechnical investigation, a detailed hydrologic study to determine the drainage flow that would need to be rerouted, a determination of how best to reroute the flow, any environmental studies required, and a comparison of costs and operational requirements between a ground storage tank and a pond.

2.3 Increase Depth of I-5 Pond

The I-5 Pond has a capacity of 38 MG, a maximum operating depth of approximately 25 FT, and a surface area of approximately 6.5 acres. A 1 FT elevation increase and the 6.5-acre surface area would result in a volume increase of approximately 2.1 MG.

The design high level elevation of the pond is 898 FT MSL. The design water levels in the S-5 WRP effluent chamber range from a minimum of 899 to a maximum of 903 FT MSL. Based on the plan weir elevation into the effluent chamber (approximately 906.8 FT), a slight increase in maximum elevation in the pond may be possible, but would have to be verified by hydraulic studies. Higher pond water elevations would require pumping to the pond.

If a vertical wall is constructed around the pond, and depending on the wall height, a means (flat shallow portion inside wall or other) of allowing someone who accidentally gets in the pond to remain safe or to get back over the wall would need to be provided for.

Based on the limited volume that could be attained by raising the maximum water level while maintaining gravity flow from the plant to the I-5 Pond, increasing pond depth is not recommended.

Section 3 – Summary and Estimated Costs

3.1 Summary

Construction of S-5 WRP improvements that include an expansion is scheduled to start later this year. The treatment capacity following the expansion will comply with TCEQ design criteria for a flow of 0.8 MGD (current permitted flow is 0.4 MGD). The I-5 Pond receives flow from the S-5 WRP and provides 38 MG of storage. Preliminary water balance calculations indicate that roughly an additional 15 MG of storage will be required to increase the TCEQ permitted flow to 0.8 MGD.

Future plans for the S-5 WRP include a second expansion to provide an ultimate facility permitted at 1.2 MGD. An expansion to 1.2 MGD will involve an expansion of RCW storage volume by approximately 35 MG (in addition to the 15 MG required to be permitted at the Phase 1 expansion to 0.8 MGD).

Three means of increasing storage were considered – (1) construction of ground storage tanks adjacent to the S-5 WRP, (2) construction of a storage pond just southwest of the S-5 WRP, and (3) increasing the depth of the I-5 Pond. The increase in storage capacity will be phased, and, as at present, storage in each phase will exceed the storage required by water balance calculations.

Raising the depth of the I-5 Pond does not provide adequate volume and planning, approvals, design, and construction of a new pond would involve a lengthy period that would extend well beyond the construction of S-5 WRP improvements to provide 0.8 MGD capacity. Barring unforeseen issues, a ground storage tank can be designed and constructed relatively quickly, though a tank would still not be completed within the time frame that S-5 WRP improvements could be completed, and construction of a ground storage tank to provide RCW storage for an increase in permitted capacity to 0.8 MGD is recommended.

While a new storage pond is not recommended to provide storage for the Phase 1 expansion to 0.8 MGD, it is recommended that studies be initiated to determine if a pond is geotechnically, structurally, drainage wise, and environmentally feasible and economically and operationally competitive with another ground storage tank. A decision as to whether increased storage to handle required additional volume for future buildout conditions by an additional tank or by a storage pond is thus deferred.

Estimated costs for raising the depth of the I-5 Pond and for a storage pond west of I-5 Pond have not been developed because they are not recommended to provide storage for the expansion of S-5 WRP to 0.8 MGD and/or would require further evaluation that is not warranted at this time. Preliminary costs for a Phase 1 project that includes a 20 MG storage tank and associated piping and pumping equipment are estimated. A 20 MG tank exceeds the additional 15 MG required for 0.8 MGD, but allows flexibility when the S-5 WRP is expanded to 1.2 MGD in the future. A conceptual-level tank-only cost for the what would

likely be a 30 MG tank, depending upon on actual development and flow patterns, to provide the total S-5 WRP RCW storage required for 1.2 MGD ultimate buildout flow is also provided.

3.2 Estimated Costs

Estimated costs for the S-5 WRP Phase 1 reclaimed water storage tank and related improvements are listed in Table 4.

Table 4
Summary of Estimated Costs

Item	Cost
Phase 1 S-5 WRP 20 MG Reclaimed Water Storage Tank Construction	\$ 25,731,000
Future S-5 WRP 30 MG Reclaimed Water Storage Tank, <i>Conceptual¹</i>	\$ 15,000,000
¹ <i>Conceptual estimate provided is for tank only. Additional evaluation for associated construction costs is warranted for future buildout of the S-5 WRP facility.</i>	

Based on the Engineering News-Record (ENR) Construction Cost Index (CCI), construction costs increased an average of about 2.2 percent per year in the three years between January 2018 and January 2021. In 2021 and 2022, the CCI increased about 8 percent and about 5 percent, respectively. Though future CCI increases are dependent on a number of factors, it appears that the CCI is trending down to historical norms.

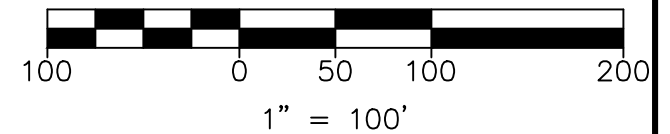
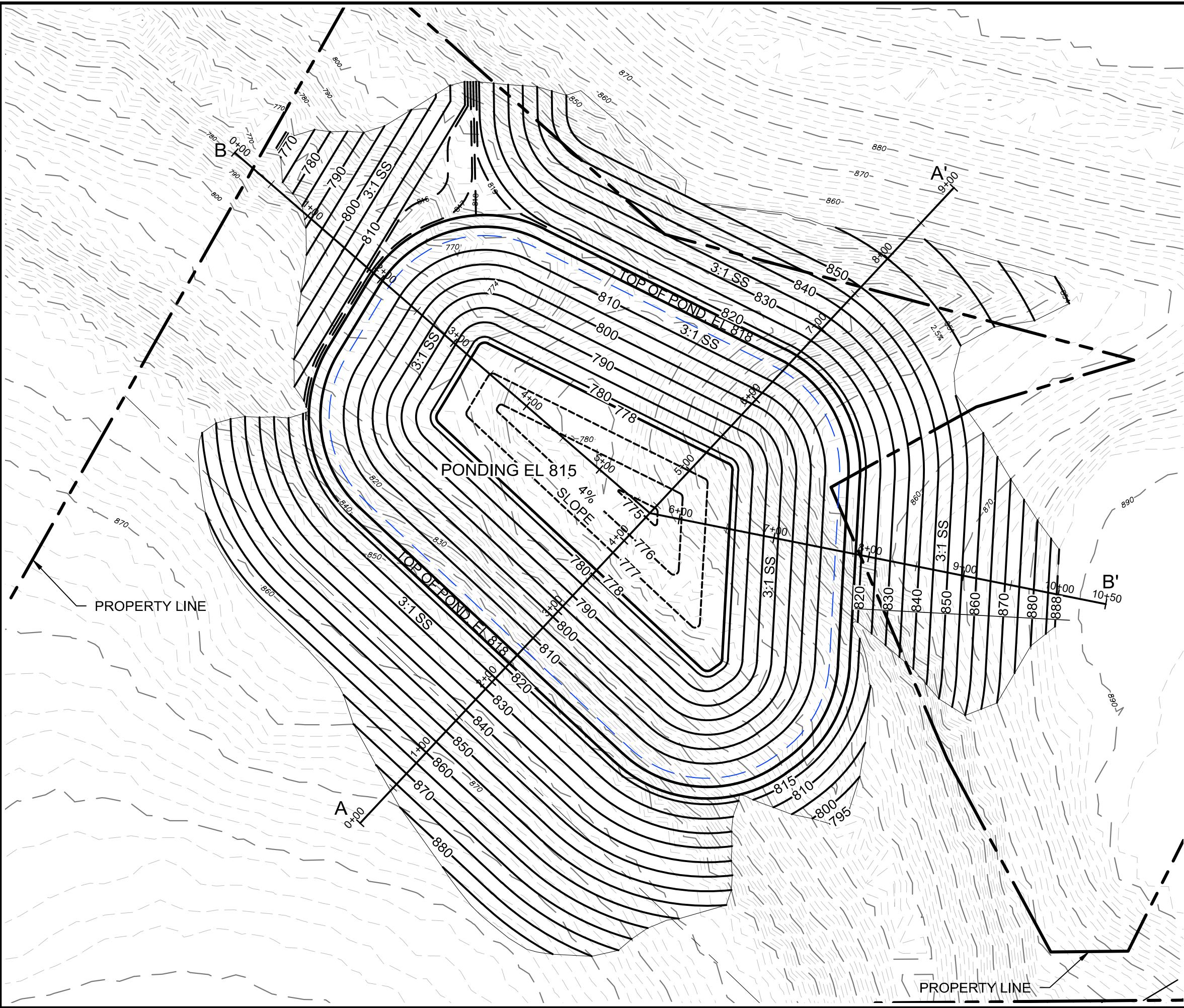
The estimated Phase 1 cost in Table 4 is based on current costs and a current ENR CCI of approximately 13,200. When estimated project implementation schedules are developed, the costs should be revised to reflect potential cost increases to the anticipated bid dates.

APPENDIX A

PRELIMINARY POND OPTIONS

- **Figure A-1. OPTION 1A – Earthen Pond (32.7 MG) Plan**
- **Figure A-2. OPTION 1A – Earthen Pond (32.7 MG) Sections**
- **Figure A-3. OPTION 1B – Earthen Pond (23.7 MG) Plan**
- **Figure A-4. OPTION 1B – Earthen Pond (23.7 MG) Sections**
- **Figure A-5. OPTION 2 – NW Concrete Wall (35.1 MG) Plan**
- **Figure A-6. OPTION 2 – NW Concrete Wall (35.1 MG) Sections**

Plot Date: 05/01/23 - 12:45pm, Plotted by: Admin
Drawing Path: K:\clients\Castleberry Engineering\LMUD\IS-5 WRP\, Drawing Name: W-LMUD S-5 proposed pond2.dwg



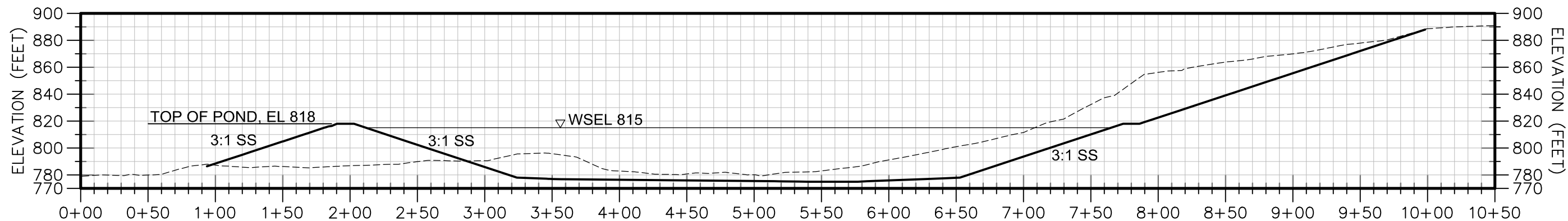
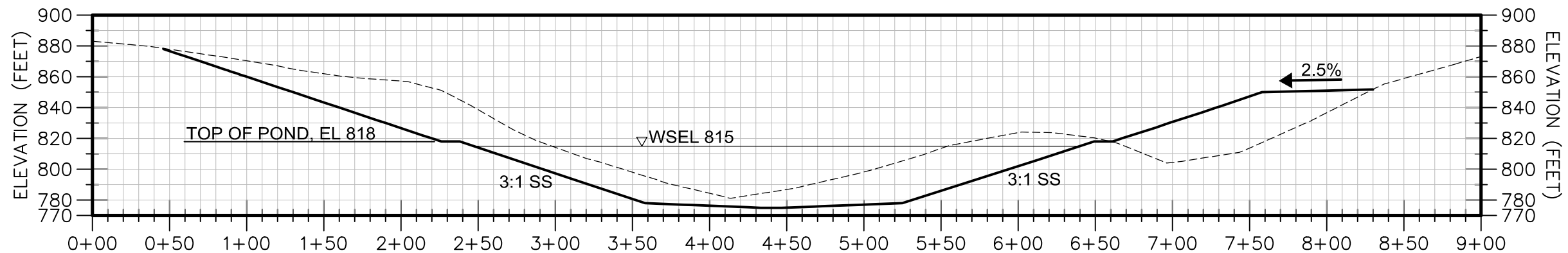
THIS SCENARIO PROVIDES 32,681,413
GALLONS OF CAPACITY (WSEL 815.0).
TO CONSTRUCT THE POND THE
QUANTITIES ARE AS FOLLOWS:
194,804 CY (CUT)
111,365 CY (FILL)
83,439 CY (NET CUT)

LAKEWAY MUNICIPAL UTILITY DISTRICT
S-5 WRP EXPANSION

APPENDIX A

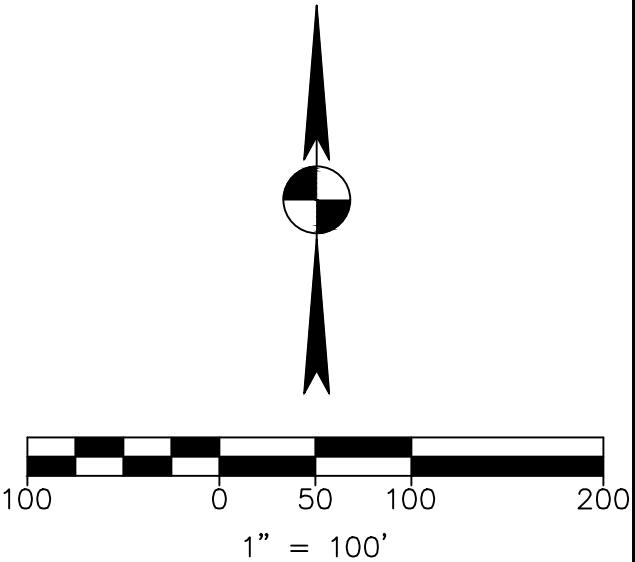
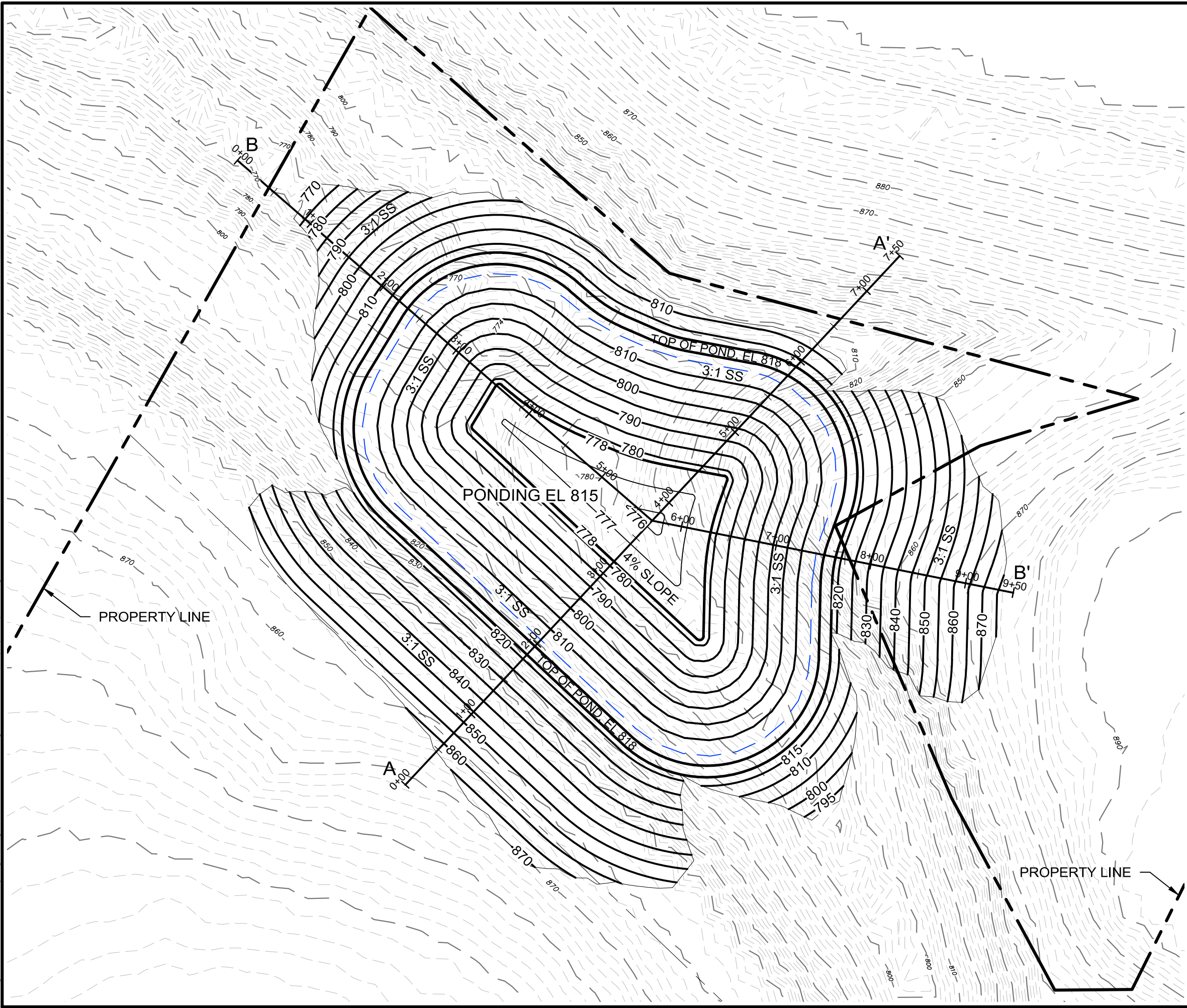
FIGURE 1
OPTION 1A - EARTHEN POND - WSEL 815
TOP OF POND ELEV 818
32.7 MG

Plot Date: 05/01/23 - 12:47pm, Plotted by: Admin
Drawing Path: K:\clients\Castleberry Engineering\LMUD\IS-5 WRP\, Drawing Name: W-LMUD S-5 proposed pond2.dwg



LAKEWAY MUNICIPAL UTILITY DISTRICT S-5 WRP EXPANSION
APPENDIX A FIGURE 2 OPTION 1A - EARTHEN POND - WSEL 815 TOP OF POND ELEV 818

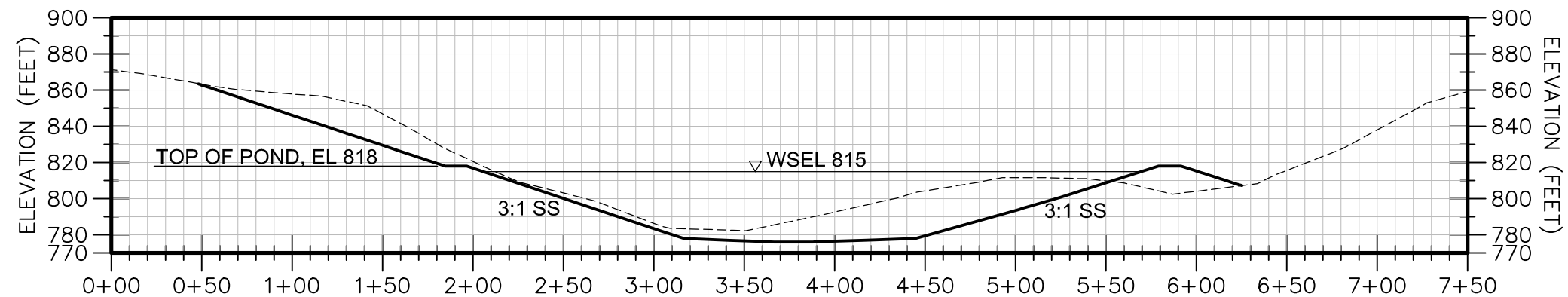
Plot Date: 05/01/23 - 12:50pm, Plotted by: Admin
Drawing Path: K:\clients\Castleberry Engineering\LMUD\IS-5 WRP\, Drawing Name: W-LMUD S-5 proposed pond2.dwg



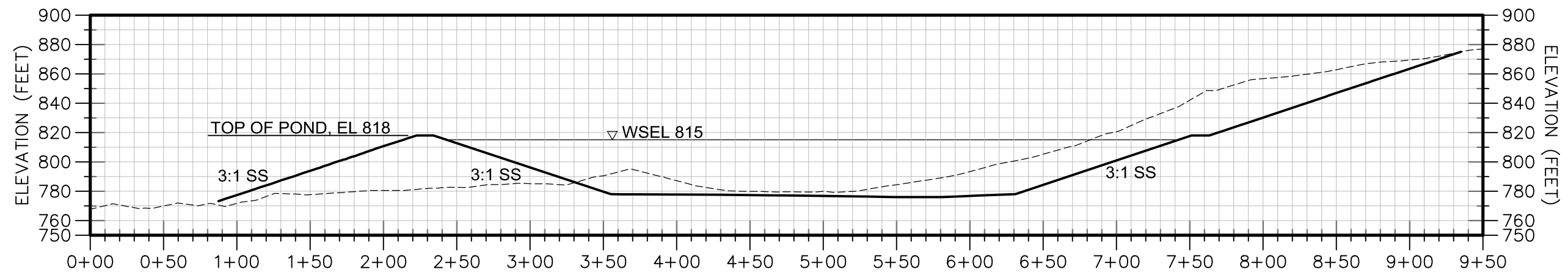
THIS SCENARIO PROVIDES 23,697,811
GALLONS OF CAPACITY (WSEL 815.0).
TO CONSTRUCT THE POND THE
QUANTITIES ARE AS FOLLOWS:
92,103 CY (CUT)
68,340 CY (FILL)
23,763 CY (NET CUT)

LAKEWAY MUNICIPAL UTILITY DISTRICT S-5 WRP EXPANSION
APPENDIX A FIGURE 3 OPTION 1B - EARTHEN POND - WSEL 815 TOP OF POND ELEV 818 23.7 MG

Plot Date: 05/01/23 - 12:51pm, Plotted by: Admin
Drawing Path: K:\clients\Castleberry Engineering\LMUD\IS-5 WRP\, Drawing Name: W-LMUD S-5 proposed pond2.dwg



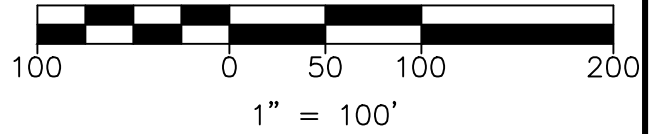
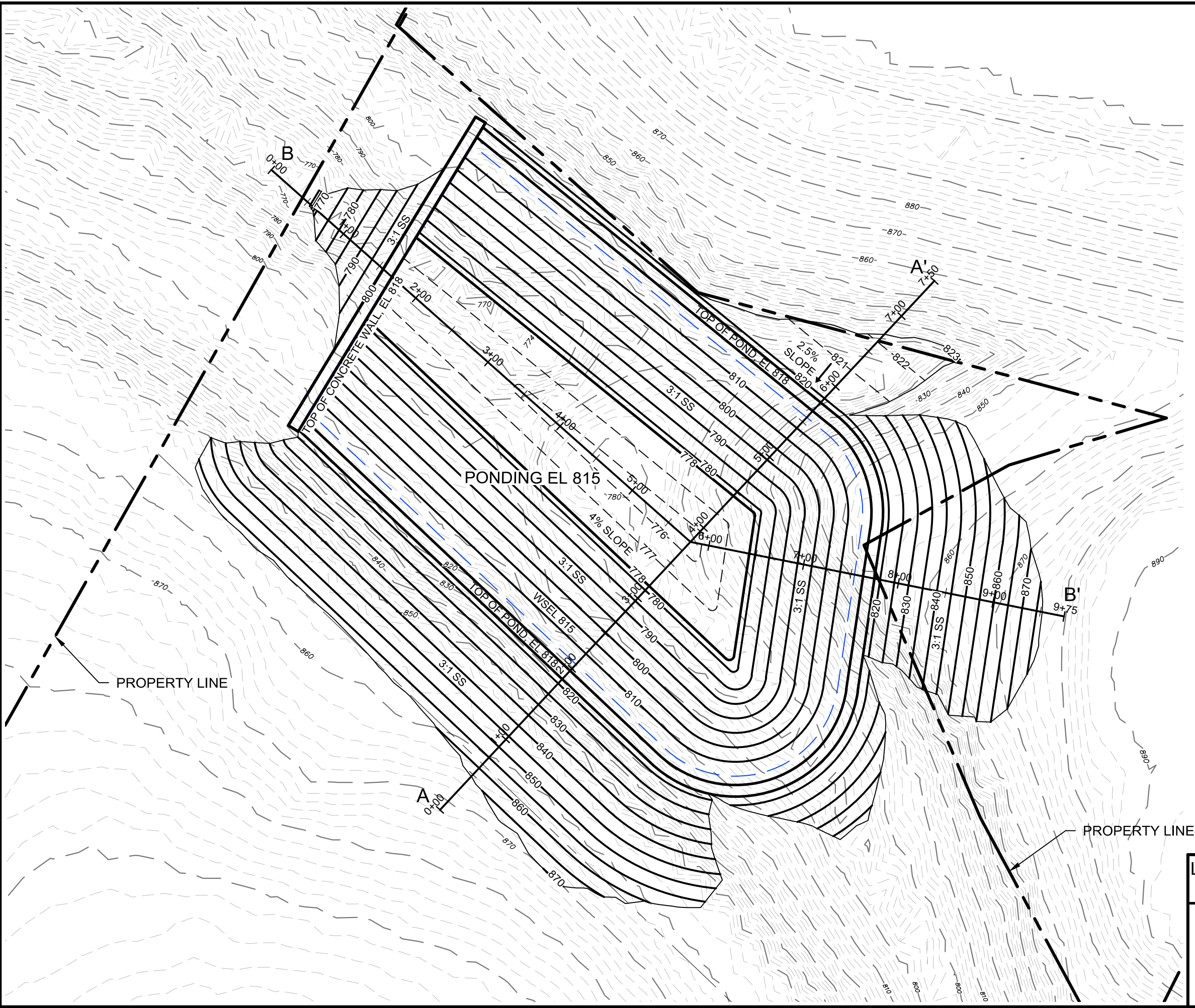
OPTION 1B - SECTION A-A'



OPTION 1B - SECTION B-B'

LAKEWAY MUNICIPAL UTILITY DISTRICT S-5 WRP EXPANSION
APPENDIX A FIGURE 4 OPTION 1B - EARTHEN POND - WSEL 815 TOP OF POND ELEV 818 23.7 MG

Plot Date: 05/01/23 - 12:55pm, Plotted by: Admin
Drawing Path: K:\clients\Castleberry Engineering\LMUD\IS-5 WRP\, Drawing Name: W-LMUD S-5 proposed pond Option2.dwg

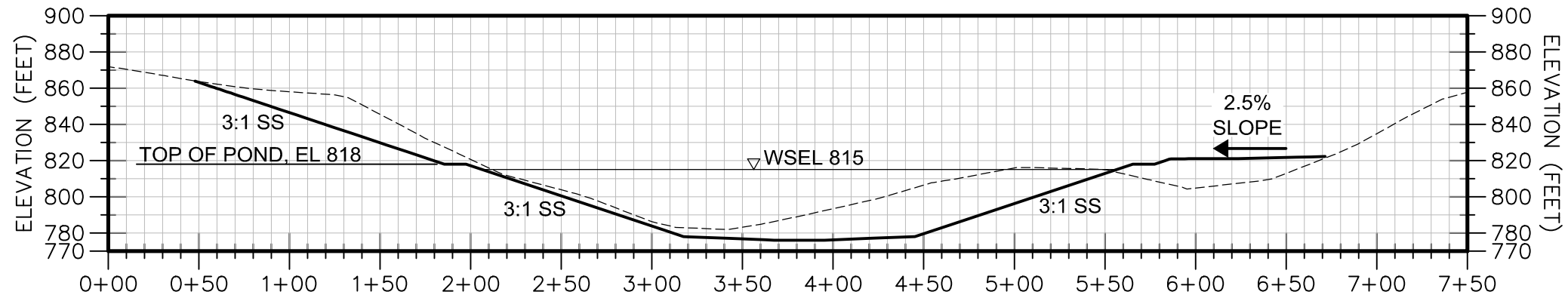


THIS SCENARIO PROVIDES 35,123,480
GALLONS OF CAPACITY (WSEL 815.0).
TO CONSTRUCT THE POND THE
QUANTITIES ARE AS FOLLOWS:
105,300 CY (CUT)
38,010 CY (FILL)
67,290 CY (NET CUT)
ADDITION OF 12' WIDE CONCRETE WALL

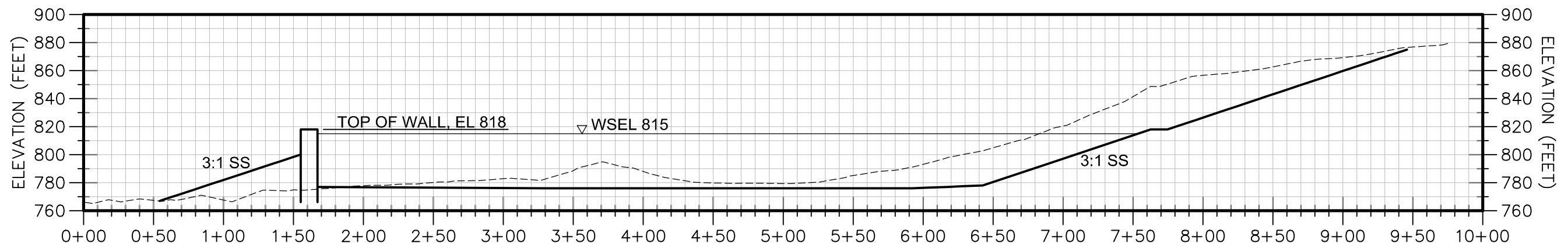
LAKEWAY MUNICIPAL UTILITY DISTRICT
S-5 WRP EXPANSION

APPENDIX A
FIGURE 5
OPTION 2 - NW CONCRETE WALL WSEL 815
TOP OF POND ELEV 818
35.1 MG

Plot Date: 05/01/23 - 12:58pm, Plotted by: Admin
Drawing Path: K:\clients\Castleberry Engineering\LMUD\IS-5 WRP\, Drawing Name: W-LMUD S-5 proposed pond1.dwg



OPTION 2 - SECTION A-A'



OPTION 2 - SECTION B-B'

LAKEWAY MUNICIPAL UTILITY DISTRICT S-5 WRP EXPANSION	
APPENDIX A	
FIGURE 6	
OPTION 2 - CONCRETE WALL (ELEV 818)	
WSEL 815	

APPENDIX B

PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COST

PRELIMINARY

Opinion of Probable Construction Cost

Project 20 MG RCW Storage Tank
Task Construction of 20 MG Prestressed Concrete Tank & Associated facilities

Date May-23
Estimator JG
Reviewer CC

Description	Quantity	Unit	Unit Price (\$/unit)	Total (\$)
Division #1 - Special Conditions				
Mobilization (5%)	1	LS	\$ 325,700	\$ 325,700
Insurance (2%)	1	LS	\$ 325,600	\$ 325,600
Division #2 - Site Work				
Site Preparation and Grading	1	LS	\$ 30,000	\$ 30,000
Excavation, Structural fill, Erosion control, Haul-off	1	LS	\$ 5,250,000	\$ 5,250,000
Paving Repair Overlay	1778	SY	\$ 40	\$ 71,111
Site fencing	1850	LF	\$ 35	\$ 64,750
Division #3 - Concrete				
Miscellaneous Concrete	1	LS	\$ 20,000	\$20,000
Division #4 - Masonry				
none				
Division #5 - Metals				
Included in other items				
Division #6, 7, & 8 - Wood & Plastics, Thermal & Moisture Protection, Doors, and Windows				
none				
Division #9 - Finishes				
none				
Division #10 Specialties				
none				
Division #11 - Equipment				
Pumping equipment	1	LS	\$ 100,000	\$ 100,000
Division #12 - Furnishings				
none				
Division #13 - Special Construction				
Construction of 20 MG concrete RCW storage tank, open top, complete w/foundation	1	LS	\$ 10,000,000	\$ 10,000,000
Division #14 - Conveying Systems				
none				
Division #15 - Mechanical				
Items From Existing 12 IN Effluent Line to Storage Tanks				
Connect 24 IN tank supply line to exist 12" S5 effluent line, tapping sleeve, valve & reducer	1	LS	\$ 30,000	\$ 30,000
24 IN from existing 12 IN effluent line to tank PS, including riser in tank	84	LF	\$ 220	\$ 18,480
Tank PS	1	LS	\$ 150,000	\$ 150,000
12 IN pipe from tank PS to discharge point at approximately mid-tank elevation	50	LF	\$ 175	\$ 8,750
16 IN Pipe From Tanks to I5.	1400	LF	\$ 200	\$ 280,000
10 IN transfer - Tank Balancing Line Stubout	20	LF	\$ 75	\$ 1,500
10 IN GV on Tank Transfer Line	1	LS	\$ 10,000	\$ 10,000
16 IN GV on EFF Line from tank	2	EA	\$ 5,000	\$ 10,000
Fittings	1.42	Ton	\$ 8,000	\$ 11,320
Division #16 - Electrical and Instrumentation				
Electrical Equipment	1	LS	\$ 150,000	\$ 150,000
Electrical Ductbanks	1	LS	\$ 20,000	\$ 20,000
Lighting	1	,	\$ 15,000	\$ 15,000
SCADA/Instrumentation	1	LS	\$ 40,000	\$ 40,000
Subtotal				\$ 16,932,211
Miscellaneous Items & Contingency 20%				3,386,442
Subtotal - Construction Cost				\$ 20,318,653
Contractor's Overhead and Profit 15%				\$ 3,047,798
Sub - Total				\$ 23,366,451
Geotech				\$ 20,000
Surveying				\$ 7,500
Engineering				\$ 2,336,645
Total Estimated Project Cost				\$ 25,730,596

ATTACHMENT P

Well Review

(Domestic Worksheet 3.0, Section 6)

Contents:

P1. Well Location Map(s)

(2 pages)

P2. Well Location Cross-Reference Data Table

(3 pages)

P3. Water Well Reports

(285 pages)

Three types of wells are located on the attached map. They include Texas Water Development Board (TWDB) Located wells, TCEQ plotted wells, and other known wells. It should be noted that records may not exist for all wells in the area. There was not a requirement to file well records before the 1950s and not all well logs are properly filed.

Plotted Wells

Plotted wells within approximately one mile of the proposed irrigation areas and plant facilities were identified from the drilling records on file with the TCEQ. The locations of these wells were plotted on the attached topographic map as best as could be determined from the well records. These wells are labeled as P1 through P163. The location of these wells may or may not be accurate depending on the scale and care taken by the driller to describe the well location.

Other Wells

Six undocumented wells are known to exist in the vicinity. The wells do not appear to match any of the drilling records for wells in the area. These wells have been named the McBride Well, the School Tract Well, the Old Windmill Well, the Travino Well, and two fall under the Wunneburger Well name. The McBride, School Tract and Windmill wells were plugged. The Travino Well, which is unused, has a 6-inch diameter steel casing and a concrete pad surface completion. The depth, water level, water quality, and drill date are all unknown. It appears that water from the well was run into a nearby stock tank to augment surface water supplies.

Two undocumented wells are on property owned by the Wunneburgers. One is a drilled well that was on the property when it was purchased and is not being used. The well has a surface mounted pump on a concrete slab surface completion. The well diameter appears to be about 6 inches. Well depth, water level, and drilling date are all unknown. The Wunneburgers have stated that the water quality is poor. It is likely that the well was drilled to provide water for domestic and stock watering purposes. The other well is a hand dug well associated with a primitive log cabin. The well is rock lined and is currently covered by a concrete slab and metal plate. There is no record dating the drilling of this well either. The water level has been within 10 feet of the ground surface and there is a submersible pump in the well.

Water from this well has been used for stock by the Wunneburgers. The well is reported to have water in it only during wet weather periods and "pumps-off" quickly.

It is possible that other unrecorded wells are in and around the community. However, it is unlikely that any wells will be located on the final plant and final irrigation sites.

Evaluation

Descriptive parameters of these wells are summarized in the attached table. None of the wells are categorized as public wells as defined in 30 TAC 290.83. None of the wells supply water systems under common control which have the potential for serving 15 or more connections or which serve 25 or more people for a minimum of 60 days per year. Instead, all the wells are categorized as private and do not appear to be located within the 250-foot separation distance from treatment plants required of 30 TAC 309.13(c).

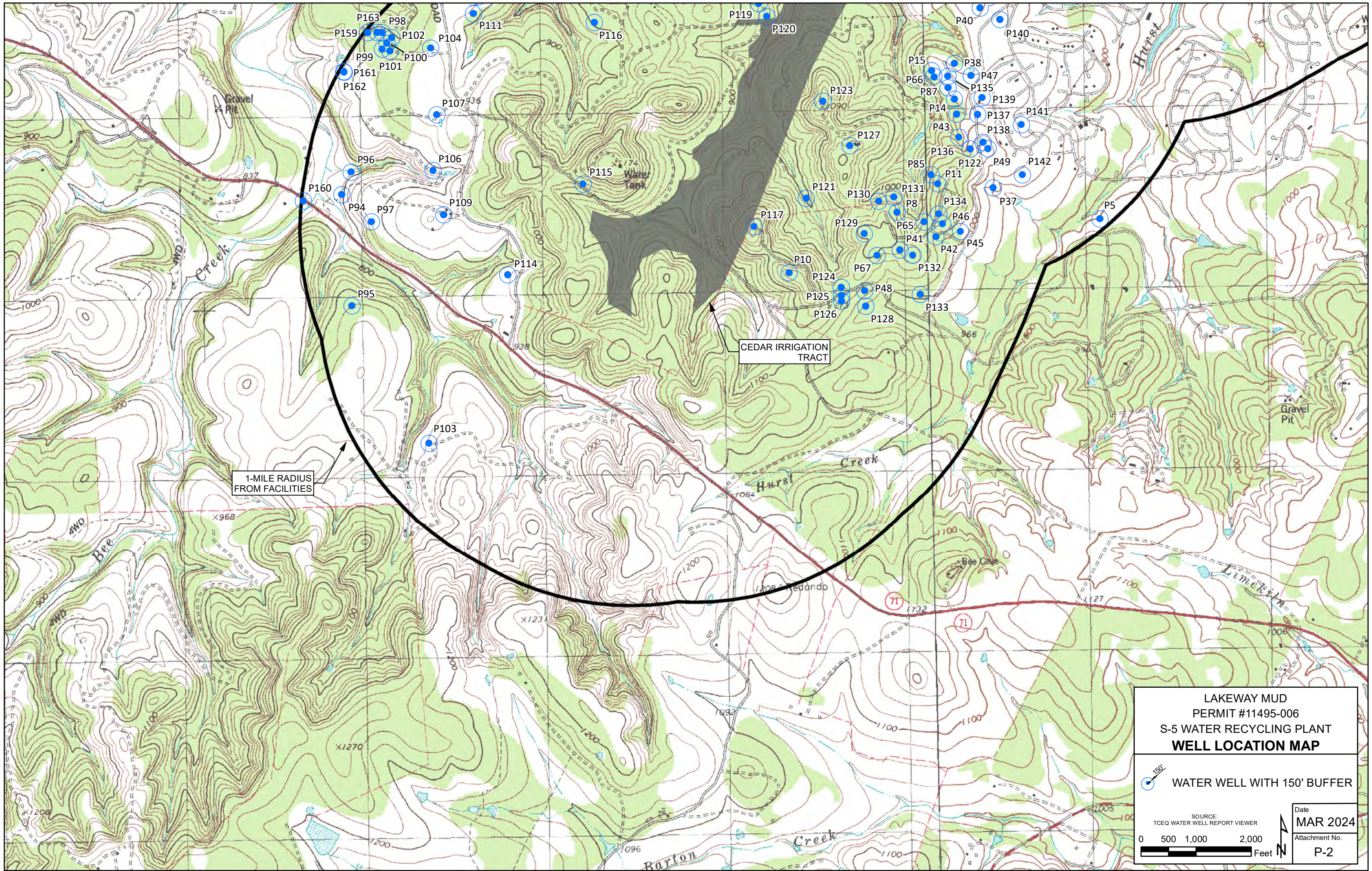
Based on the attached summary, the wells appear to take water from the Trinity Group Aquifer with the possible exception of the shallow monitoring wells owned by Lakeway MUD, which are now plugged.

The Trinity Group Aquifer is subdivided into the lower Trinity unit, the middle Trinity unit and the upper Trinity unit. The lower Trinity unit consists of the Hosston and Sligo Members of the Travis Peak Formation. In this aquifer low permeability and transmissibility coefficients limit the rate of movement of water. Water from this unit is moderately to unusually saline. Well yields range from small to moderate. The middle Trinity unit is comprised of the Hensell Sand and Cow Creek Limestone of the Travis Peak Formation and the lower member of the Glen Rose Formation. Permeabilities and transmissibilities are very low. Groundwater is slightly saline and contains high sulfates. Well yields are usually small but sufficient for domestic and livestock purposes. The upper Trinity unit produces water from the upper member for the Glen Rose Formation and the Paluxy Formation. Permeabilities of the aquifer are very low and therefore yields are very small but sufficient for domestic and livestock use. The quality of water is usually fresh. Given the depth to the potable supply in this region and that the outcrops for the water bearing formations are not local, no impact to groundwater supplies is anticipated. Perched water levels, not generally used for domestic supply, have been observed in District-owned observation wells as shallow as 34 feet.

Irrigation application of wastewater effluent is widely practiced in the community and has been in practice since 1973. Therefore, obtaining pre-operational sampling is not feasible. Quality data for the located wells is collected by the TWDB and is included; however, it does not date prior to 1973.



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LAKEWAY MUD
PERMIT #11495-006
S-5 WATER RECYCLING PLANT
WELL LOCATION MAP

 WATER WELL WITH 150' BUFFER

SOURCE:
TCEQ WATER WELL REPORT VIEWER

0 500 1,000 2,000 Feet

Date
MAR 2024

Attachment No.
P-2

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WELL LOCATION CROSS-REFERENCE DATA

Map Key	Well Report	Well Reference	Owner	Date Drilled	Use	Casing (inch dia)	Depth (ft)	Static Level ¹ (ft)	Source	Yield (gpm)	Quality	Producing?	Filled?	Notes
L1		58-41-101	Lloyd Dooley	1965	Domestic	8	600	460 (1965) 288.5 (1970)	Hosston	5	High sulfates	Yes	No	
L2		58-41-102	Yaupon Golf Course	1984	Irrigation	5.625	680	260.6 (1987)	Hosston	50	Slightly saline	Yes	No	
O1		N/A	McBride	N/A	Domestic	6	N/A	N/A	N/A		N/A	No	Yes	Plugged
O2		N/A	School Tract	N/A	Stock	8	N/A	N/A	N/A		N/A	No	Yes	Plugged
O3		N/A	Windmill	N/A	Unknown	6	N/A	N/A	N/A		N/A	No	Yes	Plugged
O4		N/A	Travino	N/A	N/A	6	N/A	N/A	N/A		N/A	Yes	No	
O5		N/A	Wunneburger	N/A	N/A	6	N/A	N/A	N/A		N/A	Yes	No	
O6		N/A	Wunneburger	N/A	Stock	N/A	N/A	N/A	N/A		N/A	Yes	No	
P1		58-41-1AA	Bob Leonard	1984	Domestic	4.5	660	330	Trinity	40-50	N/A	Yes	No	
P2		58-41-1R	H.A. Albert	1982	Domestic	5	217	110	N/A	15	N/A	Yes	No	
P3		58-41-1U	David Bolin	1984	Domestic	4	1010	540	N/A	N/A	N/A	Yes	No	
P4		58-41-1X	Bob Pope	1983	Domestic	4	448	N/A	N/A	10-12	N/A	Yes	No	
P5		58-41-1	Southern Classic Homes	1987	Industrial	8 & 6	570	450	N/A	20	N/A	Yes	No	
P6		58-41-1W	Merlene Armendaris	1984	Domestic	5.5	285	120	N/A	15	N/A	Yes	No	
P7		58-41-1P1	James Chelf	1977	Domestic	5	165	80	N/A	10	N/A	Yes	No	Found in Grid #58-41-2
P8		57-48-3	Brannan Homes-Wayne Seime	1988	N/A	5	695	391	Trinity	20-30	N/A	Yes	No	
P9		58-41-1E	Kim Taylor	1968	Domestic	N/A	610	N/A	N/A	N/A	N/A	Yes	No	Found in Grid #58-41-2
P10		57-48-3	Chester Dorman	1990	Domestic	5	270	73	Glen Rose	20	N/A	Yes	No	Found in Grid #58-41-2
P11		58-41-1	Marquis Homes	1995	Domestic	7	870	440	Trinity	50	N/A	Yes	No	Found in Grid #58-41-2
P12		57-48-3	Bud Goza	1988	Domestic	5	250	175	N/A	8-10	N/A	Yes	No	
P13		58-41-1P2	Tony Palompa	1978	Domestic	5	330	120	N/A	20	N/A	Yes	No	Found in Grid #58-41-2
P14		58-41-1	Mark Alana	1995	Domestic	5	780	330	Trinity	50+	N/A	Yes	No	
P15		N/A	W. Shackelford	1996	Domestic	4.5	510	330	Glen Rose	15	N/A	Yes	No	
P16		58-41-1	Van Trease	1993	Domestic	5	810	N/A	Trinity	40-50	N/A	Yes	No	
P17		58-41-1M1	Lakeway MUD	1996	Monitor	4	380	301	N/A	N/A	1996 &	No	Yes	Plugged
P18		58-41-1M2	Lakeway MUD	1996	Monitor	4	60	34	N/A	N/A	1996 &	No	Yes	Plugged
P19		58-41-1M3	Lakeway MUD	1996	Monitor	4	60	40	N/A	N/A	1996 &	No	Yes	Plugged
P20		58-41-1M4	Lakeway MUD	1996	Monitor	4	380	>305	N/A	N/A	1996 &	No	Yes	Plugged
P21		58-41-1M5	Lakeway MUD	1996	Monitor	4	60	43	N/A	N/A	1996 &	No	Yes	Plugged
P22		58-41-1M6	Lakeway MUD	1996	Monitor	4	380	43	N/A	N/A	1996 &	No	Yes	Plugged
P23		58-41-1M7	Lakeway MUD	1996	Monitor	4	60	43	N/A	N/A	1996 &	No	Yes	Plugged
P24		58-33-7M	Harold Lucksinger	1971	Domestic	N/A	240	100	N/A	30	N/A	Yes	No	
P25		58-33-7M	J. Park Yates	1971	Domestic	N/A	240	80	N/A	50	N/A	Yes	No	
P27		58-41-1J	Otis Finkelman	1971	Domestic	7	214	60	N/A	14	N/A	Yes	No	
P28		58-41-1M	Paul Keller	1975	Domestic	7	425	275	N/A	10-15	N/A	Yes	No	
P35		57-48-3	Ron White/Carl Morris-Builder	2000	Domestic	4.5	800	501	N/A	15	N/A	Yes	No	
P36	15509	58-41-1	John Allen	2002	Domestic	6	480	N/A	Glenrose	70	N/A	Yes	No	
P37		58-41-1	Jack West	1997	Domestic	6.75	750	405	Trinity	50	N/A	Yes	No	
P38		58-41-1	Stalwart Construction	1997	Domestic	6.75	720	335	Trinity	50	N/A	Yes	No	
P40		57-48-3	Kim Pickrell	2001	Domestic	6	850	514	N/A	30+	N/A	Yes	No	
P41		58-41-1	Sterling Custom Homes	1997	Domestic	10	840	N/A	Trinity	50	N/A	Yes	No	
P42		58-41-1	Steven Whitaker	1996	Domestic	6	820	N/A	Trinity	50	N/A	Yes	No	
P43		58-41-1	W.E. Shackleford	1996	Domestic	6	510	330	Glenrose	15	N/A	Yes	No	
P44		58-41-1	Lloyd Innerarity	1996	Irrigation	6	660	N/A	Trinity	N/A	N/A	Unknown	Unknown	No Data
P45		58-41-1	Richard Zetterlund	1995	Domestic	6	780	N/A	Trinity	40	N/A	Yes	No	
P46		58-41-1	Riverbend Homes	1998	Domestic	7	940	450	Trinity	30	N/A	Yes	No	
P47		N/A	Stephen Laboy	2001	Domestic	6.5	860	314	Trinity	35	N/A	Yes	No	
P48		58-41-1	Marshall Willis	2000	Domestic	6.5	800	N/A	Trinity	70	N/A	Yes	No	
P49		58-41-1	Jeff Alt	1998	Domestic	7	800	450	Trinity	100	N/A	Yes	No	

WELL LOCATION CROSS-REFERENCE DATA

Map Key	Well Report	Well Reference	Owner	Date Drilled	Use	Casing (inch dia)	Depth (ft)	Static Level ¹ (ft)	Source	Yield (gpm)	Quality	Producing?	Filled?	Notes
P65		57-48-3	Leon Yoder	2001	Domestic	6	840	N/A	Trinity	30-40	N/A	Yes	No	
P66		57-48-3	Ian Futz	1996	Domestic	6	740	N/A	Trinity	N/A	N/A	Unknown	Unknown	No Data
P67		57-48-3	Benchmark Homes	1995	Domestic	6	620	399	Glenrose	25	N/A	Yes	No	
P68		57-48-3	Benchmark Homes	1995	Domestic	6	620	N/A	Glenrose	25	N/A	Yes	No	
P72	152651	58-41-1	Gene Villanueva	2008	Domestic	7	850	409	N/A	30	N/A	Yes	No	
P73	198126	58-41-1	Chris Canada	2009	Domestic	6.5	680	392	Trinity	50	N/A	Yes	No	
P76	278629	58-41-1	Auqa Land lakeway Medical Dvlp, LLC	2011	Irrigation	8	860	N/A	Trinity	50-60	N/A	Yes	No	
P77	285827	58-41-1	Johnson Residence	2012	Geothermal Heat Loop	4.75	250	N/A	N/A	N/A	N/A	Unknown	Unknown	No Data
P81	308397	57-48-3	Simon Elliott	2012	Irrigation	6.5	425	N/A	Trinity	35	N/A	Yes	No	
P84	352449	58-41-1	Lakeway WOTCA	2013	Irrigation	6.75	770	371	Trinity	50	N/A	Yes	No	
P85		57-48-3	John Weaver/Allen - Customer	2001	Domestic	6	880	N/A	Trinity	40	N/A	Yes	No	
P87		58-41-1	Doug Brown	1997	Domestic	7	740	334	Trinity	50	N/A	Yes	No	
P88		58-41-1	Matt Telfer	1996	Domestic	6	250	170	Glenrose	15	N/A	Yes	No	
P91		58-49-1	Kenneth E. Winborn	1986	Domestic	6	450	320	N/A	20	N/A	Yes	No	
P94	134327	57-48-3	AG&M BEE CREEK INVESTMENTS	2008	Domestic	6.75	270	157	N/A	60	N/A	Yes	No	
P95	598700	57-48-3	Strobel & Associates, LLC.	2022	Domestic	6.125	390	112	Lower Trinity	25	N/A	Yes	No	
P96	361592	57-48-3	Architectural Granite & Marble	2014	Industrial	6.75	565	181	Trinity	100	N/A	Yes	No	
P97	342986	57-48-3	Lake Travis ISD	2013	Irrigation	10	780	274	Trinity	36	N/A	Yes	No	
P98	120544	57-48-3	Prestige Homes	2007	Domestic	6.25	625	N/A	Trinity	60	N/A	Yes	No	
P99	148070	57-48-3	San Gabriel Builders c/o Kerry Martin	2008	Domestic	6.5	645	N/A	Trinity	40-50	N/A	Yes	No	
P100	394844	57-48-3	Ogah Ediom	2015	Domestic	6.5	680	459	N/A	100	N/A	Yes	No	
P101	493882	57-48-3	Scott Bryant	2018	Domestic	6.75	685	317	Trinity	10	N/A	Yes	No	
P102	397017	57-48-3	Lake Travis Builders (Duran)	2015	Domestic	6.25	625	N/A	Lower Trinity	30-40	N/A	Yes	No	
P103	281702	57-48-6	Wheelock Street Capital	2012	Irrigation	9.875	740	360	Trinity	20+	N/A	Yes	No	
P104	71751	57-48-3	RICHARD SKINNER #1	2005	Domestic	605	430	326	N/A	35	N/A	Yes	No	
P105	108251	57-48-3	PRYOR CUSTOM HOMES	2007	Domestic	6.75	620	310	N/A	50+	N/A	Yes	No	
P106	518929	57-48-3	Larry Williams	2019	Domestic	6.5	450	345	N/A	20	N/A	Yes	No	
P107	26187	57-48-3	LARRY WILLIAMS	2003	Domestic	7	410	320	N/A	N/A	N/A	No	Yes	Plugged Report #228173
P108	26227	57-48-3	BRENT HOLT	2003	Domestic	7	430	308	N/A	10	N/A	Yes	No	
P109	421075	57-48-3	Bee Creek Stable LP	2016	Domestic	8	465	N/A	Middle Trinity	N/A	N/A	Unknown	Unknown	No Data
P110	102794	57-48-3	LOUIS HAUSMAN	2006	Domestic	6.75	655	338	N/A	100	N/A	Yes	No	
P111	38542	57-48-3	JIM RAUGHTON	2004	Domestic	8	380	266	N/A	10	N/A	Yes	No	
P112	115518	57-48-3	CHRIS COKINS	2007	Domestic	6.75	650	286	N/A	30	N/A	Yes	No	
P113	102758	57-48-3	HAUSMAN HOMES	2006	Domestic	6.75	675	356	N/A	200	N/A	Yes	No	
P114	28035	57-48-3	SHADOWLAKE BUILDERS	2003	Domestic	7	430	273	N/A	60	N/A	Yes	No	
P115	96653	57-48-3	RICHARD SKINNER	2006	Domestic	6.75	670	377	N/A	100	N/A	Yes	No	
P116	20590	57-48-3	TREYCO	2003	Domestic	6.125	310	N/A	N/A	N/A	N/A	No	Yes	Plugged: Report #107588
P117	601467	57-48-3	Barker Project (Arbogast Homes)	2022	Domestic	6.25	990	682	Hosston Trinity	15-20	N/A	Yes	No	
P118	474702	57-48-3	Weigelt Enterprises	2018	Irrigation	10	830	330	N/A	80	N/A	Yes	No	
P119	474700	57-48-3	Weigelt Enterprises	2018	Irrigation	12.25	830	330	N/A	25	N/A	Yes	No	
P120	467735	57-48-3	Weigelt Enterprises	2017	Test Well	8.5	830	N/A	N/A	80	N/A	Yes	No	
P121	614344	57-48-3	Robert Sanchez	2022	Domestic	6.25	910	730	Hosston Trinity	15-20	N/A	Yes	No	
P122	460445	57-48-3	Steven Cox	2016	Irrigation	6.5	890	490	N/A	10	N/A	Yes	No	
P123	181840	57-48-3	Duncan Johnson Comm-Word (Owner)	2009	Domestic	6	890	N/A	Trinity	30	N/A	Yes	No	
P124	77018	57-48-3	Gary Simon	2005	Domestic	6	875	N/A	Trinity	35	N/A	Yes	No	
P125	91305	57-48-3	Fred Edlin	2005	Domestic	6	875	N/A	Trinity	35	N/A	Yes	No	
P126	302100	57-48-3	Mike Meyer	2012	Domestic	6.5	875	N/A	Trinity	15	N/A	Yes	No	
P127	463997	57-48-3	Michael Macs	2017	Domestic	6.75	888	587	N/A	18	N/A	Yes	No	

WELL LOCATION CROSS-REFERENCE DATA

Map Key	Well Report	Well Reference	Owner	Date Drilled	Use	Casing (inch dia)	Depth (ft)	Static Level ¹ (ft)	Source	Yield (gpm)	Quality	Producing?	Filled?	Notes
P128	117485	57-48-6	Mollison Homes c/o Mike Mollison	2007	Domestic	6.5	845	N/A	Trinity	50	N/A	Yes	No	
P129	382354	57-48-3	Matthew Scrivener	2014	Irrigation	6.75	870	605	Trinity	40	N/A	Yes	No	
P130	532064	57-48-3	JOHNNY MORROW	2019	Domestic	6.125	870	560	Lower Trinity	20	N/A	Yes	No	
P131	531625	57-48-3	DAVID BABIN	2019	Domestic	6.125	890	N/A	Lower Trinity	15	N/A	Yes	No	
P132	13298	57-48-3	Harvey Atwell	2002	Domestic	6.75	820	520	Trinity	55	N/A	Yes	No	
P133	411492	57-48-3	Paul Beavers	2015	Domestic	6.75	780	525	N/A	27	N/A	Yes	No	
P134	488707	58-41-1	Marc Dodge	2018	Domestic	6.25	910	522	Lower Trinity	5	N/A	Yes	No	
P135	152651	58-41-1	Gene Villanueva	2008	Domestic	7	850	409	Trinity	30	N/A	Yes	No	
P136	60485	58-41-1	Dennis Cook	2005	Domestic	7	860	377	Trinity	40	N/A	Yes	No	
P137	174386	58-41-1	David Piland	2004	Domestic	6	800	N/A	Trinity	N/A	N/A	Unknown	Unknown	No Data
P138	125832	58-41-1	Mark Shimek	2004	Domestic	6.25	850	N/A	Trinity	N/A	N/A	Unknown	Unknown	No Data
P139	363714	58-41-1	CHRISTOPHER LEVY	2014	Domestic	6.5	770	431	Trinity	30-35	N/A	Yes	No	
P140	363765	58-41-1	Hurst Creek MUD	2014	Domestic	6.25	770	393	Trinity	N/A	N/A	No	Yes	Plugged: Report #95544
P141	93219	58-41-1	J R BOEHL	2006	Domestic	6.75	795	540	N/A	25	N/A	Yes	No	
P142	374747	58-41-1	HURST CREEK MUD	2014	Irrigation	6.5	750	N/A	Trinity	35-40	N/A	Yes	No	
P143	396533	58-33-7	Triple S. Petroleum Co.	2014	Monitor	8.25	25	0	N/A	N/A	N/A	No	Yes	Plugged: Report #155587
P144	394242	58-41-1	Tejas Inc	2015	Monitor	3	11	N/A	N/A	N/A	N/A	No	Yes	Plugged: Report #150291
P145	394241	58-41-1	Tejas Inc	2015	Monitor	3	11	N/A	N/A	N/A	N/A	No	Yes	Plugged Report #150290
P146	394239	58-41-1	Tejas Inc	2015	Monitor	3	9	N/A	N/A	N/A	N/A	No	Yes	Plugged: Report #150289
P147	394237	58-41-1	Tejas Inc	2015	Monitor	3	9	N/A	N/A	N/A	N/A	No	Yes	Plugged: Report #150288
P148	652378	58-41-1	The Lakeway Church	2023	Irrigation	6.13	690	354	Lower Trinity	15	N/A	Yes	No	
P149	137038	58-41-1	Lakeway Service Center	2008	Monitor	7.875	88.5	N/A	N/A	N/A	N/A	Unknown	Unknown	No Data
P150	142808	58-41-1	Village Service Center	2008	Monitor	7.875	100	N/A	N/A	N/A	N/A	Unknown	Unknown	No Data
P151	142814	58-41-1	Village Service Center	2008	Monitor	7.875	100	N/A	N/A	N/A	N/A	Unknown	Unknown	No Data
P152	142824	58-41-1	Village Service Center	2008	Monitor	7.875	33	N/A	N/A	N/A	N/A	Unknown	Unknown	No Data
P153	142817	58-41-1	Village Service Center	2008	Monitor	7.875	100	N/A	N/A	N/A	N/A	Unknown	Unknown	No Data
P154	142819	58-41-1	Village Service Center	2008	Monitor	7.875	100	N/A	N/A	N/A	N/A	Unknown	Unknown	No Data
P155	355570	58-33-7	Ralph and Virginia Moss	2014	Irrigation	6.25	390	257	Glen Rose	20-25	N/A	Yes	No	
P156	416172	58-41-1	BLAKE & ABIGAIL RUE	2015	Irrigation	6.5	850	434	N/A	20	N/A	Yes	No	
P157	99878	58-41-1	Daniel Straub	2004	Domestic	8	500	432	N/A	20	N/A	Yes	No	
P158		58-33-7	US BUREAU OF RECLAMATION	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Unknown	Unknown	Unable to locate
P159	282628	57-48-3	Mike Glubke	2011	Domestic	6.5	620	N/A	Trinity	40	N/A	Yes	No	
P160	302877	57-48-3	Bob Teaford	2012	Domestic	8	130	12	N/A	10	N/A	Yes	No	
P161	529957	57-48-3	Travis County	2019	Irrigation	6.75	640	373	N/A	20	N/A	Yes	No	
P162	529956	57-48-3	Travis County	2019	Irrigation	6.75	400	225	N/A	40	N/A	Yes	No	
P163	342739	57-48-3	Tim Lowe	2013	Domestic	6.5	645	N/A	Trinity	35-40	N/A	Yes	No	

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TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Travis Peak Fin.

Aquifer

~~Travis~~ Kho

Field No.

Owner's Well No.

State Well No.

County

58-41-101

Travis

1. Location: 1/4, 1/4 Sec., Block Survey Austin
 2. Owner: Loyd Doulie Address: Star Rt. A, Bee Cave, Tex.
 Tenant: Same Address: Box 372
 Driller: Glass Delg. Co. Address: Austin

3. Elevation of LSD is 92.0 ft. above sea, determined by 7 1/2 type

4. Drilled: 10/16/65; Dug, (Cable Tool) Rotary, 8" hole

5. Depth: Rept. 600 ft. Meas. ft.

6. Completion: Open Hole Straight Wall Underreamed, Gravel Packed

7. Pump: Mfr. Type Subm.

No. Stages, Bore Dia. in., Setting 525 ft.

Column Dia. in., Length Tailpipe ft.

8. Motor: Fuel Elec. Make & Model HP. 1

9. Yield: Flow gpm, Pump 5 gpm, Meas. (Rept), Est. Dnkr.

10. Performance Test: Date Length of Test Made by

Static Level ft. Pumping Level ft. Drawdown ft.

Production gpm Specific Capacity gpm/ft.

Water Level: 460 ft. Rept. 10/16/65 LSD

282.5 ft. Rept. 9/9/70 TOP of 8' casing

ft. Rept. 19 below

ft. Rept. 19 above

12. Use: Dom., Stock, Public Supply, Ind., Irr., Waterflooding, Observation, Not Used.

13. Quality: (Remarks on taste, odor, color, etc.)

Temp. 80 °F, Date sampled for analysis 9/9/70 Laboratory TSHD

Temp. °F, Date sampled for analysis Laboratory

Temp. °F, Date sampled for analysis Laboratory

14. Other data available as circled: Driller's Log, Radioactivity Log, Electric Log,

Formation Samples, Pumping Test, Dlog - see Back

15. Record by: R. Bluntzer Date 8/19/66

Source of Data DLT & WDIR

16. Remarks:

CASING & BLANK PIPE			
Cemented From		ft. to	
Diam. (in.)	Type	Setting, ft.	
		from	to
8	old steel	0	575

which is ft. above surface.

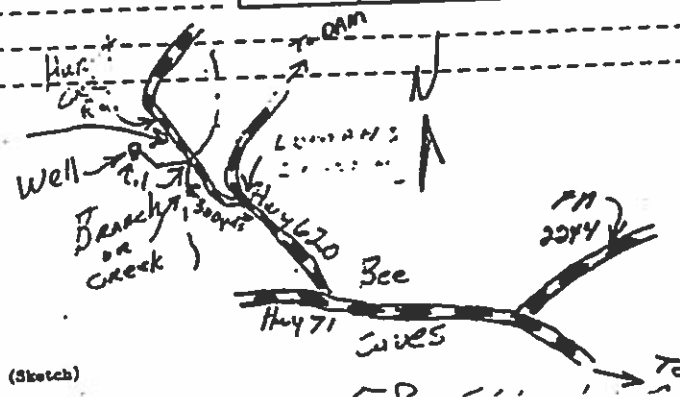
which is 1.1 ft. above surface.

which is ft. above surface.

which is ft. above surface.

WELL SCREEN			
Screen Openings		Setting, ft.	
Diam. (in.)	Type	from	to
	OPEN HOLE	543	577

Travis Peak
 20 ft
 PAIS Creek



(Sketch)

YD-58-41-101

0 to 20 Surface

20 to 98 Blue Lime

98 to 101 Soapstone

101 to 150 Blue Lime

150 to 280 Gray Lime

280 to 305 White Lime

305 to 307 Brown Water Sand

307 to 341 Gray Lime

341 to 397 Blue Lime

397 to 422 White Lime

422 to 461 Brown Lime

461 to 474 Gray Lime

474 to 498 Green Shale

498 to 529 Brown Clay

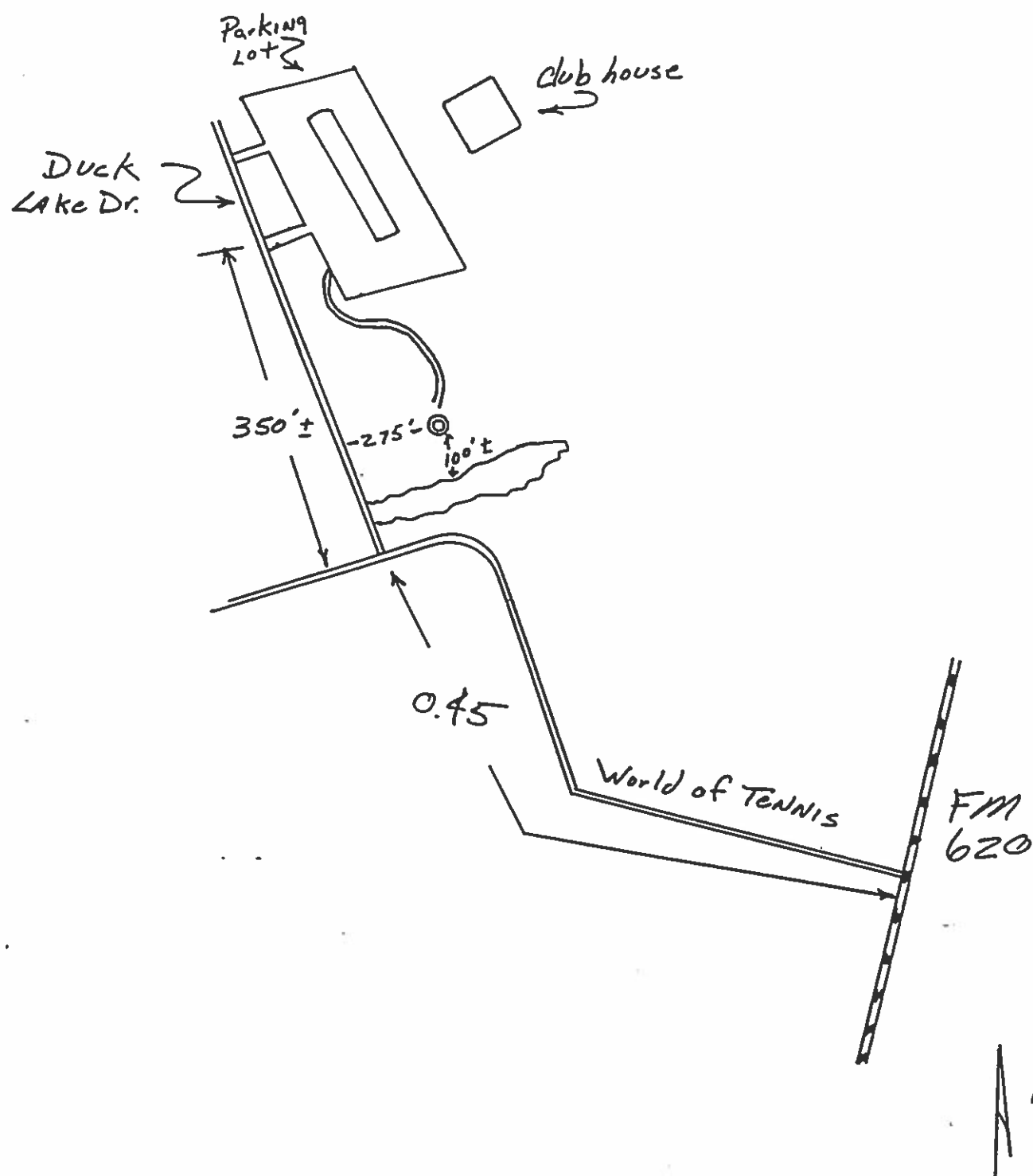
529 to 538 Light Gray Lime

538 to 548 Light Gray Lime

548 to 571 Water Sand

571 to 577 Red Clay

YD-58-41-101



- 41-102

Owner: LAKEWAY WORLD OF TENNIS Address: 1200 LAKEWAY DR. City: AUSTIN State: TX ZIP: 78734 L2
LOCATION OF WELL: *YAUPOON Golf Course*
County: TRAVIS 4-5 miles in N direction from BEE CAVES

DESCRIPTION:
Job No.: Block No.: Township: *Map on 58-49-7D*
Abstract No.: Survey Name: *58-49-2B13*
Distance and direction from two intersecting section or survey lines:

1) TYPE OF WORK: 4) PROPOSED USE: 5) DRILLING METHOD:
NEW WELL IRRIGATION AIR ROTARY

6) WELL LOG: 00014 DIAMETER OF HOLE 7) BOREHOLE METHOD:
DIAMETER FROM TO OPEN HOLE
9 0 495
6 495 680 IF GRAVEL... FROM FT TO FT

Date Drilled: 08/12/84

GEOLOGICAL DESCRIPTION: 8) CASING, BLANK PIPE, AND WELL SCREEN DATA:
FROM TO DESCRIPTION DIA NEW/USED DESCRIPTION FROM TO GAGE CASING SCREEN
0 1 TOP SOIL 6 5/8 N STEEL 0 495 188
1 26 CALICHE
26 145 BLUE LIME
145 360 BROWN
360 400 BROWN
400 445 GRAY LINE
445 480 HAMMID SHALE
480 510 GRAY LINE
510 680 SAND

9) CEMENTING DATA:
Cemented from 0 FT. TO 40 FT.
FT. TO FT.
Method used: CENTRAL TEXAS DRILL
Cemented by: CENTRAL TEXAS DRILL

10) SURFACE COMPLETION:
APPRV. ALTER. PROC.

11) WATER LEVEL:
STATIC LEVEL : FT. DATE / /
ARTESIAN FLOW: GPM. DATE / /

12) PACKERS: TYPE DEPTH
BURLAP 40
CEMENT BASKETS 495

13) TYPE PUMP:
SUBMERSIBLE
DEPTH TO PUMP: 504

14) WELL TEST:
JETTED/ESTIMATED
YIELD: 50 GPM WITH FT DRAWDOWN AFTER HRS

15) WATER QUALITY:
TYPE OF WATER: TRINITY DEPTH OF STRATA: 80
NO STRATA OF UNDESIRABLE WATER PENETRATED

NO CHEMICAL ANALYSIS MADE

COMPANY NAME: CENTRAL TEXAS DRILLING WATER WELL DRILLER'S LICENSE NO.: 1313
ADDRESS: 9518 HWY. 290 WEST CITY: AUSTIN STATE: TX ZIP CODE: 78736

(signed) *Frank Glass* (signed) *58-49-102*
X

Please use black ink.
Send original copy by
certified mail to the
Texas Department of Water Resources
P. O. Box 13087
Austin, Texas 78711

State of Texas
WATER WELL REPORT

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

1) OWNER BOB LEONARD (Name) Address P.O. BOX 9441 AUSTIN, TX 78766 (Street or RFD) (City) (State) (Zip)
2) LOCATION OF WELL: County TRAVIS 5 miles in N.E. direction from BEE CAVES (N.E., S.W., etc.) (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description: Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____

☒ See attached map. Map on 58-42-7D

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging
4) PROPOSED USE (Check):
☒ Domestic ☐ Industrial ☐ Public Supply
☐ Irrigation ☐ Test Well ☐ Other _____
5) DRILLING METHOD (Check):
☐ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored
☒ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other _____

6) WELL LOG:
Diameter of Hole
Dia. (in.) From (ft.) To (ft.)
6" Surface 660'
Date drilled 9/20/84
7) BOREHOLE COMPLETION:
☒ Open Hole ☐ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval ... from _____ ft. to _____ ft.

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

From (ft.)	To (ft.)	Description and color of formation material	Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)	Gage Casing Screen
						From	To
0-1		TOP SOIL					
1-26		CALICHE					
26-35		BLUE	4	1/2 N	PVC PLASTIC	0'	660'
35-115		BROWN					
115-285		GRAY	6"	N	20" STEEL SLEEVE	6" BELOW	188
285-360		BROWN				GROUND LEVEL	
360-410		BROWN/GRAY SPOTS					
410-485		BROWN POWRIS (WATER)					
485-500		GRAY					
500-540		HAMMID SHALE					
540-560		GRAY					
560-660		SAND W/ LAYERS OF GRAVEL AND BRIT. GR.					
		T.D.					

9) CEMENTING DATA [Rule 319.44(b)]
Cemented from 0 ft. to 15 ft.
_____ ft. to _____ ft.
Method used _____
Cemented by CENTRAL TEXAS DRILLING

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 319.44(c)]
☐ Pitless Adapter Used [Rule 319.44(d)]
☒ Approved Alternative Procedure Used [Rule 318.71]

11) WATER LEVEL:
Static level 330 ft. below land surface Date 9-27-84
Artesian flow _____ gpm. Date _____

12) PACKERS: Type Depth
1 BURLAP 15'
2 BURLAP 560"

13) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:
Type Test: ☐ Pump ☐ Bailor ☒ Opened ☐ Estimated
Yield: 40-50 gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water TRINTY SAND Depth of strata 100'
Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME CENTRAL TEXAS DRILLING (Type or Print) Water Well Driller's License No. 1313

ADDRESS 9518 HWY 290 WEST AUSTIN TEXAS 78736
(Street or RFD) (City) (State) (Zip)

(Signed) Frank Glass (Signed) _____
(Licensed Water Well Driller) (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available. For TOWA use: Well No. 58-42-7D Located on map 58-42-7D

RECEIVED
SEP - 4 1985

DEPT. OF
WATER RESOURCES
(Use reverse side if necessary)

Send original copy by
certified mail to the
Texas Department of Water Resources
P. O. Box 13087
Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

For TDWR use only
Well No. 58-47-1R
Located on map YES
Received: C.F.S.

1) OWNER H.A. ALBERT (Name) Address 1704 Graveland Pl. Austin Tex 78733 (Street or RFD) (City) (State) (Zip)
2) LOCATION OF WELL:
County TRAVIS miles in _____ direction from _____ (Town)
(N.E., S.W., etc.)

Driener must complete the legal description to the right
with distance and direction from two intersecting sec-
tion or survey lines, or he must locate and identify the
well on an official Quarter- or Half-Scale Texas County
General Highway Map and attach the map to this form.

☐ Legal description:
Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____
☒ See attached map. map 58-33-50

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging
4) PROPOSED USE (Check):
☒ Domestic ☐ Industrial ☐ Public Supply
☐ Irrigation ☐ Test Well ☐ Other _____
5) DRILLING METHOD (Check):
☐ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored
☒ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other _____

6) WELL LOG:
Date drilled 8-4-82
DIAMETER OF HOLE
Dia. (in.) From (ft.) To (ft.)
6 Surface 217
7) BOREHOLE COMPLETION:
☒ Open Hole ☐ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval ... from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material	Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From To	Gage Casing Screen
0	to	1' Surface					
1	to	17 Broken Limestone					
17	to	48 Blue Lignite	5	N	PLASTIC	0 20	
48	to	50 Blue Lignite					
50	to	105 Gray Lignite					
105	to	126 Light Gray Lignite					
126	to	130 White Lignite					
130	to	200 Gray Lignite					
200	to	205 White Lignite					
205	to	217 Gray Lignite					

CEMENTING DATA also at surface
Cemented from 13 ft. to 18 ft.
Method used Mixed & Poured In
Cemented by W.H. GLASS
(Company or Individual)

9) WATER LEVEL:
Static level 110 ft. below land surface Date 8-4-82
Artesian flow _____ gpm. Date _____

10) PACKERS: Type Depth
PLASTIC BAG 18

11) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., _____ ft.

12) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER" 9
Type of water? GOOD Depth of strata _____
Was a chemical analysis made? ☐ Yes ☒ No

12) WELL TESTS: 1 till clean
☐ Type Test ☐ Pump ☐ Baller ☒ Jetted ☐ Estimated
Yield: 15 gpm with _____ ft. drawdown after 18 hrs.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME W.H. GLASS Sr. (Type or Print) Water Well Drillers Registration No. 91
ADDRESS 16714 FITCHUGH Rd. AUSTIN TEX 78736 (Street or RFD) (City) (State) (Zip)
(Signed) W.H. Glass Sr. (Water Well Driller) W.H. GLASS & SON DRLG. (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

9

P3

Please use black ink.
Send original copy by
certified mail to the
Texas Department of Water Resources
P. O. Box 13087
Austin, Texas 78711

State of Texas
WATER WELL REPORT

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

1) OWNER DAVID Bolin (Name) Address Austin (City) Texas (State) (Zip)
2) LOCATION OF WELL: County TARRANT 1/2 miles in ESF direction from Lakeview (In E., S.W., etc.) (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description: Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____

☒ See attached map. 58-36-64

3) TYPE OF WORK (Check): ☐ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging
4) PROPOSED USE (Check): ☒ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other _____
5) DRILLING METHOD (Check): ☐ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other _____

6) WELL LOG: Date drilled 6/28/84
DIAMETER OF HOLE
Dis. (in.) From (ft.) To (ft.)
6 1/2 Surface 45
6 45 1010
7) BOREHOLE COMPLETION: ☐ Open Hole ☐ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval ... from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material	Dis. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)	Gage Casing Screen
						From	To
0	1	top soil					
1	45	Brown Limestone					
45	105	gray "	4	N	plastic	0	720
105	120	yellow "			perf	680	720
120	475	gray " + shale strips					
475	490	Brown sandstone					
490	690	Brown + gray limestone					
690	780	Blue + gray limestone + shale					
780	805	gray limestone					
805	835	Blue + Red Shale					
835	1010	" " " + Sand strips					

8) CEMENTING DATA [Rule 319.44(b)]
Cemented from 0 ft. to 60 ft.
_____ ft. to _____ ft.
Method used _____
Cemented by _____

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 319.44(c)]
☐ Pitless Adapter Used [Rule 319.44(d)]
☐ Approved Alternative Procedure Used [Rule 319.71]

11) WATER LEVEL:
Static level 540 ft. below land surface Date _____
Artesian flow _____ gpm. Date _____

12) PACKERS: Type _____ Depth _____
shale catcher 620
" " 60

13) TYPE PUMP: ☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:
Type Test: ☐ Pump ☐ Bailor ☐ Jetted ☐ Estimated
Yield: _____ gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Tom Arnold Drilling (Type or Print) Water Well Driller's License No. 2096

ADDRESS Rt 2 Box 175 AS (Street or RFD) Round Rock (City) Texas (State) 78664 (Zip)

(Signed) Tommy D. Arnold (Licensed Water Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TDWR use only
Well No. 58-41-111
Located on map 440MM

RECEIVED

AUG 30 1984

DEPT. OF
WATER RESOURCES

(Use reverse side if necessary)

original copy by
 filed with the
 Department of Water Resources
 Box 13067
 Austin, Texas 78711

State of Texas
WATER WELL REPORT

Texas Water Well Drillers Board
 P. O. Box 13067
 Austin, Texas 78711

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

Well Name Bob Pope Address 16103 Flintrock Rd, Austin Tex
 (Name) (Street or RFD) (City) (State) (Zip)
 LOCATION OF WELL:
 County Travis 20 miles in W direction from Austin
 (N.E., S.W., etc.) (Town)

Must complete the legal description to the right
 distance and direction from two intersecting sec-
 tion survey lines, or he must locate and identify the
 well on an official Quarter- or Half-Scale Texas County
 or Highway Map and attach the map to this form.

☐ Legal description:

Section No. _____ Block No. _____ Township _____

Abstract No. _____ Survey Name _____

Distance and direction from two intersecting section or survey lines _____

See #1 on map
See attached map. 58-41-1T

TYPE OF WORK (Check):

new Well ☐ Deepening
 reconditioning ☐ Plugging

4) PROPOSED USE (Check):

☒ Domestic ☐ Industrial ☐ Public Supply
☐ Irrigation ☐ Test Well ☐ Other _____

5) DRILLING METHOD (Check):

☐ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored
☒ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other _____

ELL LOG:

DIAMETER OF HOLE
 Dia. (in.) From (ft.) To (ft.)

6 1/2 Surface 448

Well drilled 9-14-83

7) BOREHOLE COMPLETION:

☐ Open Hole ☒ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____

If Gravel Packed give interval ... from _____ ft. to _____ ft.

From _____ To _____
 (ft.) (ft.) Description and color of formation material

2 - 1 Surface
- 16 Yellow Lime
- 160 Gray Lime
2 - 170 Shale
2 - 418 Gray Lime
8 - 438 Glenn Rose
8 - 448 Hard Gray Lime

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Cage Casing Screen
			From	To	
<u>4 1/2</u>	<u>N</u>	<u>P.V.C.</u>	<u>0</u>	<u>448</u>	

CEMENTING DATA

Cemented from 0 ft. to 20 ft.

Method used dry

Cemented by _____

(Company or Individual)

9) WATER LEVEL:

Static level _____ ft. below land surface Date _____

Artesian flow _____ gpm. Date _____

RECEIVED

APR - 2 1984

10) PACKERS: Type Depth

shot TAIL 20

**DEPT. OF
 WATER RESOURCES**

(Use reverse side if necessary)

WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No

If yes, submit "REPORT OF UNDESIRABLE WATER"

Type of water? _____ Depth of strata _____

Was a chemical analysis made? ☐ Yes ☐ No

11) TYPE PUMP:

☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____

Depth to pump bowl, cylinder, jet, etc., 420 ft.

12) WELL TESTS:

☐ Type Test: ☐ Pump ☐ Baller ☐ Jetted ☒ Estimated

Yield: 10-12 gpm with _____ ft. drawdown after _____ hrs.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

Well Service Co Water Well Driller's License No. 1290
 (Type or Print)

Address 16801-E. Fitzhugh Rd Austin Tex 78736
 (Street or RFD) (City) (State) (Zip)

Signature Do A. Blair (Signed) _____ (Registered Driller Trainee)
 (Licensed Water Well Driller)

Attach electric log, chemical analysis, and other pertinent information, if available.

For TDWR use only
 Well No. 58-41-1X
 Located on map 41-1X



Did not send.

LEGEND

1	Interstate Highway
2	State Highway
3	County Road
4	Local Road
5	Unimproved Road
6	Waterway
7	Waterway
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State of Texas
WATER WELL REPORT

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

Texas Water Well Drillers Board
P.O. Box 13087
Austin, Texas 78711

1) OWNER Arthur Charles Jones Address 10722 620.50th St McAllen TX 78501
(Name) (Street or RFD) (City) (State) (Zip)
2) LOCATION OF WELL: County Jim Wells 20 miles in W direction from McAllen
(N.E., S.W., etc.) (Town)

Legal description:
Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____
☐ See attached map. Survey McAllen

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging
4) PROPOSED USE (Check): ☐ Domestic ☒ Industrial ☐ Monitor ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ Other _____
5) DRILLING METHOD (Check): ☐ Driven ☐ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☒ Air Rotary ☐ Cable Tool ☐ Other _____

6) WELL LOG:
Date Drilling: Started 6-23-87 Completed 7-1-87
Diameter of Hole: Dia. (in.) From (ft.) To (ft.)
6 20 570
7) BOREHOLE COMPLETION: ☒ Open Hole ☐ Straight Wall ☐ Unleathered ☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material	Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., If commercial	Setting (ft.)	Gage Casing Screen
						From	To
0	2	soil					
2	8	yellow sand					
8	125	blue lime					
125	200	blue lime					
200	275	blue lime					
275	350	blue lime					
350	450	blue lime					
450	520	blue lime					
520	570	white lime - (Water)					

9) CEMENTING DATA [Rule 319.44(b)]
Cemented from 0 ft. to 20 ft. No. of Sacks Used 2
ft. to _____ ft. No. of Sacks Used _____
Method used hand
Cemented by _____

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 319.44(c)]
☐ Pileless Adapter Used [Rule 319.44(d)]
☒ Approved Alternative Procedure Used [Rule 319.71]

11) WATER LEVEL:
Static level 450 ft. below land surface Date 6-23-87
Artesian flow _____ gpm. Date _____

12) PACKERS: Type _____ Depth _____

JUL 26 87

13) TYPE PUMP:
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., 520 ft.

14) WELL TESTS:
Type Test: ☐ Pump ☐ Soller ☒ Jetted ☐ Estimated
Yield: 20 gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☒ No

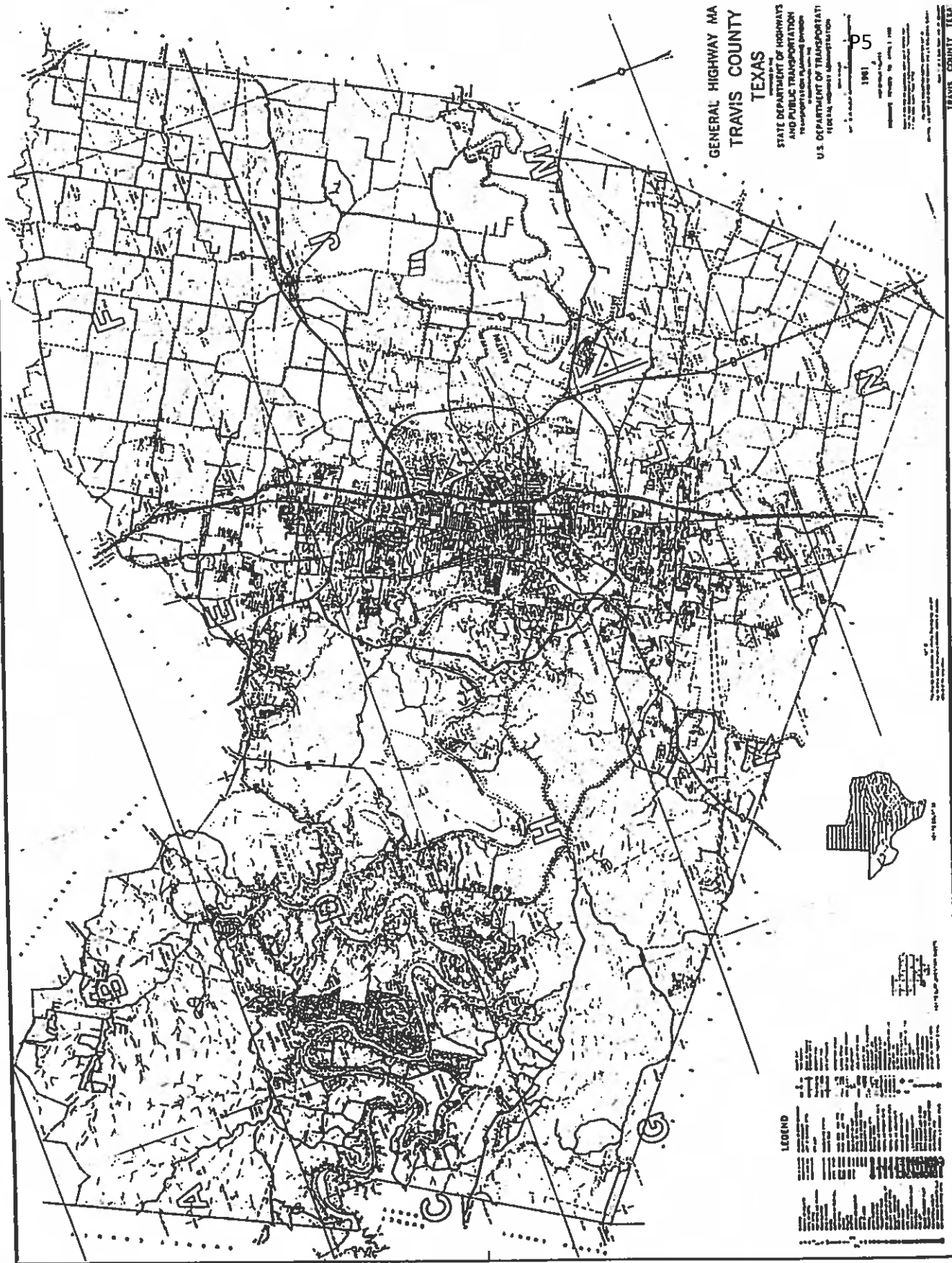
I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

RICHARD L. BIBLE
WATER WELL DRILLING
10210 GARDEN DR
AUSTIN, TEXAS 78736
Company Name _____ Water Well Driller's License No. 284
Address _____
(Signed) Richard L. Bible (Chv) _____ (State) _____ (Zip) _____
(Licensed Water Well Driller) (Registered Driller Trainee)

electric log, chemical analysis, and other pertinent information, if available.

For TWC use only
Well No. 5841-1
Located on map _____

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Vell L



GENERAL HIGHWAY MAP
TRAVIS COUNTY
TEXAS

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
TRANSPORTATION PLANNING DIVISION
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

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LEGEND

1	Interstate Highway
2	State Highway
3	County Road
4	Local Road
5	Unimproved Road
6	Waterway
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TRAVIS COUNTY TEXAS

Send original copy by
certified mail to the
Texas Department of Water Resources
P. O. Box 13087
Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

1) OWNER Murline Armendariz Address 1801 Bravard Pl Austin, Tx. 78734
(Name) (Street or RFD) (City) (State) (Zip)
2) LOCATION OF WELL: County Bastrop miles in _____ direction from _____
(N.E., S.W., etc.) (Town)

Driller must complete the legal description to the right
with distance and direction from two intersecting sec-
tion or survey lines, or he must locate and identify the
well on an official Quarter- or Half-Scale Texas County
General Highway Map and attach the map to this form.

☐ Legal description:
Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____

☒ See attached map. Map on 58-41-1V

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging
4) PROPOSED USE (Check):
☒ Domestic ☐ Industrial ☐ Public Supply
☐ Irrigation ☐ Test Well ☐ Other _____
5) DRILLING METHOD (Check):
☐ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored
☒ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other _____

6) WELL LOG:
Date drilled 12-22-84
Diameter of Hole
Dia. (in.) From (ft.) To (ft.)
Surface 4 1/2 285
7) BOREHOLE COMPLETION:
☒ Open Hole ☐ Straight Wall ☐ Undersamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval ... from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material	Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., If commercial	Setting (ft.) From To	Gage Casing Screen
0	to 1	Surface					
1	to 35	Broken Limestone					
35	to 50	Blue Limestone					
50	to 57	Yellow Limestone					
57	to 65	Blue Limestone					
65	to 72	Blue Shale					
72	to 230	Gray Limestone					
230	to 236	Water Barrier					
236	to 270	Gray Limestone					
270	to 275	Water Barrier					
275	to 285	Gray Limestone					

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:
Dia. (in.) 5.00 New or Used N Steel, Plastic, etc. PLASTIC Setting (ft.) 1' ABOVE 148
9) CEMENTING DATA [Rule 319.44(b)] also at surface
Cemented from 135 ft. to 145 ft.
Method used Mud & Portland. In
Cemented by W. H. Glass

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed [Rule 319.44(c)]
☐ Pitless Adapter Used [Rule 319.44(d)]
☐ Approved Alternative Procedure Used [Rule 319.71]

11) WATER LEVEL:
Static level 120 ft. below land surface Date 12-22-84
Artesian flow _____ gpm. Date _____

12) PACKERS: Type PIASTIC Depth 145
BAG

13) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowl, cylinder, jet, etc., _____ ft.

14) WELL TESTS: Still clear
Type Test: ☐ Pump ☐ Baker ☒ Jetted ☐ Estimated
Yield: 15 gpm with _____ ft. drawdown after 1/8 hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? GOOD Depth of strata 11
Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME W.H. GLASS & SON DRILL Water Well Driller's License No. 91
(Type or Print)
ADDRESS 15718 FITZHUGH RD. AUSTIN TX 78736
(Street or RFD) (City) (State) (Zip)
(Signed) W. H. Glass (Signed) _____
(Licensed Water Well Driller) (Registered Driller Trainee)

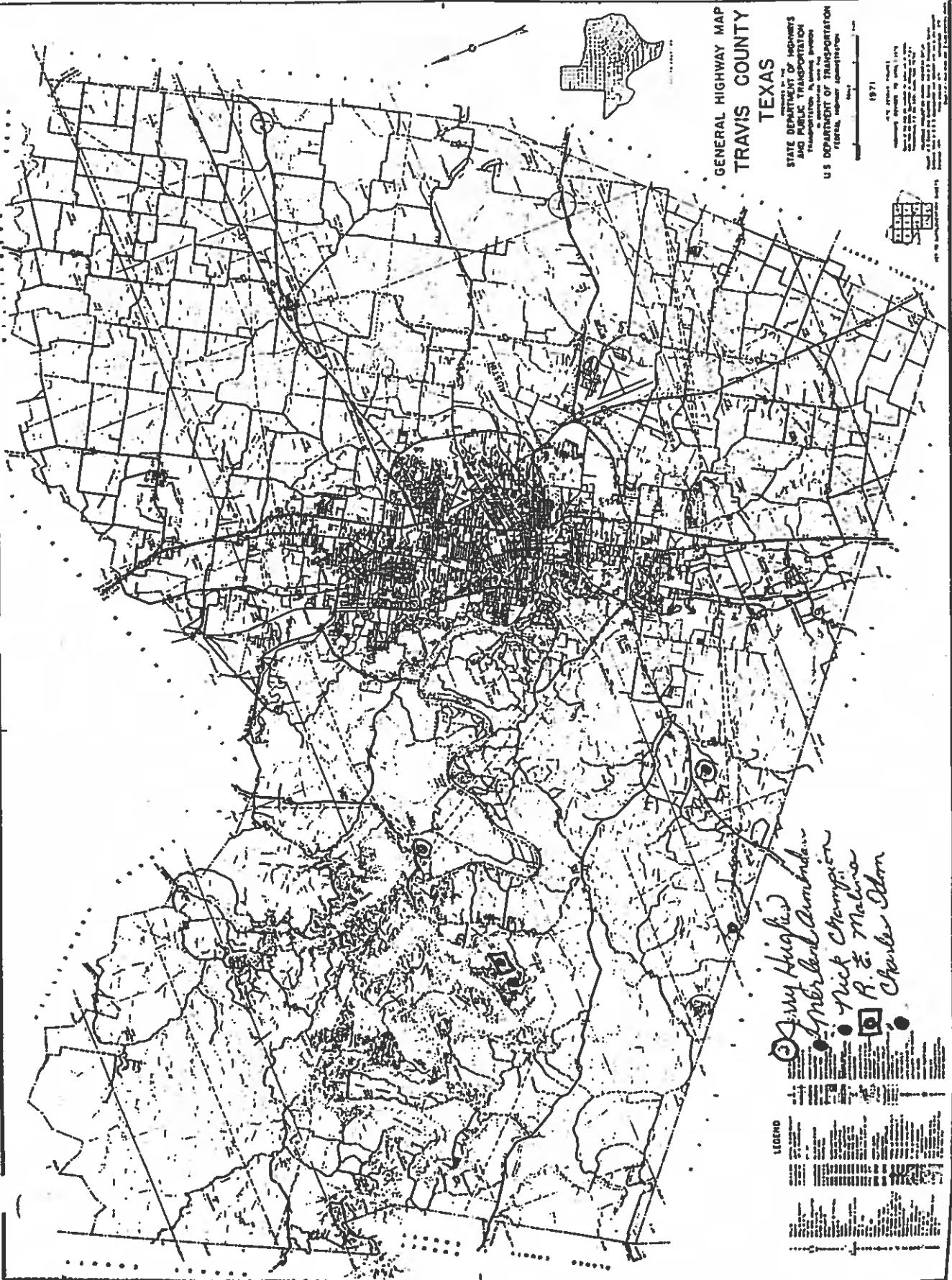
Please attach electric log, chemical analysis, and other pertinent information, if available.

For TDWR use only
Well No. 58-41-1V
Located on map 425 DLE

GENERAL HIGHWAY MAP
TRAVIS COUNTY
TEXAS

Prepared by the
STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
Travis County, Texas
in cooperation with the
U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration

1971
This map is based on the
1967 Census of Population
and Housing, Travis County, Texas
and the 1967 Census of Population
and Housing, Texas, by county.
The map is based on the 1967
Census of Population and Housing,
Travis County, Texas, by census tract.
The map is based on the 1967
Census of Population and Housing,
Texas, by county.



③ Hwy 140
Amberland Ambulance
Nick Champion
R. E. Malone
Charles Olson

LEGEND

- Interstate Highway
- State Highway
- County Road
- Local Road
- Unimproved Road
- Gravel Road
- Asphalt Road
- Concrete Road
- Waterway
- Railroad
- Airport
- City
- Town
- Village
- Hamlet
- Unincorporated Community
- Post Office
- Police Station
- Fire Station
- Public School
- Private School
- College
- University
- Religious Building
- Government Building
- Commercial Building
- Industrial Building
- Residential Building
- Public Utility
- Telephone Exchange
- Post Office
- Police Station
- Fire Station
- Public School
- Private School
- College
- University
- Religious Building
- Government Building
- Commercial Building
- Industrial Building
- Residential Building
- Public Utility
- Telephone Exchange

WATER WELL REPORT

TWDBE-WD-8

Please use black ink.
Send original copy by
certified mail to the
Texas Water Commission
P.O. Box 13087
Austin, Texas 78711

State of Texas
WATER WELL REPORT

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

1) OWNER BRANNAN HOMES-WAYNE SEIME Address 1021 RANCH RD. 620 SOUTH SUITE C AUSTIN, TEXAS
(Name) (Street or RFD) (City) (State) (Zip)
2) LOCATION OF WELL: County TRAVIS 1 miles in SW direction from LAKEWAY
(N.E., S.W., etc.) (Town)

☐ Legal description:

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

Section No. _____ Block No. _____ Township _____

Abstract No. _____ Survey Name _____

Distance and direction from two intersecting section or survey lines _____

#2. ☒ See attached map. No map

3) TYPE OF WORK (Check):

☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):

☐ Domestic ☐ Industrial ☐ Monitor ☐ Public Supply
☐ Irrigation ☐ Test Well ☐ Injection ☐ Other _____

5) DRILLING METHOD (Check):

☐ Driven
☐ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored
☐ Air Rotary ☐ Cable Tool ☐ Other _____

6) WELL LOG:

Date Drilling: 7/18 1988
Started 7/30 1988
Completed _____

DIAMETER OF HOLE
Dia. (in.) From (ft.) To (ft.)

7	Surface	

7) BOREHOLE COMPLETION:

☐ Open Hole ☐ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	10	CALICHE
10	430	GRAY SANDSTONE /LS
430	490 *	TAN L/S
490	520	GRAY SANDSTONE
520	560	BROKEN L/S
560	590	SHALE
590	610	BROWN CLAY
610	630	SANDSTONE
630	695 *	RED CLAY /LS
695	720	

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casing Screen
			From	To	
5	N	PVC	0	720	40
		PERFORATIONS	430	490	
		"	630	695	

9) CEMENTING DATA [Rule 319.44(b)]

Cemented from 0 ft. to 20 ft. No. of Sacks Used 10
_____ ft. to _____ ft. No. of Sacks Used _____
Method used HAND
Cemented by A.D.C.

10) SURFACE COMPLETION

☒ Specified Surface Slab Installed [Rule 319.44(c)]
☐ Pitless Adapter Used [Rule 319.44(d)]
☐ Approved Alternative Procedure Used [Rule 319.71]

11) WATER LEVEL:

Static level 391 ft. below land surface Date 9/14/88
Artesian flow _____ gpm. Date _____

12) PACKERS: Type Depth

SHALE TRAP / BURAP 20'

13) TYPE PUMP:

☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., 500 ft.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No

If yes, submit "REPORT OF UNDESIRABLE WATER"

Type of water? TRINITY Depth of strata SEE ABOVE

Was a chemical analysis made? ☐ Yes ☒ No

14) WELL TESTS:

Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☒ Estimated
Yield: 20-30 gpm with _____ ft. drawdown after _____ hrs.

I here by certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME ASSOCIATED DRILLING CO.
(Type or Print)

Water Well Driller's License No. 1955

ADDRESS P.O. BOX 1060

MANCHACA,

TEXAS

78652

(Street or RFD)

(City)

(State)

(Zip)

(Signed) [Signature]
(Licensed Water Well Driller)

(Signed) [Signature]
(Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only
Well No. 57-48-3
Located on map _____

SR-41-1E GW 7

Send original copy by
certified mail to the
Texas Water Development Board
P. O. Box 12386
Austin, Texas 78711

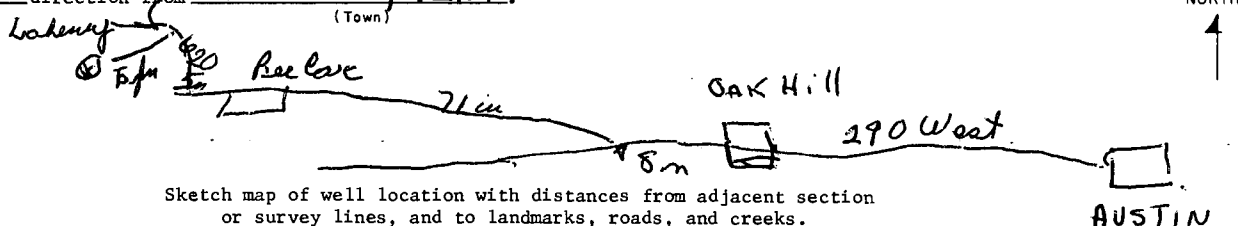
State of Texas
WATER WELL REPORT

For TWDB use only
Well No. SR-41-1E
Located on map yes
Received: 68
Form GW 8
Form GW 9

1) OWNER:
Person having well drilled Kim Taylor Address RT. 8, Box 4103 Austin, Texas
(Name) (Street or RFD) (City) (State)
Landowner SAME Address SAME
(Name) (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County TRAVIS Labor _____ League _____ Abstract No. _____
NW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ of Section _____ Block No. _____ Survey _____
(Circle as many as are known)

20 miles in West direction from AUSTIN, TEXAS
(N.E., S.W., etc.) (Town)



3) TYPE OF WORK (Check):
New Well ☒ Deepening ☐
Reconditioning ☐ Plugging ☐
4) PROPOSED USE (Check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐
5) TYPE OF WELL (Check):
Rotary ☒ Driven ☐ Dug ☐
Cable ☐ Jetted ☐ Bored ☐

6) WELL LOG:
Diameter of hole 8 3/8 in. Depth drilled 610 ft. Depth of completed well 610 ft. Date drilled 9-9-68
All measurements made from 0 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material	From (ft.)	To (ft.)	Description and color of formation material
0	30	BROKEN LOOSE ROCK	600	610	BLUE SHALE
30	80	BROKEN LIMESTONE & yellow clay			
80	125	LIMESTONE			
125	160	BLUE SHALE			
160	300	LIMESTONE & SHALE			
300	500	LIMESTONE - CREVICES			
500	540	SHALE & ROCK			
540	600	LIMESTONE			
(Use reverse side if necessary)					

7) COMPLETION (Check):
Straight wall ☒ Gravel packed ☐ Other ☐
Under reamed ☐ Open hole ☐

8) WATER LEVEL:
Static level _____ ft. below land surface Date _____
Artesian pressure _____ lbs. per square inch Date _____

9) CASING:
Type: old ☐ New ☐ Steel ☐ Plastic ☐ Other ☐
Cemented from _____ ft. to _____ ft.

10) SCREEN:
Type _____
Perforated ☐ Slotted ☐

Diameter (inches)	Setting		Gage	Diameter (inches)	Setting		Slot size
	From (ft.)	To (ft.)			From (ft.)	To (ft.)	

11) WELL TESTS:
Was a pump test made? ☐ Yes ☐ No If yes by whom? _____
Yield: _____ gpm with _____ ft. drawdown after _____ hrs
Bailer test _____ gpm with _____ ft. drawdown after _____ hrs
Artesian flow _____ gpm Date _____
Temperature of water _____
Was a chemical analysis made? ☐ Yes ☐ No
Did any strata contain undesirable water? ☐ Yes ☐ No
Type of water? _____ depth of strata _____

12) PUMP DATA:
Manufacturer's Name _____
Type _____ H.P. _____
Designed pumping rate 105 gpm ☐ gph ☐
Type power unit _____
Depth to bowls, cylinder, jet, etc., _____ ft. below land surface.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME JAMES FRANKLIN Water Well Drillers Registration No. 592
(Type or Print)
Address P.O. Box 1527 Austin TEXAS
(Street or RFD) (City) (State)
(Signed) James Franklin CENTRAL TEXAS DRILLING CO.
(Water Well Driller) (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORTTexas Water Well Drillers Board
P.O. Box 13087
Austin, Texas 78711

1) OWNER Chester Dorman ADDRESS 4602 Lasco Path Austin, Tex. 78745
(Name) (Street or RFD) (City) (State) (Zip)

2) LOCATION OF WELL:
County Travis 2 miles in W direction from Lakeway
(NE, SW, etc.) (Town)

Driller must complete the legal description below with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ LEGAL DESCRIPTION:

Section No. _____ Block No. _____ Township _____ Abstract No. _____ Survey Name _____

Distance and direction from two intersecting section or survey lines _____

☒ SEE ATTACHED MAP

3) TYPE OF WORK (Check):

☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):

☒ Domestic ☐ Industrial ☐ Monitor ☐ Public Supply
☐ Irrigation ☐ Test Well ☐ Injection ☐ De-Watering

5) DRILLING METHOD (Check):

☐ Driven
☐ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored
☒ Air Rotary ☐ Cable Tool ☐ Other _____

6) WELL LOG:

Date Drilling:

Started 2-10 19 90Completed 2-14 19 90

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
<u>7</u>	Surface	<u>40</u>
<u>6 3/4</u>	<u>40</u>	<u>270</u>

7) BOREHOLE COMPLETION:

☐ Open Hole ☒ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____

If Gravel Packed give interval ... from _____ ft. to _____ ft.

From (ft.) To (ft.) Description and color of formation material

0	1	Topsoil
1	20	Yellow limestone
20	40	Gray limestone
40	80	Yellow limestone
80	120	Shale
120	160	Red Sandy Clay/Gray Sand
*160	250	Red Sandy Clay/Sand & Gravel
250	270	Yellow Limestone

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
5	N	PVC	-2	270	40

9) CEMENTING DATA [Rule 287.44(1)]

Cemented from 0 ft. to 10 ft. No. of Sacks Used 5
_____ ft. to _____ ft. No. of Sacks Used _____Method used HandCemented by Associated Drilling Company

10) SURFACE COMPLETION

☒ Specified Surface Slab Installed [Rule 287.44(2)(A)]☐ Pitless Adapter Used [Rule 287.44(3)(B)]☐ Approved Alternative Procedure Used [Rule 287.71]

11) WATER LEVEL:

Static level 73 ft. below land surface Date 2-14-90

Artesian flow _____ gpm. Date _____

12) PACKERS:

Type	Depth
<u>Burlap</u>	<u>10</u>
<u>Burlap</u>	<u>170</u>

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Associated Drilling Company
(Type or print)WELL DRILLER'S LICENSE NO. 1955ADDRESS P.O. Box 1060

(Street or RFD)

Manchaca

(City)

Texas

(State)

78652

(Zip)

(Signed) Byron Benoit
(Licensed Well Driller)(Signed) _____
(Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only: Well No. 57-48-3 Located on map _____

**IMPORTANT NOTICE FOR PERSONS
HAVING WELLS DRILLED CONCERNING
PRIVILEGE OF CONFIDENTIALITY**

The Water Well Drillers Board and the Texas Water Commission are concerned that some persons having wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

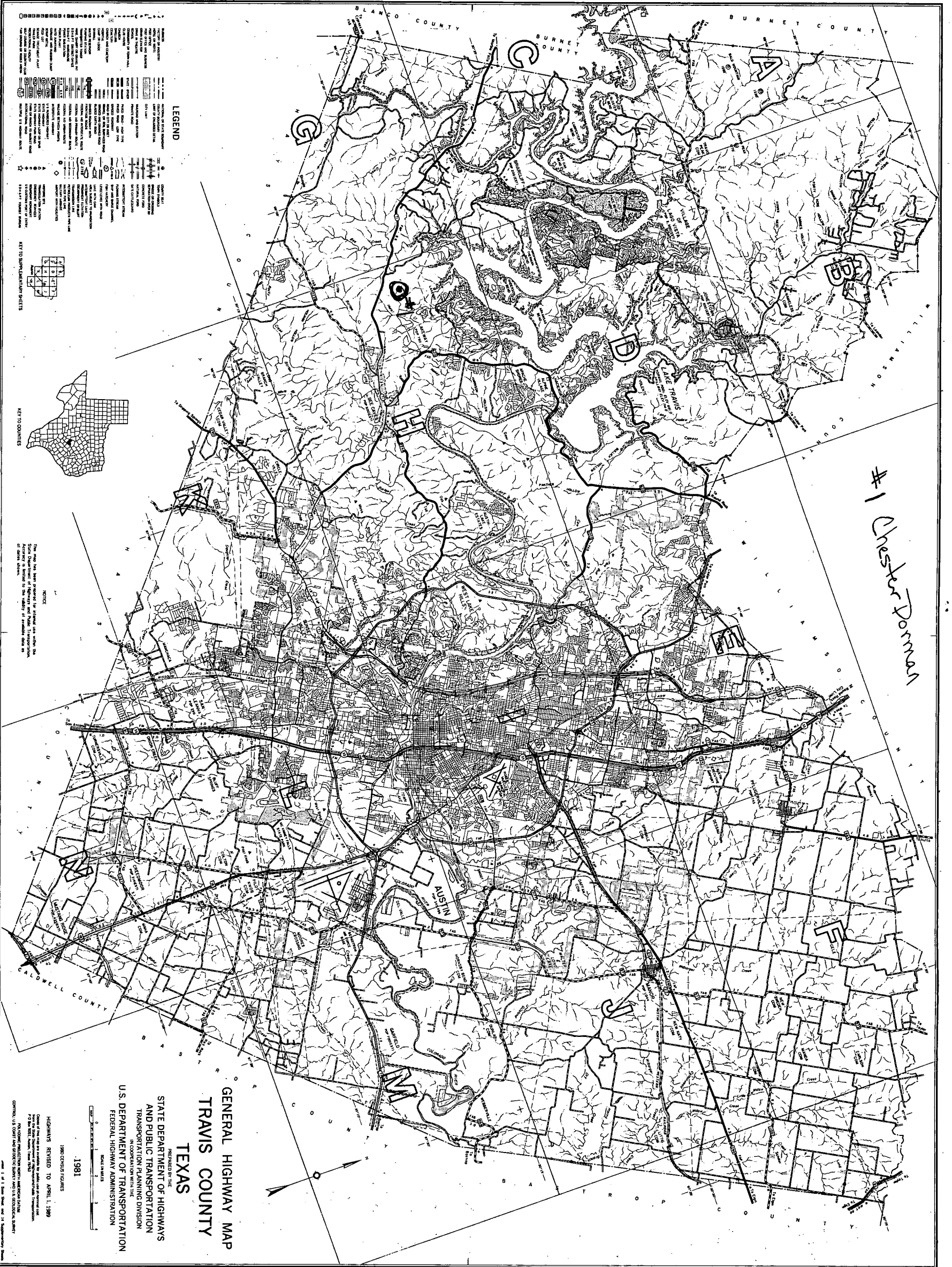
"Every licensed water well driller drilling, deepening or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within 60 days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the Commission, and the owner thereof or the person having had such well drilled. Each copy of a well log, other than a Commission copy, shall include the name, mailing address, and telephone number of the Board and the Commission. The well log required herein shall at the request in writing to the Commission, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential.

[illegible]



#1 Chester Dorman



GENERAL HIGHWAY MAP
TRAVIS COUNTY
TEXAS

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
TRANSPORTATION PLANNING DIVISION
IN COOPERATION WITH THE
FEDERAL HIGHWAY ADMINISTRATION

1981

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse Side

STATE OF TEXAS
WATER WELL REPORT

1) OWNER: **MARQUIS HOMES** ADDRESS: **#13 CHAMPIONS COURT** CITY: **AUSTIN** STATE: **TX** ZIP: **78734-**

2) ADDRESS OF WELL:

County: **TRAVIS** STATE WELL# **58-41-1**

Street or RFD: **17006 MAJESTIC RIDGE RD.**

City, State, Zip code: **AUSTIN, TX 78734-**

3) TYPE OF WORK: **NEW WELL**

4) PROPOSED USE: **DOMESTIC**

If Public Supply well, were plans submitted to the TNRCC?

6) WELL LOG: **00028**

DIAMETER OF HOLE

7) DRILLING METHOD:

8) BOREHOLE COMPLETION:

DATE DRILLING: **7-7/8** **0** **20**

AIR ROTARY

STRAIGHT WALL

N^

STARTED: **12/05/95** **7** **20** **720**

IF GRAVEL... FROM FT. TO FT.

COMPLETED: **12/05/95** **6-3/4** **720** **870**

FROM FT. TO FT.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

DIA	NEW/USED	DESCRIPTION	FROM	TO	GAGE CASING SCREEN
5	N	PLASTIC	-2	740	40

GEOLOGICAL DESCRIPTION:

FROM	TO	DESCRIPTION
0	1	TOP SOIL
1	15	CALICHE
15	340	GREY LIME
340	380	BROKEN LIME
380	430	GRAY LIME
430	470	BROKEN
470	515	HARD GRAY LIME
515	570	BROKEN
570	590	GRAY LIME
590	630	SHALE
630	665	GRAY LIME
665	685	BROKEN SANDS
685	780	RED CLAY SANDSTONE
780	825	BROKEN
825	870	SANDSTONE BLACK LIME

RECEIVED
DEC 22 1995
TEXAS NATURAL RESOURCE
CONSERVATION COMMISSION

9) CEMENTING DATA:

Cemented from	No. of Sacks Used
0 FT. TO 20 FT.	5
FT. TO FT.	

Method used: **GRAVITY**

Cemented by: **ASSOCIATED DRILLING**

Distance to septic field lines: **150** ft.

Method of verification of above distance:
MEASURED

10) SURFACE COMPLETION:

SURFACE SLAB INST.

11) WATER LEVEL:

STATIC LEVEL : **440** FT. DATE: **12/04/95**

ARTESIAN FLOW: GPM. DATE:

12) PACKERS:

TYPE	DEPTH
NEOPRENE/BURLAP	20
NEOPRENE	720

13) TYPE PUMP:

SUBMERSIBLE

DEPTH TO PUMP: **660**

14) WELL TEST:

ESTIMATED

YIELD: **50** GPM WITH FT DRAWDOWN AFTER HRS

15) WATER QUALITY:

TYPE OF WATER: **TRINITY**

DEPTH OF STRATA: **780-825**

NO CHEMICAL ANALYSIS MADE

NO STRATA OF UNDESIRABLE WATER PENETRATED

COMPANY NAME: **ASSOCIATED DRILLING CO.**

WATER WELL DRILLER'S LICENSE NO.: **2939W**

FOR TWC USE ONLY

ADDRESS: **P.O. BOX 1060**

CITY: **MANCHACA**

STATE: **TX** ZIP CODE: **78652**

WELL NO. _____

LOCATED ON MAP _____

I HEREBY CERTIFY THAT THIS WELL WAS DRILLED BY ME (OR UNDER MY SUPERVISION) AND THAT EACH AND ALL OF THE STATEMENTS HEREIN ARE TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF. I UNDERSTAND THAT FAILURE TO COMPLETE ITEMS 1 THRU 15 WILL RESULT IN THE LOG(S) BEING RETURNED FOR COMPLETION AND RESUBMITTAL.

(signed)

(LICENSED WATER WELL DRILLER)

(signed)

(REGISTERED DRILLER TRAINEE)

Please use black ink.
Send original copy by
certified mail to the
Texas Water Commission
P.O. Box 13087
Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

1) OWNER Bud Boza (Name) Address 1407 Americana Blvd (Street or RFD) Houston (City) 77002 (State) (Zip)
2) LOCATION OF WELL: County Texas 25 miles in W direction from Austin (N.E., S.W., etc.) (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____

☒ See attached map. aw#1

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☒ Domestic ☐ Industrial ☐ Monitor ☐ Public Supply
☐ Irrigation ☐ Test Well ☐ Injection ☐ Other _____

5) DRILLING METHOD (Check): ☐ Driven
☐ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored
☒ Air Rotary ☐ Cable Tool ☐ Other _____

6) WELL LOG:
Date Drilling: Started 2-10 1988
Completed " 19"

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
<u>6</u>	Surface	<u>250</u>

7) BOREHOLE COMPLETION:
☒ Open Hole ☐ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval ... from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material
<u>0</u>	<u>2</u>	<u>Tap soil</u>
<u>2</u>	<u>10</u>	<u>Yellow rock</u>
<u>15</u>	<u>150</u>	<u>Base limi</u>
<u>150</u>	<u>155</u>	<u>Shell</u>
<u>155</u>	<u>175</u>	<u>Grey limi</u>
<u>175</u>	<u>180</u>	<u>Shell</u>
<u>180</u>	<u>200</u>	<u>White limi</u>
<u>200</u>	<u>220</u>	<u>Water</u>
<u>220</u>	<u>250</u>	<u>white limi</u>

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:					
Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.)		Gage Casing Screen
			From	To	
5	N	Plastic	0	250	

9) CEMENTING DATA [Rule 319.44(b)]
Cemented from 0 ft. to 60 ft. No. of Sacks Used 8
_____ ft. to _____ ft. No. of Sacks Used _____
Method used poured
Cemented by _____

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 319.44(c)]
☐ Pitless Adapter Used [Rule 319.44(d)]
☒ Approved Alternative Procedure Used [Rule 319.71]

11) WATER LEVEL:
Static level 175 ft. below land surface Date 2-10-88
Artesian flow _____ gpm. Date _____

12) PACKERS:	Type	Depth

13) TYPE PUMP:
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., 220' ft.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☐ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☐ No

14) WELL TESTS:
Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: 8-10 gpm with _____ ft. drawdown after _____ hrs.

I here by certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

RICHARD L. BIBLE
COMPANY NAME WATER WELL DRILLING Water Well Driller's License No. 284
10210 CIRCLE DR.
ADDRESS AUSTIN, TEXAS 78736
(Street or RFD) (City) (State) (Zip)
(Signed) Richard L. Bible (Signed) _____
(Licensed Water Well Driller) (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available. For TWC use only
Well No. 57-48-3
Located on map _____

**IMPORTANT NOTICE FOR PERSONS
HAVING WELLS DRILLED CONCERNING
PRIVILEGE OF CONFIDENTIALITY**

The Water Well Drillers Board and the Texas Water Commission are concerned that some persons having water wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

“Every licensed water well driller drilling, deepening or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within 30 days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the Commission, and the owner thereof or the person having had such well drilled. Each copy of a well log, other than a Commission copy, shall include the name, mailing address, and telephone number of the Board and the Commission. The well log required herein shall at the request in writing to the Commission, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record.”

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential.

RECEIVED

Dup

Send original copy by certified mail to the Texas Water Development Board
P. O. Box 13087
Austin, Texas 78711

State of Texas

WATER WELL REPORT

AUG 29 1976

DEPT. OF WATER RESOURCES

For TWDB use only
Well No. 58-41-1P
Located on map 425
Received: 28/25
dlb

1) OWNER:

Person having well drilled Tony Palompa

Address Austin Tex

Landowner Same

2) LOCATION OF WELL:

County Jimmi

15 miles in SW direction from Austin

Locate by sketch map showing landmarks, roads, creeks, hiway number, etc.*

Sketch map showing landmarks, roads, creeks, hiway number, etc.*

Give legal location with distances and directions from adjacent sections or survey lines.

Labor

Block

Abstract No.

3) TYPE OF WORK (Check):

New Well

Reconditioning

4) PROPOSED USE (Check):

Domestic

Irrigation

5) TYPE OF WELL (Check):

Rotary

Cable

6) WELL LOG:

Diameter of hole 6 in.

Depth drilled 330 ft.

Depth of completed well 330 ft.

Date drilled 6/78

From (ft.)	To (ft.)	Description and color of formation material
0 - 15	15	Surface + Broken foam
15 - 120	120	Blue lime
120 - 225	225	Grey lime
225 - 280	280	White lime
280 - 285	285	Water
285 - 330	330	White lime

9) CASING:

Type: Old New Steel Plastic Other

Cemented from 0 ft. to 15 ft.

Diameter (inches) 5

Setting From (ft.) 0 To (ft.) 20

7) COMPLETION (Check):

Straight wall

Gravel packed

Other

Under reamed

Open Hole

8) WATER LEVEL:

Static level 120 ft. below land surface

Date 6/77

Artesian pressure lbs. per square inch

Date

Depth to pump bowls, cylinder, jet, etc., ft. below land surface.

11) WELL TESTS:

Was a pump test made? Yes No

If yes, by whom?

Yield: gpm with ft. drawdown after hrs.

Bailer test 20 gpm with 10 ft. drawdown after 1/2 hrs.

Artesian flow gpm

Temperature of water

12) WATER QUALITY:

Was a chemical analysis made? Yes No

Did any strata contain undesirable water? Yes No

Type of water? fresh depth of strata 5 ft

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME RICHARD L. BIBLE

Water Well Drillers Registration No. 284

ADDRESS 16207 Elm Dr

Austin Tex 78734

(Signed) Richard L. Bible

Richard L. Bible Drilling Co.

Please attach electric log, chemical analysis, and other pertinent information, if available.

*Additional instructions on reverse side.

2) LOCATION OF WELL:

The sketch showing the well location must be as accurate as possible, showing landmarks, in sufficient detail so that the well may be plotted on a General Highway Map of the county in which the well is located.

Reference points from which distances are measured and directions given should be of a permanent nature (e.g. highway intersections, center of towns, river and creek bridges, railroad crossings). The distance and direction from the nearest town should always be indicated.

When giving a legal description include a sketch showing location of the well within the described area, e.g. survey abstract.

Information furnished in Section 2) of the TWDBE-GW-53 is very important. Unless the well can be accurately located on a map the value of the other data contained in the Report is greatly reduced.

Central Records
Texas Dept. of Water Resources

RECEIVED
DEC 7 1978

ATTENTION OWNER: Confidentiality
 Privilege Notice on Reverse Side

STATE OF TEXAS
 WATER WELL REPORT

1) OWNER: ALANA, MARK ADDRESS: 922 VANGUARD CITY: AUSTIN STATE: TX ZIP: 78734-

2) ADDRESS OF WELL:

5)

Y: TRAVIS STATE WELL# 58-41-1

S or RPD: 3500 SERENE HILLS

City, State, Zip code: AUSTIN TX 78738-

3) TYPE OF WORK: NEW WELL

4) PROPOSED USE: DOMESTIC

If Public Supply well, were plans submitted to the TNRCC?

6) WELL LOG: 00032	DIAMETER OF HOLE		7) DRILLING METHOD:	8) BOREHOLE COMPLETION:
	DIAMETER	FROM TO		
DATE DRILLING:	7-7/8	0 20	AIR ROTARY	STRAIGHT WALL
STARTED: 12/08/95	7	20 620		IP GRAVEL... FROM FT. TO FT.
COMPLETED: 12/09/95	6-3/4	620 780		FROM FT. TO FT.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

DIA	NEW/USED	DESCRIPTION	FROM TO	GAGE CASING SCREEN
5	N	PLASTIC	-2 640	40

GEOLOGICAL DESCRIPTION:

FROM	TO	DESCRIPTION
0	25	CALICHE
25	230	GRAY LIM
230	280	BROKEN
280	330	GREY
330	350	BROKEN
350	382	GRAY LIM
382	420	BROKEN
420	450	HARD GRAY LIM
450	510	BROKEN
510	545	LIME SHALE
545	570	LIME
570	585	BROKEN SANDS
585	680	RED CLAY SANDSTONE
680	740	BROKEN
740	780	GRAY LIM
780		GREY CLAY

RECEIVED
 DEC 22 1995
 TEXAS NATURAL RESOURCES
 CONSERVATION COMMISSION

9) CEMENTING DATA:

Cemented from	No. of Sacks Used
0 FT. TO 20 FT.	5
FT. TO FT.	

Method used: GRAVITY

Cemented by: ASSOCIATED DRILLING

Distance to septic field lines: 150 ft.

Method of verification of above distance:

MEASURED

10) SURFACE COMPLETION:

SURFACE SLAB INST.

11) WATER LEVEL:

STATIC LEVEL : 330' FT. DATE: 12/16/95

ARTESIAN FLOW: GPM. DATE:

12) PACKERS:	TYPE	DEPTH
	NEOPRENE/BURLAP	20
	NEOPRENE	620

13) TYPE PUMP:

SUBMERSIBLE

DEPTH TO PUMP: 600'

14) WELL TEST:

ESTIMATED

YIELD: 50+ GPM WITH FT DRAWDOWN AFTER HRS

15) WATER QUALITY:

TYPE OF WATER: TRINITY

DEPTH OF STRATA: 680-740

NO CHEMICAL ANALYSIS MADE

NO STRATA OF UNDESIRABLE WATER PENETRATED

COMPANY NAME: ASSOCIATED DRILLING CO.

WATER WELL DRILLER'S LICENSE NO.: 2939W

FOR TWC USE ONLY

ADDRESS: P.O. BOX 1060

CITY: MANHACCA

STATE: TX ZIP CODE: 78652

WELL NO. _____

LOCATED ON MAP _____

I HEREBY CERTIFY THAT THIS WELL WAS DRILLED BY ME (OR UNDER MY SUPERVISION) AND THAT EACH AND ALL OF THE STATEMENTS HEREIN ARE TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF. I UNDERSTAND THAT FAILURE TO COMPLETE ITEMS 1 THRU 15 WILL RESULT IN THE LOG(S) BEING RETURNED FOR COMPLETION AND RESUBMITTAL.

(signed)

[Signature]

(LICENSED WATER WELL DRILLER)

(signed)

[Signature]

(REGISTERED DRILLER TRAINER)

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORTTexas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

1) W.E. SHARKE FOOD ADDRESS 3600 SERENE HILLS DR AUSTIN TX 78738
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL:
County TRAVIS 3600 SERENE HILLS DR AUSTIN TX 78738 GRID # 58-41-1
(City) (Street, RFD or other) (State) (Zip)

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) WELL LOG:

Date Drilling:

Started 1-30 19 96Completed 1-31 19 96

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
<u>6 1/2</u>	Surface	<u>20</u>
<u>6</u>	<u>20</u>	<u>510</u>

7) DRILLING METHOD (Check): ☐ Driven
☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other _____

From (ft.)	To (ft.)	Description and color of formation material
<u>0</u>	<u>10</u>	<u>CALICHE</u>
<u>10</u>	<u>40</u>	<u>BLUE LIME</u>
<u>40</u>	<u>90</u>	<u>GRAY LIME</u>
<u>90</u>	<u>170</u>	<u>BLUE LIME</u>
<u>170</u>	<u>280</u>	<u>GRAY LIME</u>
<u>280</u>	<u>310</u>	<u>BLUE LIME</u>
<u>310</u>	<u>370</u>	<u>GRAY LIME</u>
<u>370</u>	<u>410</u>	<u>BLUE LIME</u>
<u>410</u>	<u>510</u>	<u>WHITE LIME, UNWATER</u>

8) Borehole Completion (Check): ☒ Open Hole ☐ Straight Wall
☐ Underreamed ☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval from _____ ft. to _____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
<u>4 1/2</u>	<u>N</u>	<u>PLASTIC</u>	<u>0</u>	<u>410</u>	
<u>4 1/2</u>	<u>N</u>	<u>PLASTIC PERF</u>	<u>410</u>	<u>510</u>	

9) CEMENTING DATA [Rule 338.44(1)]

Cemented from 0 ft. to 20 ft. No. of sacks used 6
_____ ft. to _____ ft. No. of sacks used _____

Method used SLURRYCemented by BIBLE BULLET BIBLEDistance to septic system field lines or other concentrated contamination 410 ft.

Method of verification of above distance _____

10) SURFACE COMPLETION

☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☒ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL:

Static level 330 ft. below land surface Date 1-30-96

Artesian flow _____ gpm. Date _____

12) PACKERS:

Type Depth

PLASTIC 410PLASTIC 20

13) TYPE PUMP:

☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____

Depth to pump bowls, cylinder, jet, etc., 410 ft.

14) WELL TESTS:

Type test: ☐ Pump ☒ Bailor ☐ Jetted ☐ EstimatedYield: 15 gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"Type of water: GLN Rock Depth of strata 410 ftWas a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete Items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME BIBLE DRILLING
(Type or print)

WELL DRILLER'S LICENSE NO. 2537 WP

addr. PO Box 1223
(Street or RFD)

Johnson City
(City)

TX 78636
(State) (Zip)

(Signed) Scotly Bible
(Licensed Well Driller)

(Signed) _____
(Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse Side

State of Texas WELL REPORT

OWNER VAN TREASE-owner/ DELBY GLASS (Name) (Street or RFD) (City) (State) (Zip)

LOCATION OF WELL:
County TRAVIS . 4-5 miles in N direction from BEE CAVE
(NE, SW, etc.) (Town)

Driller must complete the legal description below with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ LEGAL DESCRIPTION:

Section No. _____ Block No. _____ Township _____ Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____

☐ SEE ATTACHED MAP

58-49-3

3) TYPE OF WORK (Check):

☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):

☒ Domestic ☐ Industrial ☐ Monitor ☐ Public Supply
☐ Irrigation ☐ Test Well ☐ Injection ☐ De-Watering

5) DRILLING METHOD (Check):

☐ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored
☒ Air Rotary ☐ Cable Tool ☐ Other _____

6) WELL LOG:

Date Drilling:

Started 6/29/93 19__

Completed _____ 19__

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
<u>6</u>	<u>Surface</u>	<u>810</u>

7) BOREHOLE COMPLETION:

☐ Open Hole ☐ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____

If Gravel Packed give interval ... from _____ ft. to _____ ft.

From (ft.) To (ft.) Description and color of formation material

0-3 TOP SOIL

3-29 CALICHE

29-37 BLUE LIME

37-49 CALICHE

49-115 BLUE LIME

115-325 GREY LIME

325-510 BROWN & GREY LIME 15/16" STRIPS SOAPSTONE

510-535 WHITE LIME

535-600 BROWN LIME

600-615 LT. BROWN & TAN LIME

over

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
<u>50</u>	<u>N</u>	<u>PLASTIC</u>	<u>0</u>	<u>810</u>	<u>SDR1</u>

9) CEMENTING DATA [Rule 287.44(1)]

Cemented from 0 ft. to 40 ft. No. of Sacks Used 6
_____ ft. to _____ ft. No. of Sacks Used _____

Method used SLURRY

Cemented by C.T.D.

13) TYPE PUMP:

☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other _____

Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:

Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☒ Estimated
Yield: 40-50 gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"

Type of water? TRINITY Depth of strata 50'

Was a chemical analysis made? ☐ Yes ☒ No

10) SURFACE COMPLETION

☐ Specified Surface Slab Installed [Rule 287.44(2)(A)]
☒ Specified Steel Sleeve Installed [Rule 287.44(3)(A)]
☐ Pileless Adapter Used [Rule 287.44(3)(B)]
☐ Approved Alternative Procedure Used [Rule 287.71]

11) WATER LEVEL:

Static level _____ ft. below land surface Date _____
Artesian flow _____ gpm. Date _____

12) PACKERS:

Type Depth

PVC & BURLAP 40, 680 & 690

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME CENTRAL TEXAS DRILLING, INC. WELL DRILLER'S LICENSE NO. 1313
(Type or print)

ADDRESS 2300 S. R.R. 12 DRIPPING SPRINGS, TX. 78620
(Street or RFD) (City) (State) (Zip)

(ed) Frank
(Licensed Well Driller)

(Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only: Well No. 58-4/-1 Located on map _____



LEGEND

- 1. Contour lines
- 2. Spot heights
- 3. Elevation
- 4. Depression
- 5. Water
- 6. Marsh
- 7. Swamp
- 8. Forest
- 9. Cultivated land
- 10. Pasture
- 11. Bare land
- 12. Urban
- 13. Industrial
- 14. Railroad
- 15. Road
- 16. Trail
- 17. Boundary
- 18. Index

Van Trease



Bruce Waterfield

Carlson Eng.

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

Texas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, Tx. 78711-3087
512-239-0530

ATTENTION OWNER: Confidentiality
-Please Notice on Reverse Side

State of Texas
WELL REPORT

1) **ER** LAKEWAY MUNICIPAL UTILITIES DISTRICT ADDRESS 1907 LOHMAN'S CROSSING LAKEWAY TX. 78734
(NAME) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: 1907 LOHMAN'S CROSSING LAKEWAY TX. 78734 STATE GRID # 58-41-1
County TRAVIS (Street or RFD) (City) (State) (Zip)

3) TYPE OF WORK (Check):

☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):

☒ Monitor ☐ Environmental Soil Boring ☐ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5)

6) WELL LOG: MW-1

Date Drilling

Started: 2-5 19 96Completed: 2-14 19 96

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
7 7/8	0	380

7) DRILLING METHOD (Check):

☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other

From (ft.) To (ft.) Description and color of formation material

0 59 GREY TO LIGHT GREY LIMESTONE(S), WATER PRESENT ALONG
FRACTURES, CAVITIES, AND WEATHERED LAMINATIONS.

59 340 ALTERNATING TAN AND GREY LIMESTONE BEDS

340 342 TAN PORUS LIMESTONE

342 348 GREY MASSIVE LIMESTONE

348 380 TAN TO DARK TAN PORUS AND FOSSILIFEROUS LIMESTONE

8) Borehole Completion (Check):

☐ Open Hole ☐ Straight Wall

☐ Undersamed ☒ Gravel Packed ☐ Other

If gravel packed give interval ... from 351 ft. to 380 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if Commercial	Setting (ft.)		Gage Casing Screen
			From	To	
4	NEW	SCH. 40 PVC RISER	0	358	
4	NEW	SCH. 40 PVC SCREEN	358	378	0.010

9) CEMENTING DATA [RULE 338.44(1)]

Cemented from 0 ft. to 336 ft. No. of sacks used

Bentonite 336 ft. to 351 ft. No. of sacks used

Method used TREME

Cemented by ADRIAN SORIANO

Distance to septic system field lines ft.

Method of verification of above distance

13) TYPE PUMP: N/A

☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other

Depth to pump bowls, cylinder, jet, etc., ft.

14) WELL TESTS: N/A

Type test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated

Yield: gpm with ft. drawdown after hrs.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"

Type of water? Depth of strata

Was a chemical analysis made? ☐ Yes ☐ No

10) SURFACE COMPLETION

☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]

☐ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]

☐ Pileless Adapter Used [Rule 338.44(3)(b)]

☒ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL:

Static level 301.26 ft. below land surface Date 8-26-96

Artesian flow gpm. Date

12) PACKERS: N/A Type Depth

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete Items 1 thru 15 will result in the log(s) being returned for completion and resubmission.

COMPANY NAME GOEPROJECTS INTERNATIONAL
(Type or print)

WELL DRILLER'S LICENSE NO. 4943M

ESS 6834 CIRCLE DR.
(Street or RFD)

AUSTIN
(City)

TX.
(State)

78736
(Zip)

(Signed) ADRIAN SORIANO
(Licensed Well Driller)

(Signed)
(Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORTTexas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, Tx. 78711-3087
512-239-0530

1) OWNER LAKEWAY MUNICIPAL UTILITIES DISTRICT ADDRESS 1907 LOHMANS CROSSING LAKEWAY TX. 78734
(NAME) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL:
County TRAVIS 1907 LOHMANS CROSSING LAKEWAY TX 78734 STATE GRID # 58-41-1
(Street or RFD) (City) (State) (Zip)

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) _____

6) WELL LOG: MW-2
Date Drilling _____
Started: 3-19 19 96
Completed: 3-19 19 96

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
7 7/8	0	60

7) DRILLING METHOD (Check): ☐ Driven
☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jettied
☐ Other _____

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall
☐ Underreamed ☒ Gravel Packed ☐ Other _____
If gravel packed give interval ... from 27 ft. to 60 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perforated, Slotted, etc. Screen Mfg., If Commercial	Setting (ft.)		Gage Casing Screen
			From	To	
4	NEW	SCH 40 PVC RISER	43	32	
4	NEW	SCH 40 PVC SCREEN	32	52	0.010

9) CEMENTING DATA [RULE 338.44(1)]
Cemented from 0 ft. to 24 ft. No. of sacks used _____
Bentonite 24 ft. to 27 ft. No. of sacks used _____
Method used _____
Cemented by LEE GEBBERT
Distance to septic system field lines _____ ft.
Method of verification of above distance _____

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pileless Adapter Used [Rule 338.44(3)(b)]
☒ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL:
Static level 34.05 ft. below land surface Date 8-26-96
Artesian flow _____ gpm. Date _____

12) PACKERS: N/A Type _____ Depth _____

13) TYPE PUMP: N/A
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS: N/A
Type test: ☐ Pump ☐ Baker ☐ Jettied ☐ Estimated
Yield: _____ gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmission.

COMPANY NAME GOEPROJECTS INTERNATIONAL WELL DRILLER'S LICENSE NO. 2525W
(Type or print)

LESS 8834 CIRCLE DR AUSTIN TX. 78736
(Street or RFD) (City) (State) (Zip)

(Signed) LEE GEBBERT (Signed) _____
(Licensed Well Driller) (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORTTexas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, Tx. 78711-3087
512-239-0530

1) OWNER: <u>LAKEWAY MUNICIPAL UTILITIES DISTRICT</u>		ADDRESS: <u>1907 LOHMANS CROSSING</u>		<u>LAKEWAY</u>	<u>TX.</u>	<u>78734</u>																																
(NAME)		(Street or RFD)		(City)	(State)	(Zip)																																
2) ADDRESS OF WELL: County <u>TRAVIS</u>		<u>1907 LOHMANS CROSSING</u>	<u>LAKEWAY</u>	<u>TX</u>	<u>78734</u>	STATE GRID # <u>58-41-1</u>																																
		(Street or RFD)	(City)	(State)	(Zip)																																	
3) TYPE OF WORK (Check): <input checked="" type="checkbox"/> New Well <input type="checkbox"/> Deepening <input type="checkbox"/> Reconditioning <input type="checkbox"/> Plugging		4) PROPOSED USE (Check): <input checked="" type="checkbox"/> Monitor <input type="checkbox"/> Environmental Soil Boring <input type="checkbox"/> Domestic <input type="checkbox"/> Industrial <input type="checkbox"/> Irrigation <input type="checkbox"/> Injection <input type="checkbox"/> Public Supply <input type="checkbox"/> De-watering <input type="checkbox"/> Testwell If Public Supply well, were plans submitted to the TNRCC? <input type="checkbox"/> Yes <input type="checkbox"/> No				5)																																
6) WELL LOG: <u>MW-3</u> Date Drilling Started: <u>3-18</u> <u>19</u> <u>96</u> Completed: <u>3-18</u> <u>19</u> <u>96</u>		DIAMETER OF HOLE Dia. (in.) From (ft.) To (ft.) <u>7 7/8</u> <u>0</u> <u>60</u>		7) DRILLING METHOD (Check): <input type="checkbox"/> Driven <input checked="" type="checkbox"/> Air Rotary <input type="checkbox"/> Mud Rotary <input type="checkbox"/> Bored <input type="checkbox"/> Air Hammer <input type="checkbox"/> Cable Tool <input type="checkbox"/> Jetted <input type="checkbox"/> Other _____																																		
From(ft.) To(ft.) Description and color of formation material		8) Borehole Completion (Check): <input type="checkbox"/> Open Hole <input type="checkbox"/> Straight Wall <input type="checkbox"/> Underreamed <input checked="" type="checkbox"/> Gravel Packed <input type="checkbox"/> Other _____ If gravel packed give interval ... from <u>25</u> ft. to <u>60</u> ft.																																				
<u>0</u> <u>18</u> <u>TAN WEATHERED LIMESTONE</u>		CASING, BLANK PIPE, AND WELL SCREEN DATA: <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th rowspan="2">Dia. (in.)</th> <th rowspan="2">New or Used</th> <th rowspan="2">Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., If Commercial</th> <th colspan="2">Setting (ft.)</th> <th rowspan="2">Gage Casting Screen</th> </tr> <tr> <th>From</th> <th>To</th> </tr> <tr> <td><u>4</u></td> <td><u>NEW</u></td> <td><u>SCH. 40 PVC RISER</u></td> <td><u>+3</u></td> <td><u>30</u></td> <td></td> </tr> <tr> <td><u>4</u></td> <td><u>NEW</u></td> <td><u>SCH. 40 PVC SCREEN</u></td> <td><u>32</u></td> <td><u>50</u></td> <td><u>0.010</u></td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>					Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., If Commercial	Setting (ft.)		Gage Casting Screen	From	To	<u>4</u>	<u>NEW</u>	<u>SCH. 40 PVC RISER</u>	<u>+3</u>	<u>30</u>		<u>4</u>	<u>NEW</u>	<u>SCH. 40 PVC SCREEN</u>	<u>32</u>	<u>50</u>	<u>0.010</u>												
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<u>18</u> <u>30.5</u> <u>GREY LIMESTONE, WET AT 23'</u>																																						
<u>30.5</u> <u>55</u> <u>TAN AND GREY LIMESTONE</u>																																						
<u>55</u> <u>60</u> <u>GREY MASSIVE LIMESTONE</u>																																						
13) TYPE PUMP: <u>N/A</u> <input type="checkbox"/> Turbine <input type="checkbox"/> Jet <input type="checkbox"/> Submersible <input type="checkbox"/> Cylinder <input type="checkbox"/> Other _____ Depth to pump bowls, cylinder, jet, etc., _____ ft.		9) CEMENTING DATA [RULE 338.44(1)] Cemented from <u>0</u> ft. to <u>20</u> ft. No. of sacks used _____ Bentonite <u>20</u> ft. to <u>25</u> ft. No. of sacks used _____ Method used _____ Cemented by <u>LEE GEBBERT</u> Distance to septic system field lines _____ ft. Method of verification of above distance _____																																				
14) WELL TESTS: <u>N/A</u> Type test: <input type="checkbox"/> Pump <input type="checkbox"/> Baker <input type="checkbox"/> Jetted <input type="checkbox"/> Estimated Yield: _____ gpm with _____ ft. drawdown after _____ hrs.		10) SURFACE COMPLETION <input type="checkbox"/> Specified Surface Slab Installed [Rule 338.44(2)(A)] <input type="checkbox"/> Specified Steel Sleeve Installed [Rule 338.44(3)(A)] <input type="checkbox"/> Pileless Adapter Used [Rule 338.44(3)(b)] <input checked="" type="checkbox"/> Approved Alternative Procedure Used [Rule 338.71]																																				
15) WATER QUALITY: Did you knowingly penetrate any strata which contained undesirable constituents? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, submit "REPORT OF UNDESIRABLE WATER" Type of water? _____ Depth of strata _____ Was a chemical analysis made? <input type="checkbox"/> Yes <input type="checkbox"/> No		11) WATER LEVEL: Static level <u>40.9</u> ft. below land surface Date <u>8-26-96</u> Artesian flow _____ gpm. Date _____																																				
		12) PACKERS: <u>N/A</u> Type _____ Depth _____																																				
I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.																																						
COMPANY NAME <u>GOEPROJECTS INTERNATIONAL</u>		WELL DRILLER'S LICENSE NO. <u>2525W</u>																																				
(Type or print)																																						
ESS <u>8834 CIRCLE DR.</u>		<u>AUSTIN</u>		<u>TX.</u>	<u>78735</u>																																	
(Street or RFD)		(City)		(State)	(Zip)																																	
(Signed) <u>LEE GEBBERT</u>		(Signed) _____																																				
(Licensed Well Driller)		(Registered Driller Trainee)																																				

Please attach electric log, chemical analysis, and other pertinent information, if available.

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

Texas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, Tx. 78711-3087
512-230-0530ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORT

1) LAKEWAY MUNICIPAL UTILITIES DISTRICT ADDRESS 1907 LOHMANS CROSSING LAKEWAY TX 78734
(NAME) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: County TRAVIS 1907 LOHMANS CROSSING LAKEWAY TX 78734 STATE GRID # 58-41-1
(Street or RFD) (City) (State) (Zip)

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5)

6) WELL LOG: MW-4
Date Drilling _____
Started: 3-14 19 96
Completed: 3-15 19 96

DIAMETER OF HOLE		
Dia. (In.)	From (ft.)	To (ft.)
7 7/8	0	380

7) DRILLING METHOD (Check): ☐ Driven ☒ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☐ Other _____

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☒ Gravel Packed ☐ Other _____
If gravel packed give interval ... from 350 ft. to 380 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (In.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if Commercial	Setting (ft.)		Cage Casting Screen
			From	To	
4	NEW	SCH 40 PVC RISER	0	358	
4	NEW	SCH 40 PVC SCREEN	358	378	0.010

9) CEMENTING DATA [RULE 338.44(1)]
Cemented from 0 ft. to 345 ft. No. of sacks used _____
Bentonite 345 ft. to 350 ft. No. of sacks used _____
Method used _____
Cemented by ADRIAN SORIANO
Distance to septic system field lines _____ ft.
Method of verification of above distance _____

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pileless Adapter Used [Rule 338.44(3)(b)]
☒ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL:
Static level >305 ft. below land surface Date 8-26-96
Artesian flow _____ gpm. Date _____

12) PACKERS: N/A Type _____ Depth _____

13) TYPE PUMP: N/A
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other _____
Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS: N/A
Type test: ☐ Pump ☐ Baker ☐ Jetted ☐ Estimated
Yield _____ gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME GOEPROJECTS INTERNATIONAL WELL DRILLER'S LICENSE NO. 2525W
(Type or print)

ESS 8434 CIRCLE DR. AUSTIN TX 78736
(Street or RFD) (City) (State) (Zip)

(Signed) ADRIAN SORIANO (Signed) _____
(Licensed Well Driller) (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

**ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse Side**

State of Texas
WELL REPORT

Texas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, Tx. 78711-3087
512-239-0530

1)	IER <u>LAKEWAY MUNICIPAL UTILITIES DISTRICT</u> (NAME)	ADDRESS <u>1007 LOHMANS CROSSING</u> (Street or RFD)	LAKESIDE TX <u>78734</u> (City) (State) (Zip)																																
2)	ADDRESS OF WELL: County <u>TRAVIS</u>	<u>1007 LOHMANS CROSSING</u> (Street or RFD)	LAKESIDE TX <u>78734</u> (City) (State) (Zip)																																
3)	TYPE OF WORK (Check): <input checked="" type="checkbox"/> New Well <input type="checkbox"/> Deepening <input type="checkbox"/> Reconditioning <input type="checkbox"/> Plugging	4) PROPOSED USE (Check): <input checked="" type="checkbox"/> Monitor <input type="checkbox"/> Environmental Soil Boring <input type="checkbox"/> Domestic <input type="checkbox"/> Industrial <input type="checkbox"/> Irrigation <input type="checkbox"/> Injection <input type="checkbox"/> Public Supply <input type="checkbox"/> De-watering <input type="checkbox"/> Testwell If Public Supply well, were plans submitted to the TNRCC? <input type="checkbox"/> Yes <input type="checkbox"/> No	5)																																
6)	WELL LOG: MW-5 Date Drilling _____ Started: <u>3-18</u> <u>19</u> <u>96</u> Completed: <u>3-18</u> <u>19</u> <u>96</u>	DIAMETER OF HOLE Dia. (in.) From (ft.) To (ft.) <u>7 7/8</u> <u>0</u> <u>60</u>	7) DRILLING METHOD (Check): <input checked="" type="checkbox"/> Air Rotary <input type="checkbox"/> Mud Rotary <input type="checkbox"/> Bored <input type="checkbox"/> Air Hammer <input type="checkbox"/> Cable Tool <input type="checkbox"/> Jetted <input type="checkbox"/> Other _____																																
From(ft.) To(ft.) Description and color of formation material		8) Borehole Completion (Check): <input type="checkbox"/> Open Hole <input type="checkbox"/> Straight Wall <input type="checkbox"/> Underreamed <input checked="" type="checkbox"/> Gravel Packed <input type="checkbox"/> Other _____ If gravel packed give interval ... from <u>30.5</u> ft. to <u>60</u> ft.																																	
0 15 WHITE IRON STAINED LIMESTONE		CASING, BLANK PIPE, AND WELL SCREEN DATA:																																	
15 31 YELLOW/TANGREY LIMESTONE, FIRST WATER AT 15'																																			
31 32 GREENISH GREY LIMESTONE, SATURATED																																			
32 40 TANGREY/DARK GREEN LIMESTONE WITH CHERT																																			
40 60 GREY/TAN LIMESTONE																																			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Dia. (in.)</th> <th rowspan="2">New or Used</th> <th rowspan="2">Steel, Plastic, etc. Perf., Slotted, etc. Screen Mig., If Commercial</th> <th colspan="2">Setting (ft.)</th> <th rowspan="2">Gage Casting Screen</th> </tr> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>NEW</td> <td>SCH. 40 PVC RISER</td> <td>+3</td> <td>35.5</td> <td></td> </tr> <tr> <td>4</td> <td>NEW</td> <td>SCH. 40 PVC SCREEN</td> <td>35.5</td> <td>55.5</td> <td>0.010</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mig., If Commercial	Setting (ft.)		Gage Casting Screen	From	To	4	NEW	SCH. 40 PVC RISER	+3	35.5		4	NEW	SCH. 40 PVC SCREEN	35.5	55.5	0.010												
Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mig., If Commercial	Setting (ft.)				Gage Casting Screen																												
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4	NEW	SCH. 40 PVC RISER	+3	35.5																															
4	NEW	SCH. 40 PVC SCREEN	35.5	55.5	0.010																														
13) TYPE PUMP: N/A <input type="checkbox"/> Turbine <input type="checkbox"/> Jet <input type="checkbox"/> Submersible <input type="checkbox"/> Cylinder <input type="checkbox"/> Other _____ Depth to pump bowls, cylinder, jet, etc., _____ ft.--		9) CEMENTING DATA [RULE 338.44(1)] Cemented from <u>0</u> ft. to <u>25</u> ft. No. of sacks used _____ Bentonite <u>25</u> ft. to <u>30.5</u> ft. No. of sacks used _____ Method used _____ Cemented by <u>LEE GEBBERT</u> Distance to septic system field lines _____ ft. Method of verification of above distance _____																																	
14) WELL TESTS: N/A Type test: <input type="checkbox"/> Pump <input type="checkbox"/> Baker <input type="checkbox"/> Jetted <input type="checkbox"/> Estimated Yield: _____ gpm with _____ ft. drawdown after _____ hrs.		10) SURFACE COMPLETION <input type="checkbox"/> Specified Surface Slab Installed [Rule 338.44(2)(A)] <input type="checkbox"/> Specified Steel Sleeve Installed [Rule 338.44(3)(A)] <input type="checkbox"/> Pitless Adapter Used [Rule 338.44(3)(b)] -- <input checked="" type="checkbox"/> Approved Alternative Procedure Used [Rule 338.71]																																	
15) WATER QUALITY: Did you knowingly penetrate any strata which contained undesirable constituents? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, submit "REPORT OF UNDESIRABLE WATER" Type of water? _____ Depth of strata _____ Was a chemical analysis made? <input type="checkbox"/> Yes <input type="checkbox"/> No		11) WATER LEVEL: Static level <u>42.97</u> ft. below land surface Date <u>8-26-96</u> Artesian flow _____ gpm. Date _____																																	
12) PACKERS: N/A Type _____ Depth _____																																			

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME GOEPROJECTS INTERNATIONAL
(Type or print)

WELL DRILLER'S LICENSE NO. 2525W

8834 CIRCLE DR.
(Street & RFD)

AUSTIN	TX	78736
(City)	(State)	(Zip)

(Signed) LEE GEBBERT
(Licensed Well Driller)

(Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

Texas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, Tx. 78711-3087
512-239-0530

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse Side

State of Texas
WELL REPORT

1) **ER** LAKEWAY MUNICIPAL UTILITIES DISTRICT **ADDRESS** 1907 LOHMANS CROSSING LAKEWAY TX. 78734
(NAME) (Street or RFD) (City) (State) (Zip)

2) **ADDRESS OF WELL:**
County TRAVIS 1907 LOHMANS CROSSING LAKEWAY TX 78734 **STATE GRID #** 58-41-1
(Street or RFD) (City) (State) (Zip)

3) **TYPE OF WORK (Check):**
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) **PROPOSED USE (Check):** ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) **WELL LOG:** MW-6
Date Drilling _____
Started: 3-11 19 96
Completed: 3-13 19 96

6) **DIAMETER OF HOLE**
Dia. (in.) From (ft.) To (ft.)
7 7/8 0 380

7) **DRILLING METHOD (Check):** ☐ Driven
☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other _____

8) **Borehole Completion (Check):** ☐ Open Hole ☐ Straight Wall
☐ Undersamed ☒ Gravel Packed ☐ Other _____
If gravel packed give interval ... from 350 ft. to 380 ft.

9) **CASING, BLANK PIPE, AND WELL SCREEN DATA:**

Dia. (in.)	New or Used	Steel, Plastic, etc. Perl., Slotted, etc. Screen Mig., if Commercial	Setting (ft.)		Gage Casing Screen
			From	To	
4	NEW	SCH. 40 PVC RISER	0	358	
4	NEW	SCH. 40 PVC SCREEN	358	378	0.010

10) **CEMENTING DATA (RULE 338.44(1))**
Cemented from 0 ft. to 344 ft. No. of sacks used _____
Bentonite 344 ft. to 350 ft. No. of sacks used _____
Method used TREME
Cemented by ADRIAN SORIANO
Distance to septic system field lines _____ ft.
Method of verification of above distance _____

11) **SURFACE COMPLETION**
☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☒ Approved Alternative Procedure Used [Rule 338.71]

12) **WATER LEVEL:**
Static level 42.87 ft. below land surface Date 6-26-96
Artesian flow _____ gpm. Date _____

13) **PACKERS:** N/A Type _____ Depth _____

14) **TYPE PUMP:** N/A
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., _____ ft.

15) **WELL TESTS:** N/A
Type test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: _____ gpm with _____ ft. drawdown after _____ hrs.

16) **WATER QUALITY:**
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete Items 1 thru 15 will result in the log(s) being returned for completion and resubmission.

COMPANY NAME GOEPROJECTS INTERNATIONAL WELL DRILLER'S LICENSE NO. 4843M
(Type or print)

333 8034 CIRCLE DR. AUSTIN TX 78736
(Street or RFD) (City) (State) (Zip)

(Signed) ADRIAN SORIANO (Signed) _____
(Licensed Well Driller) (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse Side

State of Texas
WELL REPORT

Texas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, Tx. 78711-3087
512-239-0530

1) LAKEWAY MUNICIPAL UTILITIES DISTRICT ADDRESS 1907 LOHMANS CROSSING LAKEWAY TX. 78734
(NAME) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: 1907 LOHMANS CROSSING LAKEWAY TX 78734 STATE GRID # 58-41-1
County TRAVIS (Street or RFD) (City) (State) (Zip)

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) WELL LOG: MW-7

Date Drilling _____

Started: 3-18 19 96

Completed: 3-18 19 96

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
7 7/8	0	60

7) DRILLING METHOD (Check): ☐ Driven
☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other _____

From (ft.)	To (ft.)	Description and color of formation material
0	48	LIGHT TAN TO GREY LIMESTONE, FIRST WATER AT 27'
48	50	GREY MASSIVE LIMESTONE
50	56	LIGHT GREY PORUS LIMESTONE, WET
56	60	GREY MASSIVE LIMESTONE

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall
☐ Underreamed ☒ Gravel Packed ☐ Other _____
If gravel packed give interval ... from 31 ft. to 60 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if Commercial	Setting (ft.)		Gage Casting Screen
			From	To	
4	NEW	SCH. 40 PVC RISER	+3	36	
4	NEW	SCH. 40 PVC SCREEN	36	56	0.010

9) CEMENTING DATA [RULE 338.44(1)]

Cemented from 0 ft. to 28 ft. No. of sacks used _____

Bentonite 28 ft. to 31 ft. No. of sacks used _____

Method used _____

Cemented by LEE GEBBERT

Distance to septic system field lines _____ ft.

Method of verification of above distance _____

13) TYPE PUMP: N/A
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS: N/A
Type test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: _____ gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☐ No

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☐ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☒ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL:
Static level 42.97 ft. below land surface Date 8-26-96
Artesian flow _____ gpm. Date _____

12) PACKERS: N/A Type _____ Depth _____

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME GOEPROJECTS INTERNATIONAL WELL DRILLER'S LICENSE NO. 2525W
(Type or print)

IS 6834 CIRCLE DR. AUSTIN TX 78736
(Street or RFD) (City) (State) (Zip)

(Signed) LEE GEBBERT (Signed) _____
(Licensed Well Driller) (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

copy by _____
to the _____
Water Department Board
Box 1.
in, Texas 78711

State of Texas
WATER WELL REPORT

For TWDB use only
Well No. 58-33-7M
Located on map 425
Received: 7/1/71

#1

OWNER:
Person having well drilled Arnold Buckhanger Address 511 East 41st Street Austin Texas
(Name) (Street or RFD) (City) (State)

Landowner Same Address Same
(Name) (Street or RFD) (City) (State)

LOCATION OF WELL:
County Texas _____ miles in NW direction from Bee Caves, TxDOS
(N.E., S.W., etc.) (Town)

Locate by sketch map showing landmarks, roads, creeks, survey number, etc.*
See Back

(Use reverse side if necessary)

Give legal location with distances and directions from adjacent sections or survey lines.

Labor _____ League _____
Block _____ Survey _____
Abstract No. _____
(NW 1/4 NE 1/4 SW 1/4 SE 1/4) of Section _____

TYPE OF WORK (Check):
New Well ☒ Deepening _____
Reconditioning _____ Plugging _____

4) PROPOSED USE (Check):
Domestic ☒ Industrial _____ Municipal _____
Irrigation _____ Test Well _____ Other _____

5) TYPE OF WELL (Check):
Rotary ☒ Driven _____ Dug _____
Cable _____ Jetted _____ Bored _____

ELL LOG:
Diameter of hole 6 1/4 in. Depth drilled 240 ft. Depth of completed well 240 ft. Date drilled 7-12-71
All measurements made from 0 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
0	2	Top Black Soil
2	48	Clay
48	7	Blue Limestone
7	16	White Limestone
16	209	White Water Sand
209	240	Hard White Limestone

9) CASING:
Type: Old ☒ New _____ Steel ☒ Plastic _____ Other _____
Cemented from 0 ft. to 45 ft.
Diameter (inches) _____ Setting From (ft.) _____ To (ft.) _____ Casing _____
7" O.D. 0 45
7" in a 6 1/4 in hole

10) SCREEN:
Type _____
Perforated _____ Slotted _____
Diameter (inches) _____ Setting From (ft.) _____ To (ft.) _____ Slot Size _____

(Use reverse side if necessary)

COMPLETION (Check):
Straight well ☒ Gravel packed _____ Other _____
Under reamed _____ Open Hole _____

WATER LEVEL:
Static level 100 ft. below land surface Date 7-12-71
Artesian pressure _____ lbs. per square inch Date _____
Depth to pump bowls, cylinder, jet, etc., _____ ft. below land surface.

11) WELL TESTS:
Was a pump test made? Yes _____ No _____ If yes, by whom? gelled 30 gpm
Yield: _____ gpm with _____ ft. drawdown after _____ hrs.
Boiler test _____ gpm with _____ ft. drawdown after _____ hrs.
Artesian flow _____ gpm
Temperature of water _____

12) WATER QUALITY:
Was a chemical analysis made? Yes _____ No _____
Did any strata contain undesirable water? Yes _____ No _____
Type of water? _____ depth of strata _____

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

DATE E.A. Glass Water Well Drillers Registration No. 488
(Type or Print)

ADDRESS P.O. Box 1527 AUSTIN Texas 78711
(Street or RFD) (City) (State)

Signature E.A. Glass CENTRAL TEXAS DRILLING Co.
(Water Well Driller) (Company Name)

Attach electric log, chemical analysis, and other pertinent information, if available.

Additional instructions on reverse side.

HW-2-22-51

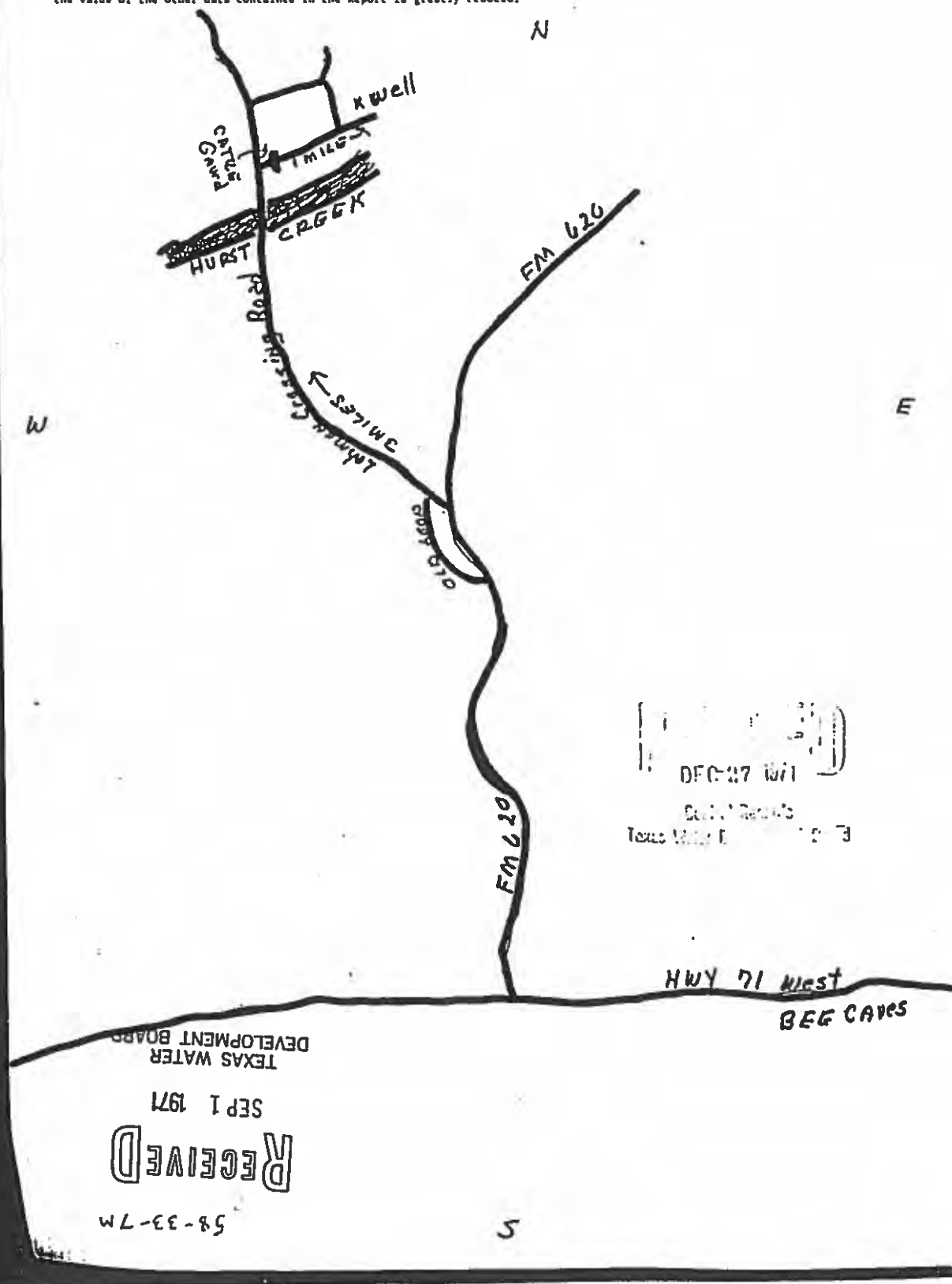
2) LOCATION OF WELL:

The sketch showing the well location must be as accurate as possible, showing landmarks, in sufficient detail so that the well may be plotted on a General Highway Map of the county in which the well is located.

Reference points from which distances are measured and directions given should be of a permanent nature (e.g. highway intersections, center of towns, river and creek bridges, railroad crossings). The distance and direction from the nearest town should always be indicated.

When giving a legal description include a sketch showing location of the well within the described area, e.g. survey abstract.

Information furnished in Section 2) of the TWDBE-GW-55 is very important. Unless the well can be accurately located on a map the value of the other data contained in the Report is greatly reduced.



Send original copy by certified mail to the Texas Water Development Board P. O. Box 12386 Austin, Texas 78711

State of Texas

WATER WELL REPORT

For TWDB use only
Well No. _____
Located on map _____
Received: _____

#1

1) OWNER:
Person having well drilled J. Paul Harris Address 1116 Belmont Highway Austin Texas
(Name) (Street or RFD) (City) (State)
Landowner Same Address Same (City) (State)
(Name) (Street or RFD)

2) LOCATION OF WELL:
County Travis _____ miles in NW direction from Bel Paso Texas
(N.E., S.W., etc.) (Town)
Locate by sketch map showing landmarks, roads, creeks, hiway number, etc.*
Give legal location with distances and directions from adjacent sections or survey lines.
Labor _____ League _____
Block _____ Survey _____
Abstract No. _____
(NW, NE, SW, SE) of Section _____
(Use reverse side if necessary)

3) TYPE OF WORK (Check):
New Well ☒ Deepening _____
Reconditioning _____ Plugging _____

4) PROPOSED USE (Check):
Domestic ☒ Industrial _____ Municipal _____
Irrigation _____ Test Well _____ Other _____

5) TYPE OF WELL (Check):
Rotary ☒ Driven _____ Dug _____
Cable _____ Jetted _____ Bored _____

6) WELL LOG:
Diameter of hole 6 1/4 in. Depth drilled 240 ft. Depth of completed well 240 ft. Date drilled 8-3-71
All measurements made from 0 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
0-1		Top Soil
1-46		Pluche
46-105		Blue Limestone
105-191		White Limestone
191-203		White Water Sand
203-240		Hard White Limestone

9) CASING:
Type: Old ☒ New _____ Steel ☒ Plastic _____ Other _____
Cemented from 0 ft. to 51 ft.
Diameter (inches) _____ Setting From (ft.) _____ To (ft.) _____ Casing _____
7" O.D. 0 51

10) SCREEN:
Type _____
Perforated _____ Slotted _____
Diameter (inches) _____ Setting From (ft.) _____ To (ft.) _____ Slot Size _____

7) COMPLETION (Check):
Straight well ☒ Gravel packed _____ Other _____
Under reamed _____ Open Hole _____

8) WATER LEVEL:
Static level 80 ft. below land surface Date 8-3-71
Artesian pressure _____ lbs. per square inch Date _____
Depth to pump bowls, cylinder, jet, etc., _____ ft. below land surface.

11) WELL TESTS:
Was a pump test made? Yes _____ No _____ If yes, by whom? J. Paul Harris
Yield: _____ gpm with _____ ft. drawdown after _____ hrs.
Bailer test _____ gpm with _____ ft. drawdown after _____ hrs.
Artesian flow _____ gpm
Temperature of water _____

12) WATER QUALITY:
Was a chemical analysis made? Yes _____ No _____
Did any strata contain undesirable water? Yes _____ No _____
Type of water? _____ depth of strata _____

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME F.A. Glass Water Well Drillers Registration No. 488
(Type or Print)
ADDRESS P.O. Box 1527 Austin Texas
(Street or RFD) (City) (State)
(Signed) F.A. Glass Central Texas Drilling Co.
(Water Well Driller) (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

*Additional instructions on reverse side.

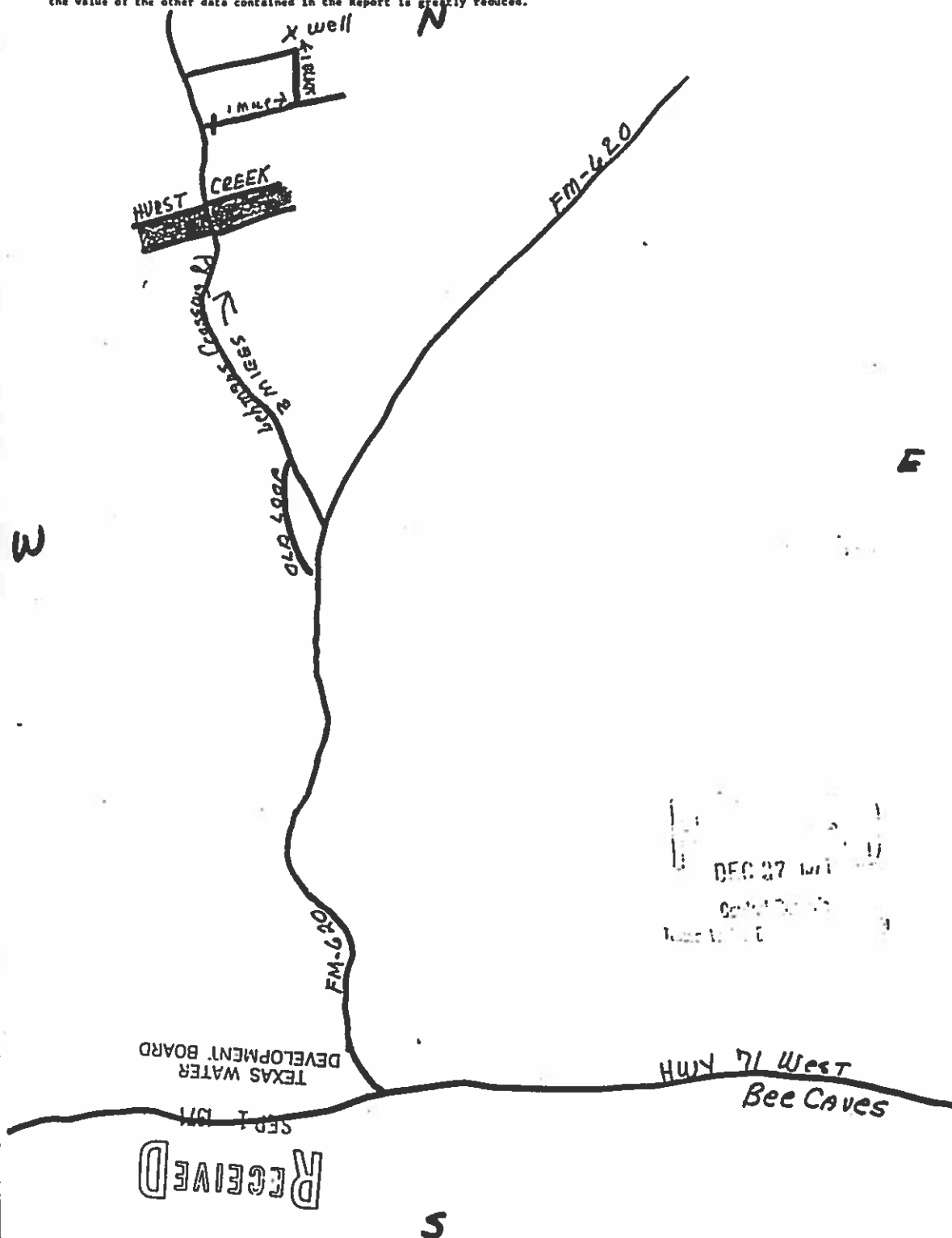
2) LOCATION OF WELL:

The sketch showing the well location must be as accurate as possible, showing landmarks, in sufficient detail so that the well may be plotted on a General Highway Map of the county in which the well is located.

Reference points from which distances are measured and directions given should be of a permanent nature (e.g. highway intersections, center of towns, river and creek bridges, railroad crossings). The distance and direction from the nearest town should always be indicated.

When giving a legal description include a sketch showing location of the well within the described area, e.g. survey abstract.

Information furnished in Section 2) of the TUDSE-CU-53 is very important. Unless the well can be accurately located on a map the value of the other data contained in the Report is greatly reduced.



Send original copy by certified mail to the Texas Water Development Board P. O. Box 12386 Austin, Texas 78711

State of Texas

WATER WELL REPORT

For TWDB use only
Well No. TX-41-11
Located on map 11
Received: 7/1

1) OWNER:
Person having well drilled Otis Finkelstein Address 1119 Guiney Dr., Houston, Tx.
(Name) (Street or RFD) (City) (State)
Landowner Same Address _____
(Name) (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Tarrant 28 miles in S.W. direction from Austin
(N.E., S.W., etc.) (Town)
Locate by sketch map showing landmarks, roads, creeks, highway number, etc.*
or Give legal location with distances and directions from adjacent sections or survey lines.
Labor _____ League _____
Block _____ Survey _____
Abstract No. _____
(N½ NE¼ SW¼ SE¼) of Section _____
(Use reverse side if necessary)

3) TYPE OF WORK (Check):
New Well ☒ Deepening _____
Reconditioning _____ Plugging _____
4) PROPOSED USE (Check):
Domestic ☒ Industrial _____ Municipal _____
Irrigation _____ Test Well _____ Other _____
5) TYPE OF WELL (Check):
Ratary ☒ Driven _____ Dug _____
Cable _____ Jetted _____ Bored _____

6) WELL LOG:
Diameter of hole 6 1/4 in. Depth drilled 214 ft. Depth of completed well 214 ft. Date drilled 10/31/71
All measurements made from 0 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
0 - 1		Surface
1 - 18		Yellow Limestone
18 - 62		Blue Limestone (hard)
62 - 65		Discontinuity
65 - 128		Hard Gray Limestone
128 - 131		Discontinuity
131 - 162		Gray Limestone
162 - 202		Sand (loose)
202 - 214		Gray Limestone

9) CASING:
Type: Old _____ New ☒ Steel _____ Plastic _____ Other _____
Cemented from 0 ft. to 26 ft.
Diameter (inches) _____ Setting From (ft.) _____ To (ft.) _____ Casing _____
7 O.D. 1 above - 26

10) SCREEN:
Type _____
Perforated _____ Slotted _____
Diameter (inches) _____ Setting From (ft.) _____ To (ft.) _____ Slot Size _____

7) COMPLETION (Check):
Straight well ☒ Crevell packed _____ Other _____
Under reamed _____ Open Hole _____
(Use reverse side if necessary)

8) WATER LEVEL:
Static level 60 ft. below land surface Date 10/31/71
Artesian pressure _____ lbs. per square inch Date _____
Depth to pump bowls, cylinder, jet, etc., 185 ft. below land surface.

11) WELL TESTS:
Was a pump test made? Yes ☒ No _____ If yes, by whom? _____
Yield: _____ gpm with _____ ft. drawdown after _____ hrs.
Ballor test 14 gpm with 100 ft. drawdown after 1/2 hrs.
Artesian flow 14 gpm
Temperature of water _____

12) WATER QUALITY:
Was a chemical analysis made? Yes ☒ No _____
Did any strata contain undesirable water? Yes ☒ No _____
Type of water? good depth of strata 40

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Delby A. Glass Water Well Drillers Registration No. 1290
(Type or Print)
ADDRESS Box 94-N Austin, Texas
(Street or RFD) (City) (State)
(Signed) D. A. Glass W. Hugh Glass Sons
(Water Well Driller) (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

*Additional instructions on reverse side.

TWDB-CW-33

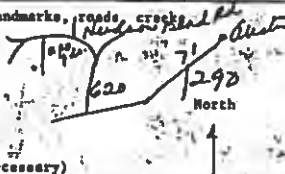
Send original copy by
certified mail to the
Texas Water Development Board
P.O. Box 13087
Austin, Texas 78711

State of Texas
WATER WELL REPORT

For TWDB use only
Well No. 58-41-1
Located on map YES
Received: 75-1

1) OWNER:
Person having well drilled Paul Keller (Name)
Address 2055 E. 12th St. (Street or RFD) Austin (City) (State)
Landowner Same as above (Name)
Address 2055 E. 12th St. (Street or RFD) Austin (City) (State)

2) LOCATION OF WELL:
County Tarrant 25 miles in N.W. direction from North (Town)
(N.E., S.W., etc.)

Locate by sketch map showing landmarks, roads, creek, highway number, etc.

(Use reverse side if necessary)

OR Give legal location with distances and directions from adjacent sections or survey lines:
Labor None League
Block None Survey
Abstract No. None
(N1/4, NE1/4, SW1/4, SE1/4) of Section None

3) TYPE OF WORK (Check):
New Well ☒ Deepening ☐
Reconditioning ☐ Plugging ☐
4) PROPOSED USE (Check):
Domestic ☒ Industrial ☐
Irrigation ☐ Test Well ☐ Other ☐
5) TYPE OF WELL (Check):
Rotary ☒ Driven ☐ Dug ☐
Cable ☐ Jetted ☐ Bored ☐

6) WELL LOG:
Diameter of hole 6 in. Depth drilled 425 ft. Depth of completed well 425 ft. Date drilled 4/75
All measurements made from 7 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
<u>0</u>	<u>18</u>	<u>Rock</u>
<u>18</u>	<u>180</u>	<u>Blue lime</u>
<u>180</u>	<u>295</u>	<u>Grey lime</u>
<u>295</u>	<u>305</u>	<u>White lime</u>
<u>305</u>	<u>365</u>	<u>Grey lime</u>
<u>365</u>	<u>390</u>	<u>White lime</u>
<u>390</u>	<u>400</u>	<u>Water</u>
<u>400</u>	<u>425</u>	<u>White lime</u>

9) Casing:
Type: Old New ☐ Steel ☐ Plastic ☐ Other ☐
Cemented from 0 ft. to 21 ft.

Diameter (inches) 7.00 Setting (ft.) 0 to 21 Casing (ft.) 0 to 21

10) SCREEN:
Type: Perforated Slotted ☐
Diameter (inches) 7.00 Setting (ft.) 0 to 21 Slot Size None

7) COMPLETION (Check):
Straight well ☒ Gravel packed ☐ Other ☐
Under reamed ☐ Open hole ☒

8) WATER LEVEL:
Static level 275 ft. below land surface Date 4/75
Artesian pressure None lbs. per square inch Date None
Depth to pump bowl, cylinder, jet, etc. None ft.
Below land surface.

11) WELL TESTS:
Was a pump test made? ☒ Yes ☐ No
Yield 10 gpm with 50 ft. drawdown after 12 hrs.
Ball test 24 gpm with 50 ft. drawdown after None hrs.
Artesian flow None gpm
Temperature of water None °F

12) WATER QUALITY:
Was a chemical analysis made? ☒ Yes ☐ No
Did any strata contain undesirable water? ☒ Yes ☐ No
Type of water 10 ft. Depth of strata 10 ft.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.
Richard R. B. B. (Type or Print)
Address Rt. 1, Box 10, 7508 (Street or RFD) Austin (City) (State)
Signed R. B. B. (Water Well Driller) (Company Name) None

Please attach electric log, chemical analysis, and other pertinent information, if available.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORTTexas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

1) OWNER RON WHITE/CARL MORRIS-BUILDER ADDRESS 3520 GARY DR. PLANO TX 75023
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: County TRAVIS 3304 SERENE HILLS DR. LAKEWAY TX 78734 GRID # 57-48-3
(Street, RFD or other) (City) (State) (Zip)

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boding ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
 If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

6) WELL LOG:

Date Drilling:
 Started 9/29/00 19__
 Completed 10/4/00 19__

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
8	Surface	10
7	10	800

7) DRILLING METHOD (Check): ☐ Driven
☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other _____

From (ft.)	To (ft.)	Description and color of formation material
0	1	TOPSOIL
1	65	YELLOW LIMESTONE
65	520	BLUE LIMESTONE
520	697	GREY LIMESTONE
697	700	RED CLAY
700	730	GREY LIMESTONE
730	740	RED SAND
740	778	RED ROCK
778	800	RED SHALE

8) Borehole Completion (Check): ☒ Open Hole ☐ Straight Wall
☐ Underreamed ☐ Gravel Packed ☐ Other _____
 If Gravel Packed give interval ... from _____ ft. to _____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New Or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
4.5	N	PLASTIC	0	800	

9) CEMENTING DATA [Rule 338.44(1)]

Cemented from 0 ft. to 10 ft. No. of sacks used 9
 _____ ft. to _____ ft. No. of sacks used _____
 Method used POURED
 Cemented by REX BIBLE
 Distance to septic system field lines or other concentrated contamination X ft.
 Method of verification of above distance NOT YET INSTALLED

13) TYPE PUMP:

☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____

Depth to pump bowls, cylinder, jet, etc., 740 ft.

14) WELL TESTS:

Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☒ Estimated
 Yield: 15 gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"

Type of water? _____ Depth of strata _____

Was a chemical analysis made? ☐ Yes ☒ No

10) SURFACE COMPLETION

☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☒ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL

Static Level 501 ft. below land surface Date 10/10/00
 Artesian flow _____ Gpm Date _____

12) PACKERS:

	Type	Depth
1	PLASTIC	10
1	PLASTIC	730

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME BEE CAVE DRILLING

(Type or print)

WELL DRILLER'S LICENSE NO. 2750 WPKLADDRESS 10324 W. BEE CAVE RD

(Street or RFD)

AUSTIN

(City)

TX

(State)

78733

(Zip)

(Signed) _____

(Licensed Well Driller)

(Signed) _____

(L.C. IL(Registered Driller/Trainer))

SEQ #

Please attach electric log, chemical analysis, and other pertinent information, if available.

STATE OF TEXAS WELL REPORT for Tracking #15509

Owner:	John Allen	Owner Well #:	No Data
Address:	111 Hurst Creek Lakeway, Tx 78734	Grid #:	58-41-1
Well Location:	111 Hurst Creek Lakeway, TX 78734	Latitude:	30° 22' 05" N
Well County:	Travis	Longitude:	097° 58' 48" W
Elevation:	No Data	GPS Brand Used:	Google Earth
Type of Work:	New Well	Proposed Use:	Domestic

Drilling Date: Started: 9/12/2002
Completed: 9/12/2002

Diameter of Hole: Diameter: 8 in From Surface To 20 ft
Diameter: 6 in From 20 ft To 480 ft

Drilling Method: Air Rotary

Borehole Completion: Other: cased

Annular Seal Data: 1st Interval: From 0 ft to 20 ft with 4 (#sacks and material)
2nd Interval: No Data
3rd Interval: No Data
Method Used: Slurry
Cemented By: APEX Drilling
Distance to Septic Field or other Concentrated Contamination: 100+ ft
Distance to Property Line: No Data
Method of Verification: as per landowner
Approved by Variance: No Data

Surface Completion: Surface Sleeve Installed

Water Level: Static level: No Data
Artesian flow: No Data

Packers: Burlap 295',290',20'

Plugging Info: Casing or Cement/Bentonite left in well: No Data

Type Of Pump: No Data

Well Tests: Estimated
Yield: 70 GPM with (No Data) ft drawdown after (No Data) hours

Water Quality: Type of Water: Glenrose
Depth of Strata: 295-475 ft.
Chemical Analysis Made: No
Did the driller knowingly penetrate any strata which contained undesirable constituents: No

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the

statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: **APEX Drilling**
P.O. Box 867
Marble Falls , Tx 78654

Driller License Number: **54516**

Licensed Well Driller Signature: **Michael Becker**

Registered Driller Apprentice Signature: **Andrew Johnson**

Apprentice Registration Number: **1116**

Comments: **updated lat/long by TWDB on 2/12/08 - BA**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking number (Tracking #15509) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft)	Description
000-014	Caliche
014-049	Blue LS
049-080	Tan LS
080-120	Lt Gry-Tan LS
120-170	Gry LS w/Clay
170-195	Tan LT - Gry LS
195-250	Tan LS
250-295	Tan LT-Gry LS
295-355	Wht Tan LS
355-372	Gry Ls
372-397	Wht LS (H2O)
397-445	Brn LS (H2O)
445-475	Gry LS
475-480	Blue Clay

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
5	New	PVC +2	to 480 SDR17

ATTENTION OWNER: Confidentiality
 Privilege Notice on Reverse Side

STATE OF TEXAS
 WATER WELL REPORT

1) OWNER: WEST, JACK ADDRESS: 3901 SERENE HILLS CITY: AUSTIN STATE: TX ZIP: 78738-

2) ADDRESS OF WELL: 5)
 County: TRAVIS GRID # 58-41-1
 Street or RFD: 3901 SERENE HILLS
 City, State, Zip code: AUSTIN, TX 78738-

3) TYPE OF WORK: NEW WELL 4) PROPOSED USE: DOMESTIC
 If Public Supply well, were plans submitted to the TNRCC?

6) WELL LOG: 01174 DIAMETER OF HOLE 7) DRILLING METHOD: 8) BOREHOLE COMPLETION:
 DATE DRILLING: DIAMETER FROM TO AIR ROTARY STRAIGHT WALL N^
 STARTED: 10/31/97 7-7/8" 0 110
 COMPLETED: 11/01/97 7" 110 420 IF GRAVEL... FROM FT. TO FT.
 6-3/4" 420 640 FROM FT. TO FT.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

DIA	NEW/USED	DESCRIPTION	FROM	TO	GAGE CASING SCREEN
5	N	PLASTIC	-2	640	40
5	N	PERFORATED	600	640	1/4

GEOLOGICAL DESCRIPTION:

FROM	TO	DESCRIPTION
0	1	TOP SOIL
1	18	CALICHE
18	110	GRAY LIME
110	160	BROKEN
160	310	GRAY LIME
310	360	BROKEN
360	440	GRAY LIME SHALE
440	470	BROKEN
470	500	GRAY LIME
500	525	BROKEN
525	560	GRAY LIME SHALE
560	600	GRAY LIME
600	630	BROKEN
630	670	RED SANDSTONE CLAY
670	750	BROKEN

9) CEMENTING DATA:

Cemented from	No. of Sacks Used
110 FT. TO 0 FT.	20
FT. TO FT.	

Method used: TREMIE TUBE

Cemented by: ASSOCIATED DRILLING

Distance to septic field lines: 100 ft.

Method of verification of above distance:

MEASURED

10) SURFACE COMPLETION:

SURFACE SLAB INST.

11) WATER LEVEL:

STATIC LEVEL : 405' FT. DATE: 10/31/97

ARTESIAN FLOW: GPM. DATE:

12) PACKERS:

TYPE	DEPTH
NEOPRENE/BURLAP	110'
NEOPRENE/BURLAP	600'

13) TYPE PUMP:

SUBMERSIBLE

DEPTH TO PUMP: 640'

14) WELL TEST:

ESTIMATED

YIELD: 50 GPM WITH FT DRANDOWN AFTER HRS

15) WATER QUALITY:

TYPE OF WATER: TRINITY

DEPTH OF STRATA: 600-750

NO CHEMICAL ANALYSIS MADE

NO STRATA OF UNDESIRABLE WATER PENETRATED

COMPANY NAME: ASSOCIATED DRILLING CO.

WATER WELL DRILLER'S LICENSE NO.: 1955WI

FOR TWC USE ONLY

ADDRESS: P.O. BOX 1060

CITY: MANHACCA

STATE: TX ZIP CODE: 78652

WELL NO. _____

LOCATED ON MAP _____

I HEREBY CERTIFY THAT THIS WELL WAS DRILLED BY ME (OR UNDER MY SUPERVISION) AND THAT EACH AND ALL OF THE STATEMENTS HEREIN ARE TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF. I UNDERSTAND THAT FAILURE TO COMPLETE ITEMS 1 THRU 15 WILL RESULT IN THE LOG(S) BEING RETURNED FOR COMPLETION AND RESUBMITTAL.

(signed)

(LICENSED WATER WELL DRILLER)

(signed)

(REGISTERED DRILLER TRAINEE)

EMP #	DEC 12 1997	SEQ #
COMMENT		WG

STATE OF TEXAS WATER WELL REPORT (PAGE 2)

OWNER: WEST, JACK

ADDRESS: 3901 SERENE HILLS

CITY: AUSTIN

STATE: TX ZIP: 78738-

750 780 YELLOW CLAY

FILE ID		SEQ #
EMP #	DEC 12 1997	DESC CD
COMMENT		WG

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse Side

STATE OF TEXAS
WATER WELL REPORT

1) OWNER: **STALWART CONSTRUCTION** ADDRESS: **2702 GALENA COVE** CITY: **ROUND ROCK** STATE: **TX** ZIP: **78681-**

2) ADDRESS OF WELL: County: **TRAVIS** GRID # **58-41-1**
Street or RPD: **3405 SERENE HILLS COURT**
City, State, Zip code: **AUSTIN, TX**

3) TYPE OF WORK: **NEW WELL** 4) PROPOSED USE: **DOMESTIC**
If Public Supply well, were plans submitted to the TNRCC?

6) WELL LOG: 01157 DIAMETER OF HOLE 7) DRILLING METHOD: 8) BOREHOLE COMPLETION:

DATE DRILLING:	DIAMETER	FROM	TO	DRILLING METHOD	BOREHOLE COMPLETION	
STARTED: 08/26/97	7-7/8"	0	20	AIR ROTARY	STRAIGHT WALL	N^
COMPLETED: 08/30/97	7"	20	340		IF GRAVEL...	FROM FT. TO FT.
	6-3/4"	340	620			FROM FT. TO FT.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

DIA	NEW/USED	DESCRIPTION	FROM	TO	GAGE CASING SCREEN
5	N	PLASTIC	-2	640	40

GEOLOGICAL DESCRIPTION:

FROM	TO	DESCRIPTION
0	1	TOP SOIL
1	18	CALICHE
18	75	GRAY LIME
75	90	TAN LIME
90	230	GRAY LIME
230	260	BROKEN
260	310	GRAY LIME SHALE
310	325	BROKEN
325	445	GRAY LIME SHALE
445	460	BROKEN
460	530	GRAY LIME SHALE
530	550	BROKEN
550	560	GRAY LIME
560	585	BROKEN
585	650	RED CLAY SANDSTONE

9) CEMENTING DATA:

Cemented from No. of Sacks Used
20 FT. TO 0 FT. 6
FT. TO FT.
Method used: GRAVITY
Cemented by: ASSOCIATED DRILLING
Distance to septic field lines: 150 ft.
Method of verification of above distance:
MEASURED

10) SURFACE COMPLETION:

SURFACE SLAB INST.

11) WATER LEVEL:

STATIC LEVEL : 335' FT. DATE: 09/11/97
ARTESIAN FLOW: GPM. DATE:

12) PACKERS:

TYPE	DEPTH
NEOPRENE/BURLAP	20'
NEOPRENE/BURLAP	620'

13) TYPE PUMP:

SUBMERSIBLE
DEPTH TO PUMP: 520'

14) WELL TEST:

ESTIMATED
YIELD: 50 GPM WITH FT DRAWDOWN AFTER HRS

15) WATER QUALITY:

TYPE OF WATER: TRINITY DEPTH OF STRATA: 585-705 NO CHEMICAL ANALYSIS MADE
NO STRATA OF UNDESIRABLE WATER PENETRATED

COMPANY NAME: ASSOCIATED DRILLING CO. WATER WELL DRILLER'S LICENSE NO.: 1955WI
ADDRESS: P.O. BOX 1060 CITY: MANCHACA STATE: TX ZIP CODE: 78652

FOR TWC USE ONLY

WELL NO. _____

LOCATED ON MAP _____

I HEREBY CERTIFY THAT THIS WELL WAS DRILLED BY ME (OR UNDER MY SUPERVISION) AND THAT EACH AND ALL OF THE STATEMENTS HEREIN ARE TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF. I UNDERSTAND THAT FAILURE TO COMPLETE ITEMS 1 THRU 15 WILL RESULT IN THE LOG(S) BEING RETURNED FOR COMPLETION AND RESUBMITTAL.

(signed)

(LICENSED WATER WELL DRILLER)

(signed)

(REGISTERED DRILLER TRAINEE)

EMP #	NOV 19 1997	SEQ #
COMMENT		88

STATE OF TEXAS WATER WELL REPORT (PAGE 1)

OWNER: STALWART CONSTRUCTION ADDRESS: 2702 GALENA COVE CITY: ROUND ROCK STATE: TX ZIP: 78681-

650 705 BROKEN

705 720 RED CLAY SANDSTONE

FILE ID	SEQ #
EMP #	NOV 19 1997
COMMENT	68

**IMPORTANT NOTICE FOR PERSONS
HAVING WELLS DRILLED CONCERNING
PRIVILEGE OF CONFIDENTIALITY**

The Water Well Drillers Advisory Council and the Texas Natural Resource Conservation Commission are concerned that some persons having wells drilled may not be aware of the confidentiality privilege provisions of Section 32.005 of the Texas Water Code, the Reporting of Well Logs, reads as follows:

"Every licensed driller drilling, deepening or otherwise altering a water well within this State shall make and keep a legible and accurate well log in accordance with the department rule on forms prescribed by the department. Not later than the 60th day after the completion or cessation of drilling, deepening, or otherwise altering the well, the licensed driller shall deliver or transmit by certified mail a copy of the well log to the department and to the owner of the well or the person for whom the well was drilled. Each copy of a well log, other than a department copy must include the name, mailing address, and telephone number of the department. The well log shall be recorded at the time of drilling, and must show the depth, thickness, and character of the strata penetrated, the location of water-bearing strata, the depth, size and character of casing installed, and any other information required by department rule. The department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner or person for whom the well was drilled."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential.

[illegible]

TDLR FORM 004WWD Copies to TDLR - Owner - Driller/Pump Installer Form provided by Forms On-A-Disk, Inc. (Dallas, Texas ((214) 340-9429

**IMPORTANT NOTICE FOR PERSONS
HAVING WELL DRILLED CONCERNING
CONFIDENTIALITY**

Section 32.005 of the Texas Water Code, concerning confidentiality information in the Reporting of Well Reports, reads as follows:

Every licensed driller drilling, deepening, or otherwise altering a water well in this State shall make and keep a legible and accurate well log in accordance with department rule on forms prescribed by the department. Not later than the 60th day after the completion or cessation of drilling, deepening, or otherwise altering the well, the licensed driller shall deliver or transmit by certified mail a copy of the well log to the department, the Texas Natural Resources Conservation Commission, and the owner of the well or the person for whom the well was drilled. The well log shall be recorded at the time of drilling and must show the depth, thickness, and character of the strata penetrated, the location of water-bearing strata, the depth, size, and character of casing installed, and any other information required by department rule. The department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner or the person for whom the well was drilled.

The last sentence specifies the means whereby you may, if you wish, assure that logs of your wells will be kept confidential.

[illegible]

FILE NO	8500
EMP #	DESC CO
AUG 31 2001	
COMMENT	

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORTTexas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-05301) OWNER STERLING CUSTOM HOMES ADDRESS 1310 RANCH RD. 620 S., #C-13 AUSTIN, TX 78734
(Name) (Street or RFD) (City) (State) (Zip)2) ADDRESS OF WELL: County TRAVIS 17137 MAJESTIC RIDGE TX GRID # 58-41-1
(Street or RFD) (City) (State) (Zip)3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5)

6) WELL LOG:

Date Drilling:

Started 01-31-19 97Completed 02-01-19 97

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
8"	Surface	10'
6"	10'	840'

7) DRILLING METHOD (Check): ☐ Driven☒ Air Rotary ☐ Mud Rotary ☐ Bored☐ Air Hammer ☐ Cable Tool ☐ Jetted☐ Other _____

N

From (ft.)	To (ft.)	Description and color of formation material
0	1	TOP SOIL
1	35	CALICHE
35	140	BLUE LIME
140	200	GRAY LIME
200	215	BROWN LIME
215	460	GRAY SANDSTONE
460	530	BROWN
530	580	BROWN/TAN
580	630	GRAY LIME
630	660	HAMMID/GRAY
660	700	HENSEL
700	840	TRINITY

8) Borehole Completion (Check): ☒ Open Hole ☐ Straight Wall☐ Underreamed ☐ Gravel Packed ☐ Other _____

If Gravel Packed give interval ... from _____ ft. to _____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
5 OD	N	PVC	+2	840	SCH. 40

9) CEMENTING DATA [Rule 338.44(1)]

Cemented from 0 ft. to 30 ft. No. of sacks used 10
_____ ft. to _____ ft. No. of sacks used _____Method used SLURRYCemented by C. T. D.Distance to septic system field lines or other concentrated contamination 150+ ft.Method of verification of above distance OWNER

10) SURFACE COMPLETION

☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]☒ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]☐ Pitless Adapter Used [Rule 338.44(3)(b)]☐ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL

Static Level _____ ft. below land surface Date _____

Artesian flow _____ gpm Date _____

12) PACKERS:

	Type	Depth
3	BURLAP	30, 660, 680

13) TYPE PUMP:

☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder☐ Other _____

Depth to pump bowl/s, cylinder, jet, etc., _____ ft.

14) WELL TESTS:

Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☒ EstimatedYield: 50 gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"Type of water? TRINITY Depth of strata 25Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME CENTRAL TEXAS DRILLING, INC.
(Type or print)WELL DRILLER'S LICENSE NO. #2422ADDRESS 25203 RANCH RD. 12 DRIPPING SPRINGS TX 78620
(Street or RFD) (City) (State) (Zip)(Signed) David Kare
(Licensed Well Driller)(Signed) _____
(Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TNRCC-0199 (Rev. 11-1-94)

DRILLERS COPY

TNRCC COPY

FILE ID	SEQ #
OWNER'S COPY	DESC CD
COMMENT	CB

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORTTexas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
612-239-0530

1) OWNER WHITAKER, STEVEN ADDRESS 531-A CUTTY TRAIL AUSTIN, TX 78734
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL:
County TRAVIS 17133 MAJESTIC RIDGE RD. AUSTIN TX 78734 GRID # 58-41-1
(Street or RFD) (City) (State) (Zip)

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

6) WELL LOG:
Date Drilling: 08/02 19 96
Started 08/02 19 96
Completed 08/03 19 96

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
7"	Surface	150'
6"	150'	820'

7) DRILLING METHOD (Check): ☐ Driven
☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other

From (ft.)	To (ft.)	Description and color of formation material
0	1	TOP SOIL
1	20	CALICHE
20	85	BLUE LIME
85	360	GRAY LIME
360	390	BROWN LIME
390	580	GRAY & BROWN LIME
580	615	HAMMID
615	650	HENSEL
650	820	TRINITY

8) Borehole Completion (Check): ☒ Open Hole ☐ Straight Wall
☐ Underreamed ☐ Gravel Packed ☐ Other
If Gravel Packed give interval ... from _____ ft. to _____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
5 OD	N	PVC PLASTIC	+2	820'	SCH 40

9) CEMENTING DATA [Rule 338.44(1)]

Cemented from +2 ft. to 150 ft. No. of sacks used 32
_____ ft. to _____ ft. No. of sacks used _____

Method used PRESSURE TRIMMY LINECemented by C.T.D.Distance to septic system field lines or other concentrated contamination 85' ft.Method of verification of above distance MARKED BY OWNER

10) SURFACE COMPLETION

- ☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☒ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL

Static Level _____ ft. below land surface Date _____
Artesian flow _____ gpm Date _____

12) PACKERS:

Type	Depth
BURLAP	640 & 150'
PVC	620 & 160'

13) TYPE PUMP:

☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other

Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:

Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☒ EstimatedYield: 50 gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"Type of water? TRINITY Depth of strata 25'Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME CENTRAL TEXAS DRILLING, INC.
(Type or print)

WELL DRILLER'S LICENSE NO. #2422

ADDRESS 25203 RANCH ROAD 12 DRIPPING SPRINGS
(Street or RFD) (City)

(Signed) David Karl
(Licensed Well Driller)

(Signed) _____
(Registered Driller Trainee)

TEXAS NATURAL RESOURCE
CONSERVATION COMMISSION

Please attach electric log, chemical analysis, and other pertinent information, if available.

Send original copy by certified mail to: TNRCC, P.O. Box 13087 Austin, TX 78711-3087

Please use black ink.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORTTexas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

1) OWNER W.E. SHARKE FORD ADDRESS 3600 SERENE HILLS DR AUSTIN TX 78738
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: County TRAVIS 3600 SERENE HILLS DR AUSTIN TX 78738 GRID # 58-41-1
(Street, RFD or other) (City) (State) (Zip)

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

6) WELL LOG:

Date Drilling:

Started 1-30 19 96Completed 1-31 19 96

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
<u>6 1/2</u>	Surface	<u>20</u>
<u>6</u>	<u>20</u>	<u>570</u>

7) DRILLING METHOD (Check):

☐ Driven
☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other _____

From (ft.)	To (ft.)	Description and color of formation material
<u>0</u>	<u>10</u>	<u>CALICHE</u>
<u>10</u>	<u>40</u>	<u>BLUE LIME</u>
<u>40</u>	<u>90</u>	<u>GRAY LIME</u>
<u>90</u>	<u>170</u>	<u>BLUE LIME</u>
<u>170</u>	<u>230</u>	<u>GRAY LIME</u>
<u>230</u>	<u>310</u>	<u>BLUE LIME</u>
<u>310</u>	<u>370</u>	<u>GRAY LIME</u>
<u>370</u>	<u>410</u>	<u>BLUE LIME</u>
<u>410</u>	<u>570</u>	<u>WHITE LIME - WATER</u>

8) Borehole Completion (Check):

☒ Open Hole ☐ Straight Wall
☐ Underreamed ☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval ... from _____ ft. to _____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
<u>4 1/2</u>	<u>N</u>	<u>PLASTIC</u>	<u>0</u>	<u>410</u>	
<u>4 1/2</u>	<u>N</u>	<u>PLASTIC PERF</u>	<u>410</u>	<u>570</u>	

9) CEMENTING DATA [Rule 338.44(1)]

Cemented from 0 ft. to 20 ft. No. of sacks used 6

ft. to _____ ft. No. of sacks used _____

Method used SLURRYCemented by BIBLE BIBLEDistance to septic system field lines or other concentrated contamination N/A ft.

Method of verification of above distance _____

13) TYPE PUMP:

☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____

Depth to pump bows, cylinder, jet, etc., 480 ft.

14) WELL TESTS:

Type test: ☐ Pump ☒ Bailer ☐ Jetted ☐ EstimatedYield: 15 gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"Type of water? GLEN ROCK Depth of strata 410 ftWas a chemical analysis made? ☐ Yes ☒ No

10) SURFACE COMPLETION

☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☒ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL:

Static level 330 ft. below land surfaceDate 1-30-96

Artesian flow _____ gpm.

Date _____

12) PACKERS:

Type Depth

PLASTIC 410PLASTIC 20

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME BIBLE DRILLING
(Type or print)WELL DRILLER'S LICENSE NO. 2537 WPADDRESS PO Box 1223
(Street or RFD)Johnson City
(City)TX 78636
(State) (Zip)(Signed) Sealey Bible
(Licensed Well Driller)(Signed) _____
(Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

**IMPORTANT NOTICE FOR PERSONS
HAVING WELLS DRILLED CONCERNING
PRIVILEGE OF CONFIDENTIALITY**

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"Every licensed driller drilling, deepening or otherwise altering a water well within this State shall make and keep a legible and accurate well log in accordance with the department rule on forms prescribed by the department. Not later than the 60th day after the completion or cessation of drilling, deepening, or otherwise altering the well, the licensed driller shall deliver or transmit by certified mail a copy of the well log to the department and to the owner of the well or the person for whom the well was drilled. Each copy of a well log, other than a department copy must include the name, mailing address, and telephone number of the department. The well log shall be recorded at the time of drilling, and must show the depth, thickness, and character of the strata penetrated, the location of water-bearing strata, the depth, size and character of casing installed, and any other information required by department rule. The department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner or person for whom the well was drilled."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential.

[illegible]

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORTTexas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

1) OWNER INNERARITY, LLOYD ADDRESS P.O. BOX 133 MIDLAND TX 78704
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: County TRAVIS 102 SCHOONER LAKEWAY TX 78734 GRID # 58-41-1
(Street or RFD) (City) (State) (Zip)

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☐ Domestic
☐ Industrial ☒ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
 If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5)

6) WELL LOG:

Date Drilling:

Started 01-29-19 96Completed 01-31-19 96

DIAMETER OF HOLE

Dia. (in.) From (ft.) To (ft.)

6" Surface 660

7) DRILLING METHOD (Check):

☐ Driven
☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other _____

N

From (ft.)	To (ft.)	Description and color of formation material
0	2	TOP SOIL
2	35	CALICHE
35	70	BLUE LIME
70	170	GRAY LIME
170	225	BROWN/GRAY
225	250	LIGHT GRAY
250	660	LOST CIRCULATION

8) Borehole Completion (Check): ☒ Open Hole ☐ Straight Wall
☐ Underreamed ☐ Gravel Packed ☐ Other _____
 If Gravel Packed give interval ... from _____ ft. to _____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
5 OD	N	PVC PLASTIC	+2	660	SCH. 40

RECEIVED
 JAN 30 1997

9) CEMENTING DATA [Rule 338.44(1)]

Cemented from 0 ft. to 30 ft. No. of sacks used 5 CEMENT
 _____ ft. to _____ ft. No. of sacks used _____

Method used SLURRYCemented by C. T. D.

Distance to septic system field lines or other concentrated contamination _____ ft.

Method of verification of above distance DRILLED FIRST

13) TYPE PUMP:

☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other _____

Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:

Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☒ Estimated
 Yield: ? gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"Type of water? TRINITY Depth of strata 15Was a chemical analysis made? ☐ Yes ☒ No

10) SURFACE COMPLETION

☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☒ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL

Static Level _____ ft. below land surface Date _____
 Artesian flow _____ gpm Date _____

12) PACKERS:

	Type	Depth
2	BURLAP	30, 300
1	PVC	620

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME CENTRAL TEXAS DRILLING, INC.
 (Type or print)

WELL DRILLER'S LICENSE NO. #2422

ADDRESS 2300 SOUTH RANCH ROAD 12 DRIPPING SPRINGS TX 78620
 (Street or RFD) (City) (State) (Zip)

(Signed) David Kare
 (Licensed Well Driller)

(Signed) _____
 (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

The Water Well Drillers Advisory Council and the Texas Natural Resource Conservation Commission are concerned that some persons having well drilled may not be aware of the confidentiality privilege provisions of section 32.005 of the Texas Water Code, the Reporting of Well Logs, reads as follows:

"Every licensed driller drilling, deepening, or otherwise altering a water well in this State shall make and keep a legible and accurate well log in accordance with department rule on forms prescribed by the department. Not later than the 60th day after the completion or cessation of drilling, deepening, or otherwise altering the well, the licensed driller shall deliver or transmit by certified mail a copy of the well log to the department and to the owner of the well or the person for whom the well was drilled. Each copy of a well log, other than a department copy, must include the name, mailing address, and telephone number of the department. The well log shall be recorded at the time of drilling, and must show the depth, thickness, and character of the strata penetrated, the location of water-bearing strata, the depth, size, and character of casing installed, and any other information required by department rule. The department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner or person for whom the well was drilled.

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential.

Send original copy by certified mail to: TNRCC, P.O. Box

17, Austin, TX 78711-3067

Please see back.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORTTexas Water Well Drilling Advisory Council
P.O. Box 13067
Austin, TX 78711-3067
512-239-0530

P45

1) OWNER: RICHARD ZETTERLIND ADDRESS: 13412 PERTHSHIRE Austin, TX. 78729
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: 3920 Serean Hills Dr. Austin, TX. 78729
County: TRAVIS (Street or RFD) (City) (State) (Zip) STATE WELL'S

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) 58-41-1

6) WELL LOG:
Date Drilling: _____
Started 1-20 1995
Completed 1-22 1995

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
6"	Surface	780'

7) DRILLING METHOD (Check): ☐ Driven
☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other _____

From (ft.)	To (ft.)	Description and color of formation material
0-15		CALICHE
15-45		BLUE LIME
45-105		GRAY LIME
105-225		BROWN LIME
225-305		GRAY LIME
305-310		CALICHE
310-560		BROWN/GRAY LIME
560-615		GRAY/HAMMILL LIME
615-625		GRAY LIME
625-645		SAND
645-780		TRINITY

8) Borehole Completion (Check): ☒ Open Hole ☐ Slotted
☐ Undersized ☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval ... from _____ ft. to _____ ft.

CASING, SLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Start, Plastic, etc. Port, slotted, etc. Screen (in.), if commercial	Setting (ft.)		Gauge casing Screen
			From	To	
5" O.D.	N	PVC PLASTIC	0	780'	

9) CEMENTING DATA (Rule 338.44(1))
Cemented from 0 ft. to 25 ft. No. of sacks used 4
ft. to _____ ft. No. of sacks used _____
Method used Slurry
Cemented by CMD
Distance to septic system field lines 150+ ft.
Method of verification of above distance Richard Zetterlind

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☒ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL:
Static level _____ ft. below land surface Date _____
Artesian flow _____ gpm. Date _____

12) PACKERS:
Type _____ Depth _____
PVC & BURLAP 25, 600, 620

13) TYPE PUMP:
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
6 ☐ Other _____
Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:
Type test: ☐ Pump ☐ Baller ☒ Jetted ☒ Estimated
Yield: 40 gpm. with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? TRINITY Depth of strata 45'
Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME CENTRAL TEXAS DRILLING, INC. WELL DRILLER'S LICENSE NO. 2422
(Type or print)

ADDRESS 2300 SOUTH RANCH ROAD 12 DRIPPING SPRINGS TEXAS 78620
(Street or RFD) (City) (State) (Zip)

(Signed) David Karl (Licensed Well Driller) (Signed) _____ (Registered Civil Engineer)

Please attach electric log, chemical analysis, and other pertinent information, if available.

ATTENTION OWNER: Confidentiality
 Privilege Notice on Reverse Side

STATE OF TEXAS
 WATER WELL REPORT

1) OWNER: RIVERBEND HOMES ADDRESS: 5518 GREAT DIVIDE CITY: AUSTIN STATE: TX ZIP: 78736-

2) ADDRESS OF WELL:

County: TRAVIS GRID # 58-41-1

Street or RFD: LOT #39 MAJETIC HILLS

City, State, Zip code: AUSTIN, TX 78738-

3) TYPE OF WORK: NEW WELL

4) PROPOSED USE: DOMESTIC

If Public Supply well, were plans submitted to the TNRCC?

6) WELL LOG: 01200	DIAMETER OF HOLE			7) DRILLING METHOD:	8) BOREHOLE COMPLETION:			
	DIAMETER	FROM	TO					
DATE DRILLING:	8	0	200	AIR ROTARY	STRAIGHT WALL			N^
STARTED: 03/20/98	7	200	720		IF GRAVEL...	FROM	FT. TO	FT.
COMPLETED: 03/24/98	6	720	940			FROM	FT. TO	FT.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

DIA	NEW/USED	DESCRIPTION	FROM	TO	GAGE CASING SCREEN
5	N	PLASTIC	-2	700	40
5	N	(SDR) PLASTIC	700	740	80

GEOLOGICAL DESCRIPTION:

FROM	TO	DESCRIPTION
0	4	WHITE CHALK
4	16	TAN LIME
16	19	TAN CLAY
19	32	TAN LIME
32	390	GRAY LIME
390	415	TAN LIME
415	420	GREY CLAY
420	455	TAN LIME
455	515	GREY SANDSTONE
515	560	GRAY LIME
560	615	YELLOW LIME
615	620	BROKEN LIME
620	640	GREY SANDSTONE
640	672	GRAY SHALE
672	720	GRAY LIME

9) CEMENTING DATA:

Cemented from	No. of Sacks Used
220 FT. TO 0 FT.	52
FT. TO FT.	
Method used: PRESS. CEM/TREM. TUBE	
Cemented by: ASSOCIATED DRILLING	
Distance to septic field lines: 150 ft.	
Method of verification of above distance:	
MEASURED	

10) SURFACE COMPLETION:

SURFACE SLAB INST.

11) WATER LEVEL:

STATIC LEVEL : 450' FT.	DATE: 03/24/98
ARTESIAN FLOW: GPM.	DATE:

12) PACKERS:	TYPE	DEPTH
	NEOPRENE/GROUT	220'
	SHALE TRAP	720'

13) TYPE PUMP:

SUBMERSIBLE

DEPTH TO PUMP: 600'

14) WELL TEST:

ESTIMATED

YIELD: 30 GPM WITH FT DRAWDOWN AFTER HRS

15) WATER QUALITY:

TYPE OF WATER: TRINITY

DEPTH OF STRATA: 740-905

NO CHEMICAL ANALYSIS MADE

NO STRATA OF UNDESIRABLE WATER PENETRATED

COMPANY NAME: ASSOCIATED DRILLING CO.

WATER WELL DRILLER'S LICENSE NO.: 4064WI

ADDRESS: P.O. BOX 1060

CITY: MANHACCA

STATE: TX ZIP CODE: 78652

FOR TWC USE ONLY

WELL NO. _____

LOCATED ON MAP _____

I HEREBY CERTIFY THAT THIS WELL WAS DRILLED BY ME (OR UNDER MY SUPERVISION) AND THAT EACH AND ALL OF THE STATEMENTS HEREIN ARE TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF. I UNDERSTAND THAT FAILURE TO COMPLETE ITEMS 1 THRU 15 WILL RESULT IN THE LOG(S) BEING RETURNED FOR COMPLETION AND RESUBMITTAL.

(signed)

(LICENSED WATER WELL DRILLER)

(signed)

(REGISTERED DRILLER TRAINEE)

FILE ID		SEQ #
EMP #	AUG 10 1998	
COMMENT		DESC CO

[illegible]

STATE OF TEXAS WATER WELL REPORT (PAGE 2)

OWNER: RIVERBEND HOMES

ADDRESS: 5518 GREAT DIVIDE

CITY: AUSTIN

STATE: TX ZIP: 78736-

720	740 RED SANDSTONE
740	820 BROKEN LIMESTONE
820	905 RED SANDSTONE
905	915 BROKEN YELLOW LIMESTONE WITH FLINT
915	940 GRAY LIMESTONE

FILE ID		SEQ #
EMP #	AUG 10 1998	DESC CO
COMMENT		

[illegible]

Attention Owner:
Confidentiality Privilege Notice
on reverse side of owner's copy.

Texas Department of License and Regulation
Water Well Driller/Pump Installer Program
P.O. Box 12157 Austin, Texas 78711 (512)463-7880 FAX (512)463-8616
Toll free (800)803-9202
Email address: water.well@license.state.tx.us

This form must be completed
and filed with the department
and owner within 60 days
upon completion of the well.

WELL REPORT

A. WELL IDENTIFICATION AND LOCATION DATA

1) OWNER

Name Stephen Labay Address 5604 Southwest Parkway City Austin State TX Zip 78735

2) WELL LOCATION

County TRAVIS Physical Address 3406 serene Hill Dr. City Austin State TX Zip 78738

3) Type of Work

☒ New Well ☐ Reconditioning
☐ Replacement ☐ Deepening

Lat.

Long.

Grid

4) Proposed Use (check) ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
☐ Rig Supply If Public Supply well, were plans submitted? ☐ Yes ☐ No

5) NT

6) Drilling Date

Started 3/19/01
Completed 3/23/01

Diameter of Hole

Dia. (in.)	From (ft)	To (ft)
7 7/8	0	20
6 1/2	20	860

7) Drilling Method (check)

☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other _____

From (ft) To (ft) Description and color of formation material

0	10	Top soil
10	20	Caliche
20	300	grey shell-lime
300	400	sandstone
400	520	tan shell-lime
520	560	red clay
560	640	sandstone
640	780	grey-tan lime
780	860	BROKEN TAN sandstone

8) Borehole Completion ☐ Open Hole ☒ Straight Wall
☐ Under-reamed ☐ Gravel Packed ☐ Other _____
If Gravel Packed give the interval from _____ ft. to _____ ft.

Casing, Blank Pipe, and Well Screen Data

Dia. (in.)	New Or Used	Steel, Plastic, etc. Perf., Slotted, etc Screen Mfg., if commercial	Setting (ft)		Gage Casing Screen
			From	To	
5	N	PLASTIC	-2	860	DR17

9) Cementing Data

Cementing from 0 ft. to 20 ft. # of sacks used 4
ft. to _____ ft. # of sacks used _____

Method Used gravity
Cementing By ADC
Distance to septic system field or other concentrated contamination _____ ft.
Method of verification of above distance _____

13) Plugged

☐ Well plugged within 48 hours

Casing left in well: Cement/Bentonite placed in well:

From (ft)	To (ft)	From (ft)	To (ft)	Sacks used
		N/A	N/A	

14) Type Pump

☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____

Depth to pump bowls, cylinder, jet etc., 740 ft.

15) Water Test

Type test ☐ Pump ☐ Bailer ☐ Jetted ☒ Estimated
Yield: 35 gpm with _____ ft. drawdown after _____ hrs.

16) Water Quality

Did you knowingly penetrate a strata which contain undesirable constituents.

☐ YES ☒ NO If yes, did you submit a REPORT OF UNDESIRABLE WATER

Type of water mineral Depth of Strata 780 - 860

Was a chemical analysis made ☐ Yes ☒ No

10) Surface Completion

☒ Specified Surface Slab Installed
☒ Specified Surface Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Protection Installed

JUN 06 2001

DESC CO

11) Water Level

Static level 314 ft. below Date 3/26/01
Artesian Flow _____ gpm. Date _____

12) Packers

Type	Depth
Neoprene/Burlap	20 540

Company or individual's Name (type or print) Associated Drilling Co. Lic. No. WI 1955
Address P.O. Box 1060 City Manchaca State TX Zip 78652

Signature [Signature] Date 4.11.01 Signature _____
Licensed Driller/Pump Installer _____ Apprentice _____

**IMPORTANT NOTICE FOR PERSONS
HAVING WELL DRILLED CONCERNING
CONFIDENTIALITY**

Section 32.005 of the Texas Water Code, concerning confidentiality information in the Reporting of Well Reports, reads as follows:

Every licensed driller drilling, deepening, or otherwise altering a water well in this state shall make and keep a legible and accurate well log in accordance with department rule on forms prescribed by the department. Not later than the 60th day after the completion or cessation of drilling, deepening, or otherwise altering the well, the licensed driller shall deliver or transmit by certified mail a copy of the well log to the department, the Texas Natural Resource Conservation Commission, and the owner of the well or the person for whom the well was drilled. The well log shall be recorded at the time of drilling and must show the depth, thickness, and character of the strata penetrated, the location of water-bearing strata, the depth, size, and character of casing installed, and any other information required by department rule. The department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner or the person for whom the well was drilled.

The last sentence specifies the means whereby you may, if you wish, assure that logs of your wells will be kept confidential.

[illegible]

Attention Owner:
Confidentiality Privilege Notice
on reverse side of owner's copy.

Texas Department of License and Regulation
Water Well Driller/Pump Installer Program
P.O. Box 12157 Austin, Texas 78711 (512)463-7880 FAX (512)463-8616
Toll free (800)803-9202
Email address: water.well@license.state.tx.us

This form must be completed
and filed with the department
and owner within 60 days
upon completion of the well.

WELL REPORT

A. WELL IDENTIFICATION AND LOCATION DATA

1) OWNER

Name Marshall Willis Custa Address 330 Bee Cave Rd City Austin State Texas Zip 78746

2) WELL LOCATION

County Travis Physical Address 17110 Flint Rock City Austin State Texas Zip 78738

3) Type of Work

☒ New Well ☐ Reconditioning
☐ Replacement ☐ Deepening

Lat.

Long.

Grid # 58-41-1

4) Proposed Use (check) ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
☐ Rig Supply If Public Supply well, were plans submitted? ☐ Yes ☐ No

5) NT

6) Drilling Date

Started 11/1/00

Completed 11/2/00

Diameter of Hole

Dia.(in)	From (ft)	To (ft)
<u>7 7/8</u>	<u>0</u>	<u>110</u>
<u>6 1/2</u>	<u>110</u>	<u>660</u>
<u>5</u>	<u>660</u>	<u>800</u>

7) Drilling Method (check)

☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other _____

From (ft) To (ft) Description and color of formation material

<u>0</u>	<u>40</u>	<u>Tan Broken Caliche</u>
<u>40</u>	<u>100</u>	<u>gray lime</u>
<u>100</u>	<u>170</u>	<u>gray lime shale</u>
<u>170</u>	<u>220</u>	<u>Broken</u>
<u>220</u>	<u>300</u>	<u>gray lime</u>
<u>300</u>	<u>386</u>	<u>Broken</u>
<u>386</u>	<u>440</u>	<u>gray lime shale</u>
<u>440</u>	<u>500</u>	<u>gray lime</u>
<u>500</u>	<u>565</u>	<u>Broken</u>
<u>565</u>	<u>620</u>	<u>gray lime</u>

(Use reverse side of Well Owner's copy, if necessary)

8) Borehole Completion ☐ Open Hole ☒ Straight Wall

☐ Under-reamed ☐ Gravel Packed ☐ Other _____
If Gravel Packed give the interval from _____ ft. to _____ ft.

Casing, Blank Pipe, and Well Screen Data

Dia. (in.)	New Or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft)		Gage Casing Screen
			From	To	
<u>5</u>	<u>N</u>	<u>Plastic</u>	<u>-2</u>	<u>680</u>	<u>40</u>

9) Cementing Data

Cementing from 0 ft. to 110 ft. # of sacks used 35
ft. to _____ ft. # of sacks used _____

Method Used PRESSURE
Cementing By ADC
Distance to septic system field or other concentrated contamination _____ ft.
Method of verification of above distance _____

13) Plugged

☐ Well plugged within 48 hours

Casing left in well: _____ Cement/Bentonite placed in well: _____

From (ft)	To (ft)	From (ft)	To (ft)	Sacks used

14) Type Pump

☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____

Depth to pump bowls, cylinder, jet etc., 660 ft.

15) Water Test

Typetest ☐ Pump ☐ Bailer ☐ Jetted ☒ Estimated
Yield: 70 gpm with _____ ft. drawdown after _____ hrs.

16) Water Quality

Did you knowingly penetrate a strata which contain undesirable constituents.

☐ YES ☒ NO If yes, did you submit a REPORT OF UNDESIRABLE WATER

Type of water Artesian Depth of Strata 660-800

Was a chemical analysis made ☐ Yes ☒ No

10) Surface Completion

☐ Specified Surface Slab Installed
☒ Specified Surface Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

11) Water Level

Static level 416 ft. below Date 11/8/00
Artesian Flow _____ gpm. Date 1/1

12) Packers

Type	Depth
<u>Neoprene/Burlap</u>	<u>110</u> <u>660</u>

Company or individual's Name (type or print) Associated Drilling Lic. No. WI 1955
Address P.O. Box 1060 City Manchaca State TX Zip 78652
Signature [Signature] Date 11/10/00 Signature [Signature] Date 1/1
Licensed Driller/Pump Installer Apprentice

**IMPORTANT NOTICE FOR PERSONS
HAVING WELL DRILLED CONCERNING
CONFIDENTIALITY**

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The last sentence specifies the means whereby you may, if you wish, assure that logs of your wells will be kept confidential.

[illegible]

ATTENTION OWNER: Confidentiality
Privilege Notice on reverse side
of Well Owner's copy (pink)State of Texas
WELL REPORTTexas Department of Licensing &
Regulation
P.O. Box 12157
Austin, TX 78711
512-463-7880

1) OWNER JEFF ALT ADDRESS 3707 Serene Hills Dr. Austin, TX 78738
(Name) (Street or RFD) (City) (State) (Zip)
2) ADDRESS OF WELL'S LOCATION: 3707 Serene Hills Dr. Austin, TX 78738 Long. 58 Lat. 41
County TRAVIS (Street, RFD or other) (City) (State) (Zip) Grid # 58-41-1

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

6) WELL LOG:

Date Drilling:

Started 7/9 19 98Completed 7/10 19 98

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
<u>7 7/8</u>	Surface	<u>160</u>
<u>7</u>	<u>160</u>	<u>460</u>
<u>6 3/4</u>	<u>460</u>	<u>680</u>
<u>6</u>	<u>680</u>	<u>800</u>

7) DRILLING METHOD (Check):

☐ Driven
☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other _____

From (ft.)	To (ft.)	Description and color of formation material
<u>0</u>	<u>3</u>	<u>TOP SOIL</u>
<u>3</u>	<u>25</u>	<u>CALICHE</u>
<u>25</u>	<u>280</u>	<u>GRAY LIME</u>
<u>280</u>	<u>360</u>	<u>BROKEN</u>
<u>360</u>	<u>440</u>	<u>TAN BROKEN</u>
<u>440</u>	<u>500</u>	<u>GRAY LIME</u>
<u>500</u>	<u>560</u>	<u>BROKEN</u>
<u>560</u>	<u>620</u>	<u>GRAY LIME STALE</u>
<u>620</u>	<u>670</u>	<u>BROKEN</u>
<u>670</u>	<u>710</u>	<u>RED CLAY / SANDSTONE</u>
<u>710</u>	<u>750</u>	<u>BROKEN</u>
<u>750</u>	<u>760</u>	<u>RED CLAY / SANDSTONE</u>

(Use reverse side of Well Owner's copy, if necessary) OVER

8) Borehole Completion (Check): ☐ Open Hole ☒ Straight Wall
☐ Underreamed ☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval from _____ ft. to _____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
<u>5</u>	<u>N</u>	<u>PLASTIC</u>	<u>-2</u>	<u>700</u>	<u>40</u>

9) CEMENTING DATA

Cemented from 160 ft. to 0 ft. No. of sacks used 26
ft. to _____ ft. No. of sacks used _____

Method used Premie tubeCemented by ADC

Distance to septic system field lines or other concentrated contamination _____ ft.

Method of verification of above distance Measured13) ☐ Well plugged within 48 hours

Casing left in well:		Cement/bentonite placed in well:		Sacks used:
From (ft)	To (ft)	From (ft)	To (ft)	

14) TYPE PUMP:

☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder

☐ Other _____Depth to pump bowls, cylinder, jet, etc., 600' ft.

15) WELL TESTS:

Type test: ☐ Pump ☐ Bailer ☐ Jetted ☒ EstimatedYield: 100 gpm with _____ ft. drawdown after _____ hrs.

16) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? TRINITY Depth of strata 760 → 800

Was a chemical analysis made? ☐ Yes ☒ No

10) SURFACE COMPLETION

☒ Specified Surface Slab Installed
☐ Specified Steel Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

11) WATER LEVEL:

Static level 450' ft. below land surfaceDate 7/10/98

Artesian flow _____ gpm.

Date _____

12) PACKERS:

Type

Depth

Neoprene + Burlap 160'
Neoprene + Burlap 680

I certify that I drilled this well (or the well was drilled under my direct supervision) and that each and all of the statements herein are true and correct. I understand that failure to complete items 1 through 16 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Associated Drilling Co.

WELL DRILLER'S LICENSE NO. _____

(Type or print)

ADDRESS P.O. Box 1060

(Street or RFD)

(Signed) [Signature]

(Licensed Well Driller)

COMMENT

(Signed)

FILE ID

EMP # 1955-667

TX SEP 17 1998

(State)

(Zip)

COMMENT

(Registered Driller Trainee)

SEQ #

DESC CO

TEMP

Please attach electric log, chemical analysis, and other pertinent information, if available.

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

Section 32.005 of the Texas Water Code, concerning confidential information in the Reporting of Well Logs, reads as follows:

"Every licensed driller drilling, deepening or otherwise altering a water well within this State shall make and keep a legible and accurate well log in accordance with the department rule on forms prescribed by the department. Not later than the 60th day after the completion or cessation of drilling, deepening, or otherwise altering the well, the licensed driller shall deliver or transmit by certified mail a copy of the well log to the department and to the owner of the well or the person for whom the well was drilled. Each copy of a well log, other than a department copy must include the name, mailing address, and telephone number of the department. The well log shall be recorded at the time of drilling, and must show the depth, thickness, and character of the strata penetrated, the location of water-bearing strata, the depth, size and character of casing installed, and any other information required by department rule. The department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner or person for whom the well was drilled."

The last sentence specifies the means whereby you may, if you wish, assure that logs of your wells will be kept confidential.

[illegible]

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

ATTENTION OWNER:Confidentiality Privilege Notice on
Reverse Side**State of Texas
WELL REPORT**

**Texas Water Well Drillers Advisory
Council**
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

P65

1) OWNER YODER, LEON ADDRESS 231-B MOORING CIRCLE AUSTIN TEXAS 78734
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: 17122 MAJESTIC RIDGE AUSTIN TEXAS 78738 GRID # 67-48-3
County TRAVIS (Street or RFD) (City) (State) (Zip)

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5)
N30 20.22
W098 00.04

6) WELL LOG:

Date Drilling:

Started 6-20-20 01Completed 6-20-20 01

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
9	Surface	20
6	20	840

7) DRILLING METHOD (Check):

☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other

From (ft.)	To (ft.)	Description and color of formation material
0	1	TOP SOIL
1	15	CALICHE
15	90	BLUE LIME
90	260	GRAY
260	305	BROWN
305	310	WHITE SANDSTONE
310	480	GRAY LIME
480	515	BROWN LIME
515	560	WHITE
560	590	GRAY LIME
590	640	HAMMID
640	650	GRAY LIME
650	840	TRINITY

8) Borehole Completion (Check):

☐ Open Hole ☒ Straight Well
☐ Underreamed ☐ Gravel Packed ☐ Other
If Gravel Packed give interval ... from _____ ft. to _____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
6"OD	N	PLASTIC	+2	840	SDR17

9) CEMENTING DATA [Rule 338.44(1)]

Cemented from 0 ft. to 20 ft. No. of sacks used 5
_____ ft. to _____ ft. No. of sacks used _____

Method used SLURRYCemented by CTDDistance to septic system field lines or other concentrated contamination 100+ ft.Method of verification of above distance OWNER

10) SURFACE COMPLETION

☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☒ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL

Static Level _____ ft. below land surface Date _____
Artesian flow _____ gpm Date _____

12) PACKERS:

	Type	Depth
3	PVC & BURLAP	20,640,650

13) TYPE PUMP:

☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other

Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:

Type Test: ☐ Pump ☐ Bailor ☒ Jetted ☒ Estimated
Yield: 30-40 gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"

Type of water? TRINITY Depth of strata 60Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

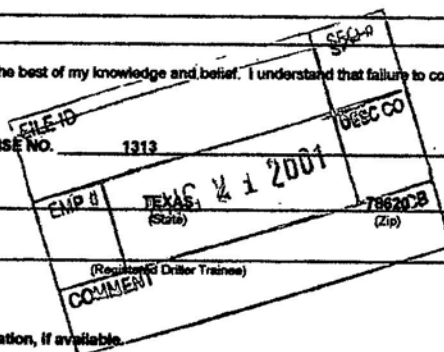
COMPANY NAME CENTRAL TEXAS DRILLING INC. INC.
(Type or print)

WELL DRILLER'S LICENSE NO. 1313

ADDRESS 2620 HWY 280 WEST DRIPPING SPRINGS
(Street or RFD) (City)

(Signed) Frank Glass
(Licensed Well Driller)

(Signed) _____
(Responsible Driller Trainee)



Please attach electric log, chemical analysis, and other pertinent information, if available.

TNRCC-0199 (Rev. 11-1-94)

WELL OWNER'S COPY

TNRCC COPY

DRILLER'S COPY

Send original copy by certified mail to: TNRCC, P.O.

3087, Austin, TX 78711-3087

Please use black ink.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORTTexas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

1) OWNER FULTZ, IAN ADDRESS 206 LAKEWAY DRIVE AUSTIN, TX 78734
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: 3402 SERENE HILLS CT. AUSTIN, TEXAS 78734 GRID # 57-48-3
County TRAVIS (Street or RFD) (City) (State) (Zip)

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
 If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5)

6) WELL LOG:

Date Drilling:

Started 09-12-19 96Completed 09-13-19 96

DIAMETER OF HOLE

Dia. (in.) From (ft.) To (ft.)

6" Surface 740'

7) DRILLING METHOD (Check):

☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other _____

N

From (ft.)	To (ft.)	Description and color of formation material
0	1	TOP SOIL
1	12	CALICHE
12	75	BLUE LIME
75	105	BROWN LIME
105	235	GRAY LIME
235	740	LOST CIRCULATION

8) Borehole Completion (Check): ☒ Open Hole ☐ Straight Wall
☐ Underreamed ☐ Gravel Packed ☐ Other _____
 If Gravel Packed give interval ... from _____ ft. to _____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
5 OD	N	PVC	+2	740	SCH. 40

9) CEMENTING DATA [Rule 338.44(1)]

Cemented from 0 ft. to 30 ft. No. of sacks used 6 CEMENT
 _____ ft. to _____ ft. No. of sacks used _____

Method used SLURRYCemented by C. T. D.Distance to septic system field lines or other concentrated contamination N/A ft.Method of verification of above distance DRILLED FIRST

10) SURFACE COMPLETION

☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☒ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL

Static Level _____ ft. below land surface Date _____

Artesian flow _____ gpm Date _____

12) PACKERS:

	Type	Depth
2	BURLAP	540, 30
2	PVC	560, 30

13) TYPE PUMP:

☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other _____

Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:

Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☒ EstimatedYield: ? gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"Type of water? TRINITY Depth of strata 20'Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME CENTRAL TEXAS DRILLING, INC.
(Type or print)WELL DRILLER'S LICENSE NO. #2422ADDRESS 2300 SOUTH RANCH ROAD 12
(Street or RFD)DRIPPING SPRINGS
(City)(Signed) David Kare
(Licensed Well Driller)

(Signed) _____

RECEIVED
 JUN 1997
 Registered Driller Trainee

Please attach electric log, chemical analysis, and other pertinent information, if available.

The Water Well Drillers Advisory Council and the Texas Natural Resource Conservation Commission are concerned that some persons having well drilled may not be aware of the confidentiality privilege provisions of section 32.005 of the Texas Water Code, the Reporting of Well Logs, reads as follows:

"Every licensed driller drilling, deepening, or otherwise altering a water well in this State shall make and keep a legible and accurate well log in accordance with department rule on forms prescribed by the department. Not later than the 60th day after the completion or cessation of drilling, deepening, or otherwise altering the well, the licensed driller shall deliver or transmit by certified mail a copy of the well log to the department and to the owner of the well or the person for whom the well was drilled. Each copy of a well log, other than a department copy, must include the name, mailing address, and telephone number of the department. The well log shall be recorded at the time of drilling, and must show the depth, thickness, and character of the strata penetrated, the location of water-bearing strata, the depth, size, and character of casing installed, and any other information required by department rule. The department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner or person for whom the well was drilled.

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Please use black ink.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORTTexas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-0630

P67

1) OWNER BENCHMARK HOMES ADDRESS 12885 RESEARCH BLVD. # 202 AUSTIN TX 78750
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: 4309 TRAVIS VISTA AUSTIN TX 57-48-3
County TRAVIS (Street or RFD) (City) (State) (Zip) GRID #

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) ⁶

6) WELL LOG:

Date Drilling:

Started 10/17/95Completed 19

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
7"	Surface	100'
6"	100'	620'

7) DRILLING METHOD (Check):

☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other

N

From (ft.)	To (ft.)	Description and color of formation material
0	1	TOP SOIL
1	23	CALICHE
23	110	BLUE LIME
110	295	GRAY LIME
295	465	BROWN LIME
465	600	GRAY LIME
600	620	LT. TAN LIME

8) Borehole Completion (Check): ☒ Open Hole ☐ Straight Wall☐ Underreamed ☐ Gravel Packed ☐ OtherIf Gravel Packed give interval ... from ft. to ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
5 OD	N	PVC PLASTIC	+2	620'	SCH 40

9) CEMENTING DATA [Rule 338.44(1)]

Cemented from +2 ft. to 100 ft. No. of sacks used 18ft. to ft. No. of sacks used Method used PRESSURE TRIMMY CEMENTEDCemented by C.T.D.Distance to septic system field lines or other concentrated contamination 18 ft.Method of verification of above distance WELL DRILLED FIRST

10) SURFACE COMPLETION

☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☒ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL

Static Level 399' ft. below land surface Date 10/18/96Artesian flow gpm Date

12) PACKERS:

Type	Depth
RUBBER	100'
BURLAP	500'

13) TYPE PUMP:

☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other

Depth to pump bowls, cylinder, jet, etc., 560 ft.

14) WELL TESTS:

Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☒ EstimatedYield: 25 gpm with ft. drawdown after hrs.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"Type of water? GLENROSE Depth of strata 15'Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME CENTRAL TEXAS DRILLING, INC.
(Type or print)WELL DRILLER'S LICENSE NO. 2422ADDRESS 2300 SOUTH RANCH ROAD 12
(Street or RFD)DRIPPING SPRINGS
(City)TX 78620
(State) (Zip)(Signed) David Karl
(Licensed Well Driller)(Signed)
(Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

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Please use black ink.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORTTexas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

P68

1) OWNER BENCHMARK HOMES ADDRESS 12885 RESEARCH BLVD. #202 AUSTIN TX 78750
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: County TRAVIS 114 SNAPPER LOT 1447 LAKEWAY AUSTIN TX 78750
(Street or RFD) (City) (State) (Zip) GRID # 57-48-3

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5)

6) WELL LOG:

Date Drilling:

Started 10-17-19 95Completed 10-17-19 95

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
7"	Surface	100'
6"	100'	620'

7) DRILLING METHOD (Check):

☐ Driven
☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other

From (ft.)	To (ft.)	Description and color of formation material
0	50	CALICHE
50	140	BLUE LIME
140	285	GRAY LIME
285	510	BROWN/GRAY
510	620	LT. GRAY

8) Borehole Completion (Check): ☒ Open Hole ☐ Straight Wall
☐ Underreamed ☐ Gravel Packed ☐ Other
If Gravel Packed give interval from _____ ft. to _____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
5 OD	N	PVC PLASTIC	0'	620'	SCH. 40

RECEIVED
JAN 30 1997
TEXAS WATER WELL
CONSERVATION COMMISSION

9) CEMENTING DATA [Rule 338.44(1)]

Cemented from 0 ft. to 100' ft. No. of sacks used 16
_____ ft. to _____ ft. No. of sacks used _____

Method used PRESSURE TRIMME LINECemented by C. T. D.

Distance to septic system field lines or other concentrated contamination _____ ft.

Method of verification of above distance DRILLED FIRST

10) SURFACE COMPLETION

☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☒ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL

Static Level _____ ft. below land surface Date _____
Artesian flow _____ gpm Date _____

12) PACKERS:

	Type	Depth
1	RUBBER	100'
1	BURLAP	500'

13) TYPE PUMP:

☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other

Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:

Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☒ Estimated
Yield: 25 gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"

Type of water? GLEN ROSE Depth of strata 10'Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME CENTRAL TEXAS DRILLING
(Type or print)

WELL DRILLER'S LICENSE NO. #2422

ADDRESS 25203 RANCH ROAD 12
(Street or RFD)

DRIPPING SPRINGS
(City)

TX 78620
(State) (Zip)

(Signed) David Karl
(Licensed Well Driller)

(Signed) _____
(Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

STATE OF TEXAS WELL REPORT for Tracking #152651

Owner:	Gene Villanueva	P72	Owner Well #:	1
Address:	318 Nautilus Ave Lakeway, TX 78738		Grid #:	58-41-1
Well Location:	3408 Serene Hills Court Lakeway, TX 78738		Latitude:	30° 20' 40" N
Well County:	Travis		Longitude:	097° 59' 56" W
Elevation:	937 ft.		GPS Brand Used:	No Data
Type of Work:	New Well		Proposed Use:	Domestic

Drilling Date: Started: 8/29/2008
Completed: 9/3/2008

Diameter of Hole: Diameter: 8 in From Surface To 120 ft
Diameter: 7 in From 120 ft To 850 ft

Drilling Method: Air Rotary

Borehole Completion: Straight Wall

Annular Seal Data: 1st Interval: From 0 ft to 120 ft with 36 (#sacks and material)
2nd Interval: From 640 ft to 700 ft with 18 (#sacks and material)
3rd Interval: No Data
Method Used: tremie
Cemented By: ADC
Distance to Septic Field or other Concentrated Contamination: 91 ft
Distance to Property Line: 50+ ft
Method of Verification: measured
Approved by Variance: No Data

Surface Completion: Surface Sleeve Installed

Water Level: Static level: 409 ft. below land surface on 9/6/2008
Artesian flow: No Data

Packers: neophrene 120'

Plugging Info: Casing or Cement/Bentonite left in well: No Data

Type Of Pump: Submersible
Depth to pump bowl: 700 ft

Well Tests: Estimated
Yield: 30 GPM with (No Data) ft drawdown after (No Data) hours

Water Quality: Type of Water: Trinity
Depth of Strata: 740'-850' ft.
Chemical Analysis Made: No
Did the driller knowingly penetrate any strata which contained undesirable constituents: No

Certification Data: The driller certified that the driller drilled this well (or the well was drilled

under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: **Associated Drilling Co.**
P.O. Box 1060
Manchaca , TX 78652

Driller License Number: **1955**

Licensed Well Driller Signature: **Byron Benoit**

Registered Driller Apprentice Signature: **Frank Barnard**

Apprentice Registration Number: **56366**

Comments: **No Data**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking number (Tracking #152651) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft)	To (ft)	Description
0-1		topsoil
1-13		caliche
13-247		gray limestone
247-249		void
249-600		gray limestone
600-640		shale
640-700		hard tan limestone
700-740		red sandstone
740-850		broken red sandstone

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
4.5"	new	plastic	-2' to 850' sdr17
			slotted 740'-850'

STATE OF TEXAS WELL REPORT for Tracking #198126

Owner:	CHRIS CANADA	Owner Well #:	No Data
Address:	120 HIGHLANDER COVE LAKEWAY, TX 78734	Grid #:	58-41-1
Well Location:	120 HIGHLANDER COVE LAKEWAY, TX 78734	Latitude:	30° 22' 04" N
Well County:	Travis	Longitude:	097° 59' 43" W
Elevation:	No Data	GPS Brand Used:	No Data
Type of Work:	New Well	Proposed Use:	Domestic

Drilling Date: Started: 8/12/2009
Completed: 8/12/2009

Diameter of Hole: Diameter: 8.75 in From Surface To 100 ft
Diameter: 6.5 in From 100 ft To 680 ft

Drilling Method: Air Rotary

Borehole Completion: Other: CASED

Annular Seal Data: 1st Interval: From 0 ft to 100 ft with 15 CEMENT (#sacks and material)
2nd Interval: From 0 ft to 100 ft with 12 VOLCLAY (#sacks and material)
3rd Interval: No Data
Method Used: PRESSURE TRIMMY CEMENTING
Cemented By: CENTRAL TEXAS DRILLING, INC.
Distance to Septic Field or other Concentrated Contamination: N/A ft
Distance to Property Line: N/A ft
Method of Verification: WELL DRILLED FIRST
Approved by Variance: No Data

Surface Completion: Surface Sleeve Installed

Water Level: Static level: 392 ft. below land surface on 8/12/2009
Artesian flow: No Data

Packers: 6 BURLAP,PVC,RUBBER 100',330',370',510',
530',570'

Plugging Info: Casing or Cement/Bentonite left in well: No Data

Type Of Pump: Submersible
Depth to pump bowl: (No Data) ft

Well Tests: Jetted
Yield: 50 GPM with (No Data) ft drawdown after (No Data) hours

Water Quality: Type of Water: TRINITY
Depth of Strata: 60 ft.
Chemical Analysis Made: No
Did the driller knowingly penetrate any strata which contained undesirable constituents: No

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: **CENTRAL TEXAS DRILLING, INC.**
2520 HWY. 290 WEST
DRIPPING SPRINGS , TX 78620

Driller License Number: **4227**

Licensed Well Driller Signature: **AARON GLASS**

Registered Driller Apprentice Signature: **No Data**

Apprentice Registration Number: **No Data**

Comments: **No Data**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking number (Tracking #198126) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft)	To (ft)	Description
0-2		TOP SOIL
2-10		CALICHE
10-12		BLUE/GRAY LIMESTONE
12-20		TAN LIMESTONE
20-50		TAN LIMESTONE W/GRAY STRIPS
50-380		GRAY LIMESTONE
380-410		TAN W/GRAY LIMESTONE
410-420		BROWN LIMESTONE
420-430		GRAY LIMESTONE
430-445		TAN LIMESTONE
445-460		BROWN LIMESTONE
460-480		GRAY LIMESTONE
480-500		HAMMIT CLAY
500-520		HAMMIT CLAY W/RED CLAY
520-540		GRAY SANDSTONE
540-550		RED/TAN SAND
550-570		STRIPS OF RED CLAY
570-610		RED LIMESTONE
610-680		SANDSTONE & GRAVEL

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
5"	OD N	SDR17 PVC	+3 TO 680
5"	OD N	SDR17 PVC	SLOT 590 TO 670 .032

STATE OF TEXAS WELL REPORT for Tracking #278629

Owner:	Aqua Land Lakeway Medical Dvlp, LLC	Owner Well #:	No Data
Address:	3700 Buffalo Speedway Ste.1100 Houston, TX 77098	Grid #:	58-41-1
Well Location:	3002 1/2 Ranch Rd. 620 South Lakeway, TX 78738	Latitude:	30° 20' 02" N
Well County:	Travis	Longitude:	097° 58' 13" W
Elevation:	No Data	GPS Brand Used:	e-Trax
Type of Work:	New Well	Proposed Use:	Irrigation

Drilling Date: Started: **11/21/2011**
Completed: **11/22/2011**

Diameter of Hole: Diameter: **10 in From Surface To 40 ft**
Diameter: **8 in From 40 ft To 860 ft**

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

Annular Seal Data: 1st Interval: **From 0 ft to 50 ft with 21 of Portland (#sacks and material)**
2nd Interval: **No Data**
3rd Interval: **No Data**
Method Used: **Slurry**
Cemented By: **Apex Drilling, Inc.**
Distance to Septic Field or other Concentrated Contamination: **100+ ft**
Distance to Property Line: **50+ ft**
Method of Verification: **Landowner**
Approved by Variance: **No Data**

Surface Completion: **Surface Sleeve Installed**

Water Level: Static level: **No Data**
Artesian flow: **No Data**

Packers: **Burlap/Neoprene 710, 705, 700, 300, 60, 50**

Plugging Info: Casing or Cement/Bentonite left in well: **No Data**

Type Of Pump: **No Data**

Well Tests: **Jetted**
Yield: **50-60 GPM with (No Data) ft drawdown after (No Data) hours**

Water Quality: Type of Water: **Trinity**
Depth of Strata: **710-853 ft.**
Chemical Analysis Made: **No**
Did the driller knowingly penetrate any strata which contained undesirable constituents: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the

statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: **Apex Drilling, Inc.**
P O Box 867
Marble Falls , TX 78654

Driller License Number: **54516**

Licensed Well Driller Signature: **Michael G. Becker, P. G.**

Registered Driller Apprentice Signature: **No Data**

Apprentice Registration Number: **No Data**

Comments: **Reference to Variance #068-12 (Distance to Sewer Line)**
Amended 4/26/12 Ref.# 10346

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking number (Tracking #278629) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft) Description
000-036 Fill
036-161 Grey Limestone
161-178 Tan Limestone
178-490 Grey/Tan Limestone
490-510 Tan Limestone
510-580 Grey/Tan Limestone
580-665 Grey Limestone w/Clay
665-710 Red Sandstone
710-715 Gravel H2O
715-742 Red Sandstone
742-754 Gravel H2O
754-790 Red Sandstone
790-800 Gravel H2O
800-830 Sandstone
830-853 Gravel H2O
853-860 Tan Clay

CASING, BLANK PIPE & WELL SCREEN DATA

Dia. New/Used Type Setting From/To
5" (5" OD) New PVC + 2' to 780' SDR17
5" (5" OD) New Slotted PVC 780' to 860' .035

8" New PVC 0' to 40' Sch40

STATE OF TEXAS WELL REPORT for Tracking #285827

Owner:	Johnson Residence	P77	Owner Well #:	No Data
Address:	125 Clubhouse Drive Austin, TX 78734		Grid #:	58-41-1
Well Location:	125 Clubhouse Drive Austin, TX 78734		Latitude:	30° 21' 45" N
Well County:	Travis		Longitude:	097° 58' 00" W
Elevation:	No Data		GPS Brand Used:	Magellan
Type of Work:	New Well		Proposed Use:	Geothermal Heat Loop

Drilling Date: Started: 4/26/2012
Completed: 4/30/2012

Diameter of Hole: Diameter: 4.75 in From Surface To 250 ft

Drilling Method: Air Rotary

Borehole Completion: Straight Wall

Annular Seal Data: 1st Interval: From 0 ft to 250 ft with 56 (#sacks and material)
2nd Interval: No Data
3rd Interval: No Data
Method Used: Pressured BH20 Grout
Cemented By: William McPike
Distance to Septic Field or other Concentrated Contamination: No Data
Distance to Property Line: No Data
Method of Verification: No Data
Approved by Variance: No Data

Surface Completion: No Data

Water Level: Static level: No Data
Artesian flow: No Data

Packers: No Data

Plugging Info: Casing or Cement/Bentonite left in well: No Data

Type Of Pump: No Data

Well Tests: No Data

Water Quality: Type of Water: No Data
Depth of Strata: No Data
Chemical Analysis Made: No Data
Did the driller knowingly penetrate any strata which contained undesirable constituents: No Data

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for

completion and resubmittal.

Company Information: **Geothermal Drilling, Inc.**
8840 Highway 75 South
Huntsville, TX 77340

Driller License Number: **3166**

Licensed Well Driller Signature: **William McPike**

Registered Driller Apprentice Signature: **Jose Lira**

Apprentice Registration Number: **57326**

Comments: **No Data**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking number (Tracking #285827) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft) Description

0-3 Topsoil

3-40 Yellow Clay

40-190 Gray Clay

190-250 Yellow Clay w/Yellow Sand

7 Boreholes

CASING, BLANK PIPE & WELL SCREEN DATA

No Data

STATE OF TEXAS WELL REPORT for Tracking #308397

Owner:	Simon Elliott	Owner Well #:	No Data
Address:	317 Martinique Pass Austin, TX 78734	Grid #:	57-48-3
Well Location:	317 Martinique Pass Austin, TX 78734	Latitude:	30° 21' 57" N
Well County:	Travis	Longitude:	098° 00' 29" W
Elevation:	No Data	GPS Brand Used:	e-Trax
Type of Work:	New Well	Proposed Use:	Irrigation

Drilling Date: Started: 11/13/2012
Completed: 11/13/2012

Diameter of Hole: Diameter: 8 in From Surface To 100 ft
Diameter: 6.5 in From 100 ft To 425 ft

Drilling Method: Air Rotary

Borehole Completion: Straight Wall

Annular Seal Data: 1st Interval: From 0 ft to 100 ft with 1-Port 9-Bens (#sacks and material)
2nd Interval: No Data
3rd Interval: No Data
Method Used: Pressure
Cemented By: Apex Drilling, Inc.
Distance to Septic Field or other Concentrated Contamination: 100+ ft
Distance to Property Line: 50+ ft
Method of Verification: Landowner
Approved by Variance: No Data

Surface Completion: Surface Sleeve Installed

Water Level: Static level: No Data
Artesian flow: No Data

Packers: Burlap/Neoprene 320', 310', 105', 100'

Plugging Info: Casing or Cement/Bentonite left in well: No Data

Type Of Pump: No Data

Well Tests: Pump
Yield: 35 GPM with (No Data) ft drawdown after (No Data) hours

Water Quality: Type of Water: M.Trinity
Depth of Strata: 320-400 ft.
Chemical Analysis Made: No
Did the driller knowingly penetrate any strata which contained undesirable constituents: No

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the

statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: **Apex Drilling, Inc.**
P.O. Box 867
Marble Falls , TX 78654

Driller License Number: **54516**

Licensed Well Driller Signature: **Michael G. Becker**

Registered Driller Apprentice Signature: **No Data**

Apprentice Registration Number: **No Data**

Comments: **No Data**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking number (Tracking #308397) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft) Description
000-001 Topsoil
001-038 Tan Limestone
038-320 Gray/Tan Limestone
320-400 Tan Limestone
400-415 Gray/Tan Limestone
415-425 Gray Clay

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
4.5"	(5" OD)	New PVC	+2' to 340' SDR17
4.5"	(5" OD)	New Slotted PVC	340' to 400' .035
4.5"	(5" OD)	New PVC	400' to 425' SDR17

STATE OF TEXAS WELL REPORT for Tracking #352449

Owner:	Lakeway WOTCA	P84	Owner Well #:	1
Address:	P.O. Box 34208 Austin, TX 78734		Grid #:	58-41-1
Well Location:	#1 World of Tennis Square Austin, TX 78734		Latitude:	30° 21' 13" N
Well County:	Travis		Longitude:	097° 59' 47" W
Elevation:	951 ft.		GPS Brand Used:	Google Earth
Type of Work:	New Well		Proposed Use:	Irrigation

Drilling Date: Started: **12/20/2013**
Completed: **12/21/2013**

Diameter of Hole: Diameter: **10 in From Surface To 10 ft**
Diameter: **8 in From 10 ft To 20 ft**
Diameter: **6.75 in From 20 ft To 770 ft**

Drilling Method: **Air Rotary**

Borehole Completion: **Open Hole**

Annular Seal Data: 1st Interval: **From 0 ft to 50 ft with 14 cement (#sacks and material)**
2nd Interval: **No Data**
3rd Interval: **No Data**
Method Used: **slurry & pour**
Cemented By: **Steve Stewart**
Distance to Septic Field or other Concentrated Contamination: **No Data**
Distance to Property Line: **No Data**
Method of Verification: **No Data**
Approved by Variance: **No Data**

Surface Completion: **Pitless Adapter Used**

Water Level: Static level: **371 ft. below land surface on 12/28/2013**
Artesian flow: **No Data**

Packers: **neoprene 50, 430, 435, 600, 605, 700, 705**

Plugging Info: Casing or Cement/Bentonite left in well: **No Data**

Type Of Pump: **Submersible**
Depth to pump bowl: **740 ft**

Well Tests: **Jettied \ Estimated**
Yield: **50 GPM with (No Data) ft drawdown after (No Data) hours**

Water Quality: Type of Water: **Trinity**
Depth of Strata: **No Data**
Chemical Analysis Made: **No**
Did the driller knowingly penetrate any strata which contained undesirable constituents: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: **Bee Cave Drilling, Inc.**
185 Angel Fire Dr.
Dripping Springs , TX 78620

Driller License Number: **54416**

Licensed Well Driller Signature: **Jim Blair**

Registered Driller Apprentice Signature: **Steve Stewart**

Apprentice Registration Number: **No Data**

Comments: **No Data**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking number (Tracking #352449) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft)	Description
0 1	topsoil
1 3	surface rock
3 7	tan caliche
7 450	gray limestone
450 570	tan limestone wb 1500 tds
570 595	gray clay
595 620	brown sandstone wb
620 650	red sandstone
650 670	tan & red sandstone
670 700	clay
700 770	red & tan sandstone wb

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
4.5	new	sdr-17 0 610	
4.5	new	perf 610 650	
4.5	new	sdr-17 650 730	
4.5	new	perf 730 770	

Send original copy by certified mail to: TNRC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

ATTENTION OWNER:Confidentiality Privilege Notice on
Reverse Side**State of Texas
WELL REPORT****Texas Water Well Drillers Advisory
Council**P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

P85

1) OWNER WEAVER, JOHN ALLEN - CUSTOMER ADDRESS 711 W. FITZHUGH DRIPPING SPRINGS TEXAS 78620
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: 17119 MAJESTIC RIDGE ROAD AUSTIN TEXAS 78734 GRID # 57-48-3
County TRAVIS (Street or RFD) (City) (State) (Zip)

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRC? ☐ Yes ☐ No

5)
N30° 20.22
W098° 00.04

6) WELL LOG:

Date Drilling:

Started 7-18-2001Completed 7-18-2001

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
8	Surface	100
6	100	860

7) DRILLING METHOD (Check):

☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other _____

N

From (ft.)	To (ft.)	Description and color of formation material
0	1	TOP SOIL
1	13	GALICHE
13	90	BLUE LIME
90	260	GRAY LIME
260	300	BROWN LIME
300	306	WHITE SANDSTONE
306	475	GRAY LIME
475	520	BROWN LIME
520	588	BROWN & WHITE WATER
588	620	GRAY LIME
620	660	HAMMID
660	700	GRAY & BROWN LIME
700	860	TRINITY

8) Borehole Completion (Check): ☐ Open Hole ☒ Straight Wall
☐ Underreamed ☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval ... from _____ ft. to _____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
8"OD	N	PLASTIC	+2	860	SDR17

9) CEMENTING DATA [Rule 338.44(1)]

Cemented from 0 ft. to 100 ft. No. of sacks used 18
_____ ft. to _____ ft. No. of sacks used _____

Method used PRESSURE TRIMMINGCemented by CTDDistance to septic system field lines or other concentrated contamination 75 ft.Method of verification of above distance OWNER

10) SURFACE COMPLETION

- ☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☒ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL

Static Level _____ ft. below land surface Date _____
Artesian flow _____ gpm Date _____

12) PACKERS:

	Type	Depth
3	PVC & BURLAP	100,680,700

13) TYPE PUMP:

☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____

Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:

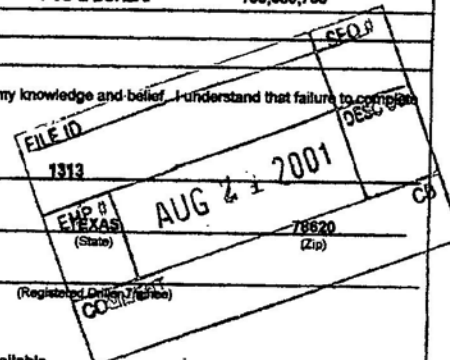
Type Test: ☐ Pump ☐ Bailor ☒ Jetted ☒ EstimatedYield: 40 gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"Type of water? TRINITY Depth of strata 60Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME CENTRAL TEXAS DRILLING, INC.
(Type or print)WELL DRILLER'S LICENSE NO. 1313ADDRESS 2520 HWY 290 WEST DRIPPING SPRINGS
(Street or RFD) (City)(Signed) Frank Glass
(Licensed Well Driller)(Signed) _____
(Registered Drilling Technician)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TNRC-0189 (Rev. 11-1-84)

WELL OWNER'S COPY

TNRC COPY

DRILLER'S COPY

ATTENTION OWNER: Confidentiality
 Privilege Notice on Reverse Side

STATE OF TEXAS
 WATER WELL REPORT

1) OWNER: **BROWN, DOUG** ADDRESS: **208 PALOS VERDES** CITY: **AUSTIN** STATE: **TX** ZIP: **78734-**

2) ADDRESS OF WELL: County: **TRAVIS** GRID # **58-41-1** Street or RFD: **3412 SERENE HILLS COURT** City, State, Zip code: **AUSTIN, TX**

3) TYPE OF WORK: **NEW WELL** 4) PROPOSED USE: **DOMESTIC**
 If Public Supply well, were plans submitted to the TNRCC?

6) WELL LOG: 01073

DATE DRILLING:	DIAMETER	FROM	TO	7) DRILLING METHOD:	8) BOREHOLE COMPLETION:
STARTED: 03/04/97	7-7/8"	0	20	AIR ROTARY	STRAIGHT WALL
COMPLETED: 03/05/97	7"	20	380		IF GRAVEL... FROM FT. TO FT.
	6-3/4"	380	600		FROM FT. TO FT.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

DIA	NEW/USED	DESCRIPTION	FROM	TO	GAGE CASING SCREEN
5	N	PLASTIC	-2	630	40

GEOLOGICAL DESCRIPTION:

FROM	TO	DESCRIPTION
0	1	TOP SOIL
1	18	CALICHE
18	230	GRAY LIME
230	280	BROKEN
280	355	GREY BROKEN SHALE
355	360	BROKEN
360	380	GRAY LIME
380	400	BROKEN
400	450	HARD GRAY LIME
450	490	BROKEN
490	535	SHALE LIME
535	555	LIME
555	580	BROKEN SANDS
580	650	RED CLAY SANDSTONE
650	660	BROKEN

9) CEMENTING DATA:

Cemented from 10 FT. TO 0 FT. No. of Sacks Used 3
 FT. TO FT.
 Method used: **GRAVITY**
 Cemented by: **ASSOCIATED DRILLING**
 Distance to septic field lines: 100 ft.
 Method of verification of above distance: **MEASURED**

10) SURFACE COMPLETION:

SURFACE SLAB INST.

11) WATER LEVEL:

STATIC LEVEL : 334' FT. DATE: 04/07/97
 ARTESIAN FLOW: GPM. DATE:

12) PACKERS:

TYPE	DEPTH
NEOPRENE/BURLAP	20'
NEOPRENE/BURLAP	610'

13) TYPE PUMP:

SUBMERSIBLE
 DEPTH TO PUMP: 560'

14) WELL TEST:

ESTIMATED
 YIELD: 50 GPM WITH FT DRAWDOWN AFTER HRS

15) WATER QUALITY:

TYPE OF WATER: **TRINITY** DEPTH OF STRATA: 650-740
 NO STRATA OF UNDESIRABLE WATER PENETRATED

NO CHEMICAL ANALYSIS MADE

COMPANY NAME: **ASSOCIATED DRILLING CO.**

WATER WELL DRILLER'S LICENSE NO.: 2939W

ADDRESS: P.O. BOX 1060

CITY: **MANCHACA**

STATE: **TX** ZIP CODE: 78652

FOR TWC USE ONLY

WELL NO. _____

LOCATED ON MAP _____

I HEREBY CERTIFY THAT THIS WELL WAS DRILLED BY ME (OR UNDER MY SUPERVISION) AND THAT EACH AND ALL OF THE STATEMENTS HEREIN ARE TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF. I UNDERSTAND THAT FAILURE TO COMPLETE ITEMS 1 THRU 15 WILL RESULT IN THE LOG(S) BEING RETURNED FOR COMPLETION AND RESUBMITTAL.

(signed) [Signature]
 (LICENSED WATER WELL DRILLER)

(signed) [Signature]
 (REGISTERED DRILLER TRAINEE)

STATE OF TEXAS WATER WELL REPORT (PAGE 2)

OWNER: BROWN, DOUG

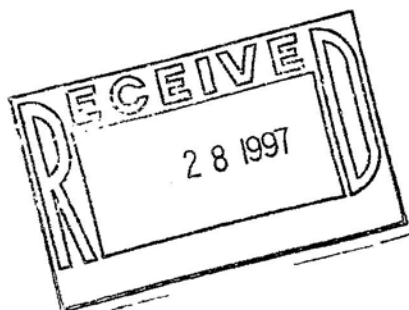
ADDRESS: 208 PALOS VERDES

CITY: AUSTIN

STATE: TX ZIP: 78734-

660 680 RED CLAY SANDSTONE

680 740 BROKEN



**IMPORTANT NOTICE FOR PERSONS
HAVING WELLS DRILLED CONCERNING
PRIVILEGE OF CONFIDENTIALITY**

The Water Well Drillers Advisory Council and the Texas Natural Resource Conservation Commission are concerned that some persons having wells drilled may not be aware of the confidentiality privilege provisions of Section 32.005 of the Texas Water Code, the Reporting of Well Logs, reads as follows:

"Every licensed driller drilling, deepening or otherwise altering a water well within this State shall make and keep a legible and accurate well log in accordance with the department rule on forms prescribed by the department. Not later than the 60th day after the completion or cessation of drilling, deepening, or otherwise altering the well, the licensed driller shall deliver or transmit by certified mail a copy of the well log to the department and to the owner of the well or the person for whom the well was drilled. Each copy of a well log, other than a department copy must include the name, mailing address, and telephone number of the department. The well log shall be recorded at the time of drilling, and must show the depth, thickness, and character of the strata penetrated, the location of water-bearing strata, the depth, size and character of casing installed, and any other information required by department rule. The department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner or person for whom the well was drilled."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential.

[illegible]

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse SideState of Texas
WELL REPORTTexas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-05301) OWNER MATT TELFER (Name) ADDRESS 294 B MOORING CIR. AUSTIN TX 78734
(Street or RFD) (City) (State) (Zip)2) ADDRESS OF WELL: County TRAVIS (Street, RFD or other) (City) (State) (Zip) GRID # 58-41-13) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No6) WELL LOG:
Date Drilling:
Started 3-21 1996
Completed 3-21 1996

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
<u>6 1/2</u>	Surface	<u>15</u>
<u>6</u>	<u>15</u>	<u>250</u>

7) DRILLING METHOD (Check): ☐ Driven
☒ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☐ Other _____

X

N

From (ft.)	To (ft.)	Description and color of formation material
<u>0</u>	<u>3</u>	<u>TOP SOIL</u>
<u>3</u>	<u>20</u>	<u>CALACHE</u>
<u>20</u>	<u>30</u>	<u>BLUE LIME</u>
<u>30</u>	<u>90</u>	<u>GRAY LIME</u>
<u>90</u>	<u>130</u>	<u>BLUE LIME</u>
<u>130</u>	<u>170</u>	<u>SHALE</u>
<u>170</u>	<u>210</u>	<u>BLUE LIME</u>
<u>210</u>	<u>250</u>	<u>WHITE LIME</u>

8) Borehole Completion (Check): ☒ Open Hole ☐ Straight Wall
☐ Underreamed ☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval ... from _____ ft. to _____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
<u>4 1/2</u>	<u>N</u>	<u>PLASTIC</u>	<u>0</u>	<u>250</u>	

9) CEMENTING DATA [Rule 338.44(1)]

Cemented from 0 ft. to 20 ft. No. of sacks used 6
ft. to _____ ft. No. of sacks used _____Method used SLURRYCemented by BULLET BIRE

Distance to septic system field lines or other concentrated contamination _____ ft.

Method of verification of above distance _____

13) TYPE PUMP:

☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder☐ Other _____
Depth to pump bowls, cylinder, jet, etc., 220 ft.

14) WELL TESTS:

Type test: ☐ Pump ☐ Bailer ☐ Jetted ☒ Estimated
Yield: 15 gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"Type of water? GLEN ROSE Depth of strata 210Was a chemical analysis made? ☐ Yes ☒ No

10) SURFACE COMPLETION

☐ Specified Surface Slab Installed [Rule 338.44(2)(A)]
☒ Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
☐ Pitless Adapter Used [Rule 338.44(3)(b)]
☐ Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL:

Static level 170 ft. below land surface Date 3-21-96
Artesian flow _____ gpm. Date _____

12) PACKERS:

Type	Depth
<u>PLASTIC</u>	<u>200</u>
<u>PLASTIC</u>	<u>20</u>

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME BIBLE DRILLING
(Type or print)WELL DRILLER'S LICENSE NO. 2537 WPADDRESS PO BOX 1223 JOHNSON CITY TX 78636
(Street or RFD) (City) (State) (Zip)(Signed) Seanley Bible
(Licensed Well Driller)(Signed) _____
(Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

**IMPORTANT NOTICE FOR PERSONS
HAVING WELLS DRILLED CONCERNING
PRIVILEGE OF CONFIDENTIALITY**

The Water Well Drillers Advisory Council and the Texas Natural Resource Conservation Commission are concerned that some persons having wells drilled may not be aware of the confidentiality privilege provisions of Section 32.005 of the Texas Water Code, the Reporting of Well Logs, reads as follows:

"Every licensed driller drilling, deepening or otherwise altering a water well within this State shall make and keep a legible and accurate well log in accordance with the department rule on forms prescribed by the department. Not later than the 60th day after the completion or cessation of drilling, deepening, or otherwise altering the well, the licensed driller shall deliver or transmit by certified mail a copy of the well log to the department and to the owner of the well or the person for whom the well was drilled. Each copy of a well log, other than a department copy must include the name, mailing address, and telephone number of the department. The well log shall be recorded at the time of drilling, and must show the depth, thickness, and character of the strata penetrated, the location of water-bearing strata, the depth, size and character of casing installed, and any other information required by department rule. The department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner or person for whom the well was drilled."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential.

[illegible]

Please use black ink.
Send original copy by
certified mail to the
Texas Water Commission
P.O. Box 13087
Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

1) OWNER Kenneth E Winbow (Name) Address 204 Coimethion Austin 78734 (City) (State) (Zip)
2) LOCATION OF WELL: County Travis 18 miles in W direction from Austin (N.E., S.W., etc.) (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:

Section No. _____ Block No. _____ Township _____

Abstract No. _____ Survey Name _____

Distance and direction from two intersecting section or survey lines _____

☒ See attached map. Sheet 6 58-49-1 Driveway

3) TYPE OF WORK (Check):

☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):

☒ Domestic ☐ Industrial ☐ Monitor ☐ Public Supply
☐ Irrigation ☐ Test Well ☐ Injection ☐ Other _____

5) DRILLING METHOD (Check):

☐ Driven
☐ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored
☒ Air Rotary ☐ Cable Tool ☐ Other _____

6) WELL LOG:

Date Drilling: 3-29 1986
Started " 19"
Completed " 19"

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
8	Surface	20
6	20	450

7) BOREHOLE COMPLETION:

☒ Open Hole ☐ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval ... from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	2	Top soil
2	10	Yellow sand
10	80	Blue limi
80	140	Grey limi
140	200	Blue limi
200	260	Grey limi
260	340	Blue limi
340	380	Grey limi
380	410	White limi
410	425	Water
425	450	White limi

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casing Screen
			From	To	
6 1/2	Plastic		0	20	

9) CEMENTING DATA [Rule 319.44(b)]

Cemented from 0 ft. to 20 ft. No. of Sacks Used 2
_____ ft. to _____ ft. No. of Sacks Used _____
Method used Load poured
Cemented by _____

10) SURFACE COMPLETION

☐ Specified Surface Slab Installed [Rule 319.44(c)]
☐ Pitless Adapter Used [Rule 319.44(d)]
☒ Approved Alternative Procedure Used [Rule 319.71]

11) WATER LEVEL:

Static level 330 ft. below land surface Date 3-86
Artesian flow _____ gpm. Date _____

12) PACKERS: Type _____ Depth _____

13) TYPE PUMP:

☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder

☐ Other _____

Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS:

Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: 20 gpm with _____ ft. drawdown after _____ hrs.

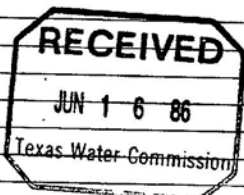
15) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No

If yes, submit "REPORT OF UNDESIRABLE WATER"

Type of water? _____ Depth of strata _____

Was a chemical analysis made? ☐ Yes ☐ No



I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

RICHARD L. BIBLE
COMPANY NAME WATER WELL DRILLING

Water Well Driller's License No. 284

10210 CIRCLE DR.
ADDRESS AUSTIN, TEXAS 78736

(Street or RFD) (City) (State) (Zip)
(Signed) Richard L. Bible (Licensed Water Well Driller)

(Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only
Well No. 58-41-1
Located on map _____

**IMPORTANT NOTICE FOR PERSONS
HAVING WELLS DRILLED CONCERNING
PRIVILEGE OF CONFIDENTIALITY**

The Water Well Drillers Board and the Texas Water Commission are concerned that some persons having water wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

"Every licensed water well driller drilling, deepening or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within 30 days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the Commission, and the owner thereof or the person having had such well drilled. Each copy of a well log, other than a Commission copy, shall include the name, mailing address, and telephone number of the Board and the Commission. The well log required herein shall at the request in writing to the Commission, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential.



STATE OF TEXAS WELL REPORT for Tracking #134327

Owner: AG&M BEE CREEK INVESTMENTS	Owner Well #: No Data
Address: 13652 HWY 71 W AUSTIN, TX 78737	Grid #: 57-48-3
Well Location: 19012 HWY 71 W SPICEWOOD, TX 78669	Latitude: 30° 20' 21" N
Well County: Travis	Longitude: 098° 02' 02" W
	Elevation: 774 ft. above sea level
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **1/14/2008** Drilling End Date: **1/14/2008**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	12
	6.75	12	270

Drilling Method: **Air Rotary**

Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	6	6
	6	12	4

Seal Method: **SLURRIED & POURED**

Distance to Property Line (ft.): **No Data**

Sealed By: **CESAR RAMOS**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **NOT YET INSTALLED**

Surface Completion: **Surface Sleeve Installed**

Water Level: **157 ft. below land surface on 2008-01-14** Measurement Method: **Unknown**

Packers: **NEOPRENE 12
NEOPRENE 180
NEOPRENE 185**

Type of Pump: **Submersible** Pump Depth (ft.): **250**

Well Tests: **Jetted** Yield: **60 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **Yes**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **BEE CAVE DRILLING INC**
185 ANGELFIRE DR
DRIPPING SPRINGS, TX 78620

Driller Name: **JIM BLAIR** License Number: **54416**

Apprentice Name: **CESAR RAMOS** Apprentice Number: **57534**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	10	CALICHE
10	40	GRAY LIMESTONE
40	45	GRAY CLAY
45	180	GRAY LIMESTONE
180	200	WHITE ROCK
200	223	GRAY ROCK
223	260	WHITE ROCK W/B 60 GPM TDS 1300
260	270	GRAY LIMESTONE

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	NEW	PLASTIC	0-200
4.5	NEW	SCREEN MFG	200-260 .050
4.5	NEW	PLASTIC	260-270

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #598700

Owner: Strobel & Associates, LLC.	Owner Well #: Boss
Address: PO Box 340850 Austin, TX 78734	Grid #: 57-48-3
Well Location: 4600 Wild Cow Cove Spicewood, TX 78669	Latitude: 30° 20' 00.98" N
	Longitude: 098° 02' 00.38" W
Well County: Travis	Elevation: 754 ft. above sea level

Type of Work: New Well	Proposed Use: Domestic
-------------------------------	-------------------------------

Drilling Start Date: **2/23/2022** Drilling End Date: **2/23/2022**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	100
	6.125	100	390

Drilling Method: **Air Hammer**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	100	Portland 8 Bags/Sacks

Seal Method: **Pressure**

Distance to Property Line (ft.): **50**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **N/A**

Distance to Septic Tank (ft.): **N/A**

Method of Verification: **Well drilled 1st**

Surface Completion: **Surface Sleeve Installed**

Surface Completion by Driller

Water Level: **112 ft. below land surface, and 25 GPM
artesian flow on 2022-02-28**

Packers: **Burlap at 100 ft.
Burlap/Plastic at 120 ft.
Burlap/Plastic at 200 ft.
Burlap/Plastic at 290 ft.**

Type of Pump: **Submersible**

Pump Depth (ft.): **360**

Well Tests: **Jetted Yield: 15 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	290 - 390	Lower Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Centex Pump & Supply, Inc.**
2520 Hwy. 290 West
Dripping Springs, TX 78620

Driller Name: **Martin Lingle**License Number: **54813**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	Top Soil
1	15	Rock & Caliche
15	18	Caliche
18	20	Blue
20	170	Gray Tan
170	220	Tan
220	250	Gray w/ Clay
250	260	Red Clay
260	390	Red Sand Stone Gravel

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5	Blank	New Plastic (PVC)	SDR17	2	290
4.5	Perforated or Slotted	New Plastic (PVC)	SDR17	290	390

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #361592

Owner: Architectural Granite & Marble	Owner Well #: 2
Address: 19012 Hwy. 71 W. Spicewood, TX 78669	Grid #: 57-48-3
Well Location: 19012 Hwy. 71 W. Spicewood, TX 78669	Latitude: 30° 20' 25" N
Well County: Travis	Longitude: 098° 02' 00" W
	Elevation: 781 ft. above sea level
Type of Work: New Well	
Proposed Use: Industrial	

Drilling Start Date: **3/10/2014** Drilling End Date: **3/10/2014**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	10
	8	10	20
	6.75	20	565

Drilling Method: **Air Rotary**

Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	50	14 cement

Seal Method: **slurry & pour**

Sealed By: **Steve Stewart**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Pitless Adapter Used**

Water Level: **181 ft. below land surface on 2014-03-14** Measurement Method: **Unknown**

Packers: **neoprene 50, 150, 450, 453, 455**

Type of Pump: **Submersible** Pump Depth (ft.): **540**

Well Tests: **Jetted** Yield: **100 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Bee Cave Drilling, Inc.**
185 Angel Fire Dr.
Dripping Springs, TX 78620

Driller Name: **Jim Blair** License Number: **54416**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	8	topsoil
8	12	tan limestone
12	25	tan caliche
25	45	gray limestone
45	50	gray clay
50	140	light gray limestone
140	155	white limestone
155	185	gray limestone wb 10 gpm
185	270	white/tan limestone wb 50gpm 1100tds
270	310	gray limestone
310	360	gray clay w/ red
360	390	trinity mix
390	430	red & gray shale
430	565	trinity mix w/ sand

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	new	sdr-17	0 495
4.5	new	perf	495 565

STATE OF TEXAS WELL REPORT for Tracking #342986

Owner: Lake Travis ISD	Owner Well #: No Data
Address: 11601 Hwy. 71 W Building B Austin, TX 78738	Grid #: 57-48-3
Well Location: 4932 Bee Creek Rd. Spicewood, TX 78669	Latitude: 30° 20' 16" N
Well County: Travis	Longitude: 098° 01' 56" W
	Elevation: 894 ft. above sea level
Type of Work: New Well	
Proposed Use: Irrigation	

Drilling Start Date: **8/5/2013**Drilling End Date: **8/11/2013**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	12.25	0	10
	10	10	780

Drilling Method: **Air Hammer**Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	50	15 cement

Seal Method: **slurry and pour**Distance to Property Line (ft.): **No Data**Sealed By: **Driller**Distance to Septic Field or other
concentrated contamination (ft.): **none**Distance to Septic Tank (ft.): **No Data**Method of Verification: **No Data**Surface Completion: **Surface Slab Installed**Water Level: **274 ft. below land surface on 2013-08-15** Measurement Method: **Unknown**Packers: **neoprene 50, 350, 560, 600, 640, 720, 722**Type of Pump: **No Data**Well Tests: **Pump** Yield: **36 GPM with 45 ft. drawdown after 6 hours**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Bee Cave Drilling, Inc.**
185 Angel Fire Dr.
Dripping Springs, TX 78620

Driller Name: **Steve Stewart** License Number: **54416**

Apprentice Name: **Jim Blair**

Comments: **Note: surface slab not installed yet as customer is still changing the grade at the surface. when surface grading is finished, we will install surface slab.**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	white limestone
2	4	gray limestone
4	50	tan limestone
50	60	gray shale
60	65	gray limestone
65	80	gray shale
80	350	gray limestone wb 2 gpm 1000 tds
350	440	white & gray limestone
440	455	gray clay
455	470	light gray limestone wb 9 gpm
470	515	brown & gray limestone w/ clay
515	560	gray & red clay
560	565	tan & red sandstone
565	586	red & gray clay
586	590	gray sandstone w/ tan rock
590	595	gray clay

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
6.9" (OD)	New	SDR-17	0 560
6.9"	New	Perf 0.032"	560 580
6.9"	New	SDR-17	580 600
6.9"	New	Perf 0.032"	600 620
6.9"	New	SDR-17	620 640
6.9"	New	Perf 0.032"	640 660
6.9"	New	SDR-17	660 720
6.9"	New	Perf 0.032"	720 760
6.9"	New	SDR-17	760 780

595	610	gray sandstone
610	620	gray clay
620	695	brown & gray sandstone w/ clay strips wb
695	755	gray sandstone wb
755	780	gray rock

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Please include the report's Tracking Number on your written request.

**Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540**

STATE OF TEXAS WELL REPORT for Tracking #120544

Owner: Prestiage Homes	Owner Well #: No Data
Address: 19200 Sean Avery Path Austin, TX	Grid #: 57-48-3
Well Location: 19200 Sean Avery Path Austin, TX	Latitude: 30° 20' 50" N
	Longitude: 098° 01' 53" W
Well County: Travis	Elevation: No Data
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **7/20/2007** Drilling End Date: **7/20/2007**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	20
	6.25	20	625

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	20	4 of Portland

Seal Method: **Slurry**

Distance to Property Line (ft.): **50+**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **100+**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Landowner**

Surface Completion: **Surface Sleeve Installed**

Water Level: **No Data**

Packers: **Neoprene 530', 520', 20'**

Type of Pump: **No Data**

Well Tests: **Estimated Yield: 60 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	530-605	Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Apex Drilling, Inc**
PO Box 867
Marble Falls, TX 78654

Driller Name: **Michael G Becker, P.G.** License Number: **54516**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	Top Soil
1	35	Tan Limestone
35	240	Grey Tan Limestone
240	310	Tan-Lt. Grey Limestone
310	395	Tan-White Limestone
395	435	Grey Limestone w/ Clay
435	480	Grey Clay
480	530	Red Sandstone
530	535	Gravel H2O
535	560	Red Sandstone
560	565	Red Sandstone
565	590	Red Sandstone
590	605	Gravel
605	625	Red Sandstone/Tan Clay

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5" (5" OD)	New	PVC	+2 to 585' SDR17
4.5" (5" OD)	New	Slotted PVC	585' to 625' .035

STATE OF TEXAS WELL REPORT for Tracking #148070

Owner: San Gabriel Builders c/o Kerry Martin	Owner Well #: No Data
Address: P O Box 341107 Austin, TX 78734	Grid #: 57-48-3
Well Location: Bee Creek Estates Spicewood, TX 78669	Latitude: 30° 20' 47" N
Well County: Travis	Longitude: 098° 01' 53" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **3/17/2008** Drilling End Date: **3/17/2008**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	100
	6.5	100	645

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	100	9 of Portland

Seal Method: **Pressure Tremmie**

Distance to Property Line (ft.): **50+**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **100+**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Land Owner**

Surface Completion: **Surface Sleeve Installed**

Water Level: **No Data**

Packers: **Burlap/Neoprene 485, 480, 100**

Type of Pump: **No Data**

Well Tests: **Jetted** Yield: **40-50 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	485-635	Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Apex Drilling, Inc.**
P O Box 867
Marble Falls, TX 78654

Driller Name: **Michael G. Becker, P.G.** License Number: **54516**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	35	Caliche
35	65	Grey Limestone with Clay
65	150	Grey Tan Limestone
150	165	Tan Limestone
165	230	Tan Grey Limestone
230	358	Tan Limestone
358	402	White Limestone
402	425	Grey Limestone with Clay
425	458	Clay
458	485	Grey Limestone Sandy
485	505	Red Sandstone
505	538	Red Sand and H2O
538	545	Tan Limestone
545	620	Sand and H2O
620	635	Gravel
635	645	Tan Clay

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5" (5" OD)	New	PVC + 2	to 555' SDR17
4.5" (5" OD)	New	Slotted PVC	555' to 575' .035
4.5" (5" OD)	New	PVC	575' to 595' SDR17
4.5" (5" OD)	New	Slotted PVC	595' to 635' .035
4.5" (5" OD)	New	PVC	635' to 645' SDR17

STATE OF TEXAS WELL REPORT for Tracking #394844

Owner: Ogah Ediom	Owner Well #: No Data
Address: 7918 Castle Peak Trail Austin, TX 78726	Grid #: 57-48-3
Well Location: 19109 Sean Avery Path Spicewood, TX 78669	Latitude: 30° 20' 48" N
	Longitude: 098° 01' 52" W
Well County: Travis	Elevation: No Data

Type of Work: New Well	Proposed Use: Domestic
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Drilling Start Date: **1/29/2015** Drilling End Date: **2/9/2015**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	20
	8	20	101
	6.5	101	680

Drilling Method: **Air Hammer**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	101	21

Seal Method: **Tremie Tube**

Distance to Property Line (ft.): **No Data**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **166**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **From Proposed Site**

Surface Completion: **Surface Sleeve Installed**

Water Level: 459 ft. below land surface on 2015-02-04	Measurement Method: Unknown
Packers: shale trap 632', 620', 101'	
Type of Pump: Submersible	Pump Depth (ft.): 600
Well Tests: Estimated	Yield: 100 GPM

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Tom Arnold Drilling**
2750 South A W Grimes Blvd
Round Rock, TX 78664

Driller Name: **Tommy Arnold**License Number: **2096**Comments: **^JLO**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	topsoil & loose rock
1	29	yellow limestone
29	89	tan limestone
65	680	yellow shale
89	167	blue limestone & shale
167	320	gray limestone
320	345	brown limestone
345	380	brown & white limestone
380	390	white limestone
390	400	gray sandstone
400	450	blue limestone & shale
450	479	red & blue shale
479	505	red sandstone
505	515	white limestone
515	544	red sandstone & sand
544	560	red clay
560	568	red sandstone
568	593	gray limestone

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4 1/2	New	plastic	from 0 to 605
		perf	from 575 to 605

593	605	cemented gravel
605	620	red sandstone
620	629	cemented gravel
629	632	red shale
632	665	cemented gravel & sand

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #493882

Owner: Scott Bryant	Owner Well #: No Data
Address: 2727 Exposition Blvd. Austin, TX 78703	Grid #: 57-48-3
Well Location: 19101 Sean Avery Path Spicewood, TX 78669	Latitude: 30° 20' 46.61" N
	Longitude: 098° 01' 51.42" W
Well County: Travis	Elevation: 922 ft. above sea level
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **9/17/2018** Drilling End Date: **9/18/2018**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10.625	0	8
	8	8	50
	6.75	50	685

Drilling Method: **Air Rotary**

Borehole Completion: **Perforated or Slotted**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	42	Cement 12 Bags/Sacks
	42	50	Bentonite 2 Bags/Sacks

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Pitless Adapter Used**

Surface Completion by Driller

Water Level: **317 ft. below land surface on 2018-09-24**

Packers: **Rubber at 50 ft.
Rubber at 380 ft.
Rubber at 430 ft.
Rubber at 570 ft.
Rubber at 575 ft.**

Type of Pump: **Submersible**

Pump Depth (ft.): **600**

Well Tests: **Jetted Yield: 10 GPM**

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
570 - 670	Trinity

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Bee Cave Drilling, Inc.**
185 Angel Fire Dr.
Dripping Springs, TX 78620

Driller Name: **Jim Blair**License Number: **54416**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	topsoil
1	3	white limestone
3	20	yellow limestone
20	120	gray limestone
120	150	gray shale
150	250	gray limestone
250	270	white limestone
270	380	gray limestone
380	430	gray sandstone wb 30 gpm 600 tds
430	490	gray clay
490	500	dark gray sandstone
500	550	red clay
550	610	red, tan, & gray sandstone
610	620	gravel
620	670	red sandstone & gravel
670	685	black rock

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5	Blank	New Plastic (PVC)	sdr-17	0	580
4.5	Perforated or Slotted	New Plastic (PVC)	sdr-17	580	680

STATE OF TEXAS WELL REPORT for Tracking #397017

Owner: **Lake Travis Builders (Duran)**Owner Well #: **No Data**Address: **P O Box 342105
Austin, TX 78734**Grid #: **57-48-3**Well Location: **19108 Sean Avery Path
Spicewood, TX 78669**Latitude: **30° 20' 49" N**Longitude: **098° 01' 51" W**Well County: **Travis**Elevation: **No Data**Type of Work: **New Well**Proposed Use: **Domestic**Drilling Start Date: **6/9/2015**Drilling End Date: **6/9/2015**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	17
	6.25	17	625

Drilling Method: **Air Rotary**Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	20	4 Portland

Seal Method: **Slurry**Distance to Property Line (ft.): **50+**Sealed By: **Apex Drilling INC.**Distance to Septic Field or other
concentrated contamination (ft.): **100+**Distance to Septic Tank (ft.): **No Data**Method of Verification: **Land Owner**Surface Completion: **Surface Sleeve Installed**Water Level: **No Data**Packers: **Burlap/Neoprene 500,490,480,30,20**Type of Pump: **No Data**Well Tests: **Jetted** **Yield: 30-40 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	500-620	L Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Apex Drilling, Inc.**
P.O. Box 867
Marble Falls, TX 78654

Driller Name: **Andrew Jackson Johnson**License Number: **54989**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	Top Soil
1	32	Tan LS
32	320	Gray Tan LS
320	345	White Tan LS
345	365	Gray Tan LS
365	390	Tan White LS
390	395	Gray Tan LS
395	462	Gray LS w/ Clay
462	480	Gray LS
480	565	Red SS
565	621	Gravel
621	625	Hard LS

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5 (5 OD)	New	PVC	+2' to 561' SDR17
4.5 (5 OD)	New	Screen	561' to 621 .035

STATE OF TEXAS WELL REPORT for Tracking #281702

Owner: Wheelock Street Capital	Owner Well #: 1
Address: 5025 McDade Dr Austin, TX 78735	Grid #: 57-48-6
Well Location: 5928 Pedernales Summit Parkway Austin, TX 78738	Latitude: 30° 19' 36" N
Well County: Travis	Longitude: 098° 01' 45" W
	Elevation: 955 ft. above sea level
Type of Work: New Well	
Proposed Use: Irrigation	

Drilling Start Date: **12/21/2011** Drilling End Date: **1/29/2012**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	12.25	0	100
	9.875	100	740

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	45	24 Ptlnd
	45	100	2 Hlplg8BnsI

Seal Method: **Unknown**

Distance to Property Line (ft.): **1000+**

Sealed By: **Unknown**

Distance to Septic Field or other
concentrated contamination (ft.): **50**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Measured**

Surface Completion: **Surface Sleeve Installed**

Water Level: **360 ft. below land surface on 2012-01-09** Measurement Method: **Unknown**

Packers:

- 6Mil Poly 100'**
- 6Mil Poly 200'**
- 6Mil Poly 300'**
- 6Mil Poly 400'**
- 6Mil Poly 500'**
- 6Mil Poly 540'**
- Shale Packer 600'**
- 6Mil Poly 620'**

Type of Pump: **Submersible**

Pump Depth (ft.): **640**

Well Tests: **Jetted** **Yield: 20+ GPM**

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
640'/720'	Good

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Whisenant & Lyle Water Services**

**P.O. Box 525
Dripping Springs, TX 78620**

Driller Name: **Martin Lingle**

License Number: **54813**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>From (ft)</i>	<i>To (ft)</i>	<i>Description</i>
0-1/2	Topsoil	
1/2-2	Caliche	
2-16	Black Clay Brown Limestone	
16-17	Gray Limestone	
17-38	Brown Limestone	
38-80	Gray Limestone	
80-101	Dark Gray Limestone	
101-220	Light Gray Limestone	
220-240	Dark Gray Limestone	
240-270	Tan Limestone	
270-340	Gray Limestone	
340-360	Tan Limestone	
360-400	Brown Limestone	
400-440	Gray Limestone	
440-480	Gray Clay	

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
6.9	New	SDR 17 Blank	+2'/640'
6.9	New	SDR 17 Slotted	640'/720'
6.9	New	SDR 17 Blank	720'/740'

480-540 Gray Brown Limestone
540-560 Red Sandstone
560-690 Brown Limestone
690-710 Red Sandstone
710-738 Calcite
738-740 Black Rock

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Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #71751

Owner: RICHARD SKINNER #1	Owner Well #: No Data
Address: 1310 RR 620 S. STE C-15 AUSTIN, TX 78734	Grid #: 57-48-3
Well Location: 4400 BEE CREEK RD. SPICEWOOD, TX 78669	Latitude: 30° 20' 47" N
	Longitude: 098° 01' 43" W
Well County: Travis	Elevation: 920 ft. above sea level

Type of Work: New Well	Proposed Use: Domestic
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Drilling Start Date: **10/20/2005** Drilling End Date: **10/20/2005**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	10
	6.5	10	430

Drilling Method: **Air Rotary**

Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	10	12 CEMENT

Seal Method: **SLURRIED & POURED**

Distance to Property Line (ft.): **No Data**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **NOT YET INSTALLED**

Surface Completion: **Surface Sleeve Installed**

Water Level: **326 ft. below land surface on 2005-10-22** Measurement Method: **Unknown**

Packers: **NEOPRENE 15
NEOPRENE 220
NEOPRENE 345**

Type of Pump: **Submersible** Pump Depth (ft.): **400**

Well Tests: **Jetted** Yield: **35 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **Yes**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **BEE CAVE DRILLING, INC.**
185 ANGELFIRE DR.
DRIPPING SPRINGS, TX 78620

Driller Name: **BOBBY ROBERTS** License Number: **54416**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	TOPSOIL
1	7	WHITE ROCK
7	8	YELLOW CLAY
8	10	WHITE ROCK
10	23	CALICHE
23	50	GREY LIMESTONE
50	58	SANDSTONE
58	67	GREY LIMESTONE
67	78	BLUE SHALE
78	115	GREY LIMESTONE / SANDSTONE
115	120	GREY SHALE
120	160	GREY LIMESTONE / SANDSTONE
160	164	BLUE SHALE
164	185	GREY LIMESTONE
185	190	GREY CLAY
190	195	TAN ROCK W/B 20 GPM TDS 1740
195	210	GREY ROCK

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	NEW	PLASTIC	0 - 370
4.5	NEW	SCREEN MFG.	370 - 430 .05

210	230	GREY LIMESTONE
230	260	GREY ROCK
260	345	GREY LIMESTONE
345	430	TAN & WHITE ROCK W/B 35 GPM

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #108251

Owner: PRYOR CUSTOM HOMES	Owner Well #: No Data
Address: 12400 HWY 71 W, STE 350-241 AUSTIN, TX 78738	Grid #: 57-48-3
Well Location: 19217 SEAN AVERY PATH SPICEWOOD, TX 78669	Latitude: 30° 20' 58" N
	Longitude: 098° 01' 43" W
Well County: Travis	Elevation: 1147 ft. above sea level

Type of Work: New Well	Proposed Use: Domestic
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Drilling Start Date: **3/19/2007** Drilling End Date: **3/19/2007**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	12
	6.75	12	620

Drilling Method: **Air Rotary**

Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	6	5
	6	12	4

Seal Method: **SLURRIED & POURED**

Distance to Property Line (ft.): **No Data**

Sealed By: **CESAR RAMOS**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **NOT YET INSTALLED**

Surface Completion: **Surface Sleeve Installed**

Water Level: 310 ft. below land surface on 2007-03-20	Measurement Method: Unknown
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Packers: **NEOPRENE 12**
NEOPRENE 570
NEOPRENE 575

Type of Pump: Submersible	Pump Depth (ft.): 560
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Well Tests: Jetted	Yield: 50+ GPM	
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Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **Yes**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **BEE CAVE DRILLING**
185 ANGELFIRE DR
DRIPPING SPRINGS, TX 78620

Driller Name: **JIM BLAIR** License Number: **54416**

Apprentice Name: **CESAR RAMOS** Apprentice Number: **3090**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	3	TOPSOIL
3	10	CALICHE
10	145	GRAY LIMESTONE
145	150	CAVE
150	345	GRAY LIMESTONE
345	420	GRAY & WHITE ROCK
420	460	BLUE CLAY
460	500	RED SANDSTONE
500	530	RED ROCK
530	540	RED CLAY
540	580	RED SANDSTONE
580	620	RED ROCK W/B 50+ GPM

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	NEW	PLASTIC	0-575
4.5	NEW	SCREEN MFG	575-615 .050
4.5	NEW	PLASTIC	615-620

STATE OF TEXAS WELL REPORT for Tracking #518929

Owner:	Larry Williams	Owner Well #:	No Data
Address:	1139 Challenger Lakeway, TX 78734	Grid #:	57-48-3
Well Location:	Bee Creek Rd. Spicewood, TX 78669	Latitude:	30° 20' 25" N
Well County:	Travis	Longitude:	098° 01' 43" W
		Elevation:	No Data
Type of Work:	New Well	Proposed Use:	Domestic

Drilling Start Date: **2/18/2019** Drilling End Date: **2/18/2019**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	20
	6.5	20	450

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	20	Cement 6 Bags/Sacks

Seal Method: **Poured**

Distance to Property Line (ft.): **n/a**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **300**

Distance to Septic Tank (ft.): **n/a**

Method of Verification: **Tape Measure**

Surface Completion: **Surface Sleeve Installed**

Surface Completion by Driller

Water Level: **345 ft. below land surface on 2019-02-21**

Packers: **Shale Trap at 20 ft.
Shale Trap at 320 ft.
Shale trap at 338 ft.**

Type of Pump: **Submersible**

Pump Depth (ft.): **400**

Well Tests: **Estimated Yield: 20 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **TOM ARNOLD DRILLING**
2750 SOUTH A. W. GRIMES BLVD
ROUND ROCK, TX 78664

Driller Name: **Tommy D Arnold**License Number: **2096**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	Topsoil & Loose Rock
1	20	Yellow Limestone
20	28	Blue Limestone
28	43	Yellow Limestone
43	170	Gray Limestone
170	450	No Drill Returns (Lost Circulation)

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5	Blank	New Plastic (PVC)		0	450
	Perforated or Slotted			390	410

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #26187

Owner: **LARRY WILLIAMS** Owner Well #: **001**
 Address: **4520 BEE CREEK** Grid #: **57-48-3**
SPICEWOOD, TX 78669
 Well Location: **4520 BEE CREEK** Latitude: **30° 20' 35" N**
SPICEWOOD, TX 78669 Longitude: **098° 01' 42" W**
 Well County: **Travis** Elevation: **950 ft. above sea level**

****This well has been plugged****

Plugging Report Tracking #228173

Type of Work: **New Well**

Proposed Use: **Domestic**

Drilling Start Date: **8/12/2003**

Drilling End Date: **8/12/2003**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	13
	7	13	410

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	310	410	Gravel	

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	13	10
	295	310	2

Seal Method: **SLURRIED & POURED**

Distance to Property Line (ft.): **No Data**

Sealed By: **GREG SVETLIK**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **NOT YET INSTALLED**

Surface Completion: **Surface Sleeve Installed**

Water Level: **320 ft. below land surface on 2003-08-15** Measurement Method: **Unknown**

Packers: **PLASTIC 13**

Type of Pump: **Submersible**

Pump Depth (ft.): **380**

Well Tests: **Jetted**

Yield: 10 GPM

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **BEE CAVE DRILLING, INC.**
185 ANGELFIRE DR.
DRIPPING SPRINGS, TX 78620

Driller Name: **JIM BLAIR** License Number: **54416**

Apprentice Name: **GREG SVETLIK** Apprentice Number: **WWDAPP00001734**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	TOPSOIL
2	11	CALICHE
11	185	GREY LIMESTONE
185	195	GREY SHALE
195	207	GREY LIMESTONE
207	212	GREY SHALE
212	217	WHITE LIMESTONE
217	245	GREY LIMESTONE
245	265	LIGHT GREY LIMESTONE
265	273	GREY SHALE
273	365	GREY LIMESTONE
365	400	WHITE ROCK W/B 10 GPM
400	410	GREY LIMESTONE

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	NEW	PLASTIC	0 - 345
4.5	NEW	SCREEN MFG.	345 - 405 .10
4.5	NEW	PLASTIC	405 - 410

STATE OF TEXAS WELL REPORT for Tracking #26227

Owner: BRENT HOLT	Owner Well #: 001
Address: 104 LONGWOOD AVENUE AUSTIN, TX 78734	Grid #: 57-48-3
Well Location: 4284 BEE CREEK RD. SPICEWOOD, TX 78669	Latitude: 30° 20' 57" N
	Longitude: 098° 01' 42" W
Well County: Travis	Elevation: 944 ft. above sea level

Type of Work: New Well	Proposed Use: Domestic
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Drilling Start Date: **8/12/2003** Drilling End Date: **8/12/2003**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	13
	7	13	430

Drilling Method: **Air Hammer**

Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	330	430	Gravel	3/8"

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	13	10 CEMENT
	315	330	2 HOLEPLUG

Seal Method: **SLURRIED & POURED**

Distance to Property Line (ft.): **No Data**

Sealed By: **GREG SVETLIK**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **NOT YET INSTALLED**

Surface Completion: **Surface Sleeve Installed**

Water Level: 308 ft. below land surface on 2003-08-19	Measurement Method: Unknown
Packers: PLASTIC 13	
Type of Pump: Submersible	Pump Depth (ft.): 400
Well Tests: Jetted	Yield: 10 GPM

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **BEE CAVE DRILLING, INC.**
185 ANGELFIRE DR.
DRIPPING SPRINGS, TX 78620

Driller Name: **JIM BLAIR** License Number: **54416**

Apprentice Name: **GREG SVETLIK** Apprentice Number: **WWDAPP00001**
734

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	TOPSOIL
1	38	CLACHE W/ SHELF ROCK
38	41	TAN CLAY
41	53	TAN LIMESTONE
53	178	GREY LIMESTONE
178	195	TAN ROCK & CLAY
195	235	GREY LIMESTONE
235	255	LIGHT GREY LIMESTONE W/B 10 GPM
255	275	GREY LIMESTONE
275	290	GREY SHALE
290	315	TAN & GREY LIMESTONE W/B 1 GPM
315	348	GREY LIMESTONE
348	375	WHITE ROCK
375	400	GREY ROCK W/B 10 GPM
400	420	WHITE ROCK W/B 10 GPM
420	430	GREY LIMESTONE

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	NEW	PLASTIC	0 - 365
4.5	NEW	SCREEN MFG.	365 - 425 .10
4.5	NEW	PLASTIC	425 - 430

STATE OF TEXAS WELL REPORT for Tracking #421075

Owner: Bee Creek Stable LP	Owner Well #: No Data
Address: 4900 Bee Creek Rd Spicewood , TX 78669	Grid #: 57-48-3
Well Location: 4900 Bee Creek Rd Spicewood, TX 78669	Latitude: 30° 20' 17" N
Ref: Test Well 415072	Longitude: 098° 01' 41" W
Well County: Travis	Elevation: No Data

Type of Work: Completion	Proposed Use: Domestic
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Drilling Start Date: **3/28/2016** Drilling End Date: **4/1/2016**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	11.625	0	390
	8	390	465

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	390	Portland 146 Bags/Sacks
	190	207	Bentonite 16 Bags/Sacks

Seal Method: **Pressure**

Sealed By: **Driller**

Distance to Property Line (ft.): **150+**

Distance to Septic Field or other
concentrated contamination (ft.): **150+**

Distance to Septic Tank (ft.): **150+**

Method of Verification: **Land Owner**

Surface Completion: 7" x 7' Slab	Surface Completion by Driller
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Water Level: **No Data**

Packers: **Neoprene at 388 ft.
Neoprene at 389 ft.
Neoprene at 390 ft.**

Type of Pump: **No Data**

Well Tests: **Pump No Test Data Specified**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	390 - 465	Middle Trinity

Chemical Analysis Made: **Yes**Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Apex Drilling, Inc.**
P.O. Box 867
Marble Falls, TX 78654

Driller Name: **Andrew Jackson Johnson** License Number: **54989**

Comments: **16 Bags 3/8" Bentonite Chips placed over lost circulation zone. 207-190**
TDS 2200, Land Owner is aware of TDS Levels, Owner has engineered plans to blend water with portable source.

Report Amended on 5/17/2016 by Request #17832

Report Amended on 5/18/2016 by Request #17845

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	Top Soil
1	27	Tan LS
27	200	Gray Tan LS
200	207	White Anhydrite
207	471	VOID Lost Returns

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
6.25	Blank	New SDR17	SCR17	2	390

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #102794

Owner: LOUIS HAUSMAN	Owner Well #: No Data
Address: 1403 DEBBA DRIVE AUSTIN, TX 78734	Grid #: 57-48-3
Well Location: 19116 SEAN AVERY PATH SPICEWOOD, TX 78669	Latitude: 30° 20' 58" N
	Longitude: 098° 01' 37" W
Well County: Travis	Elevation: 888 ft. above sea level
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **12/15/2006** Drilling End Date: **12/18/2006**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	12
	6.75	12	655

Drilling Method: **Air Hammer**

Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	10	8
	10	12	1

Seal Method: **SLURRIED & POURED**

Distance to Property Line (ft.): **No Data**

Sealed By: **CESAR RAMOS**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **NOT YET INSTALLED**

Surface Completion: **Surface Sleeve Installed**

Water Level: **338 ft. below land surface on 2006-12-20** Measurement Method: **Unknown**

Packers: **NEOPRENE 12
NEOPRENE 295
NEOPRENE 605
NEOPRENE 610**

Type of Pump: **Submersible** Pump Depth (ft.): **600**

Well Tests: **Jetted** Yield: **100 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **Yes**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **BEE CAVE DRILLING**
185 ANGELFIRE DRIVE
DRIPPING SPRING, TX 78620

Driller Name: **JIM BLAIR** License Number: **54416**

Apprentice Name: **CESAR RAMOS** Apprentice Number: **3090**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	TOPSOIL
1	20	CALICHE
20	155	GRAY LIMESTONE
155	168	TAN SAND W/B 25 GPM
168	235	GRAY SHALE
235	380	BROWN AND WHITE ROCK
380	489	BLUE SHALE
489	537	RED CLAY
537	555	RED SANDSTONE
555	590	RED CLAY
590	610	RED SANDSTONE
610	655	BROWN ROCK W/B 100 GPM TDS 1870

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	NEW	PLASTIC	0-610
4.5	NEW	SCREEN MFG.	610-650 .050
4.5	NEW	PLASTIC	650-655

STATE OF TEXAS WELL REPORT for Tracking #38542

Owner:	JIM RAUGHTON	Owner Well #:	No Data
Address:	2918 RR 620 N AUSTIN, TX 78734	Grid #:	57-48-3
Well Location:	4252 BEE CREEK RD SPICEWOOD, TX 78669	Latitude:	30° 20' 53" N
		Longitude:	098° 01' 34" W
Well County:	Travis	Elevation:	927 ft. above sea level
Type of Work: New Well		Proposed Use: Domestic	

Drilling Start Date: **4/20/2004** Drilling End Date: **4/23/2004**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	380

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	300	380	Gravel	

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	100	12 CEMENT
	290	300	2 HOLE PLUG

Seal Method: **PRESSURE CEMENTED**

Distance to Property Line (ft.): **No Data**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **NOT YET INSTALLED**

Surface Completion: **Surface Sleeve Installed**

Water Level:	266 ft. below land surface on 2004-05-12	Measurement Method:	Unknown
Packers:	PLASTIC 10		
Type of Pump:	Submersible	Pump Depth (ft.):	340
Well Tests:	Jetted	Yield:	10 GPM

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
No Data	No Data

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **BEE CAVE DRILLING, INC.**
185 ANGEL FIRE DR
DRIPPING SPRINGS, TX 78620

Driller Name: **BOBBY ROBERTS** License Number: **54870**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	TOPSOIL
1	22	CALICHE
22	31	GREY LIMESTONE
31	72	GREY CLAY
72	80	GREY LIMESTONE
80	140	GREY SANDY CLAY
140	152	BROWN CLAY & ROCK
152	161	GREY LIMESTONE
161	184	BLUE SHALE
184	210	BROWN CLAY
210	290	GREY LIMESTONE
290	291	BROWN & WHITE ROCK / BROWN CLAY
291	320	BROWN CLAY ROCK
320	340	WHITE ROCK W/B 4 GPM
340	350	GREY LIMESTONE
350	370	WHITE ROCK W/B 10 GPM
370	380	GREY LIMESTONE

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	NEW	PLASTIC	0 - 310
4.5	NEW	SCREEN MFG	310 - 370 .10
4.5	NEW	PLASTIC	370 - 380

STATE OF TEXAS WELL REPORT for Tracking #115518

Owner: CHRIS COKINS	Owner Well #: No Data
Address: 325 RR 620 SOUTH AUSTIN, TX 78734	Grid #: 57-48-3
Well Location: 19100 SEAN AVERY PATH SPICEWOOD, TX 78669	Latitude: 30° 20' 56" N
	Longitude: 098° 01' 34" W
Well County: Travis	Elevation: 1004 ft. above sea level

Type of Work: New Well	Proposed Use: Domestic
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Drilling Start Date: **5/15/2007** Drilling End Date: **5/16/2007**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	12
	6.75	12	650

Drilling Method: **Air Rotary**

Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	6	5
	6	12	6

Seal Method: **SLURRIED & POURED**

Distance to Property Line (ft.): **No Data**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **NOT YET INSTALLED**

Surface Completion: **Surface Sleeve Installed**

Water Level: 286 ft. below land surface on 2007-05-17	Measurement Method: Unknown
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Packers: **NEOPRENE 12
NEOPRENE 300
NEOPRENE 507
NEOPRENE 510**

Type of Pump: Submersible	Pump Depth (ft.): 600
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Well Tests: Jetted	Yield: 30 GPM	
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Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **Yes**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **BEE CAVE DRILLING INC**
185 ANGELFIRE DR
DRIPPING SPRINGS, TX 78620

Driller Name: **BOBBY ROBERTS** License Number: **54416**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	TOPSOIL
2	12	CALICHE
12	165	GRAY LIMESTONE
165	169	TAN SAND W/B 15 GPM TDS 650
169	325	GRAY LIMESTONE
325	355	WHITE & GRAY ROCK W/B 35 GPM TDS 1560
355	492	GRAY ROCK
492	500	RED CLAY
500	640	BROWN ROCK W/B 30 GPM TDS 1680
640	650	BLUE CLAY

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	NEW	PLASTIC	0-570
4.5	NEW	SCREEN MFG	570-650 .050

STATE OF TEXAS WELL REPORT for Tracking #102758

Owner: HAUSMAN HOMES	Owner Well #: No Data
Address: 14203 DEBBA DRIVE AUSTIN, TX 78734	Grid #: 57-48-3
Well Location: 19008 SEAN AVERY PATH SPICEWOOD, TX 78669	Latitude: 30° 20' 56" N
	Longitude: 098° 01' 33" W
Well County: Travis	Elevation: 955 ft. above sea level

Type of Work: New Well	Proposed Use: Domestic
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Drilling Start Date: **12/12/2006** Drilling End Date: **12/13/2006**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	12
	6.75	12	675

Drilling Method: **Air Hammer**

Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	10	7
	10	12	1

Seal Method: **SLURRIED & POURED**

Distance to Property Line (ft.): **No Data**

Sealed By: **CESAR RAMOS**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **NOT YET INSTALLED**

Surface Completion: **Surface Sleeve Installed**

Water Level: **356 ft. below land surface on 2006-12-14** Measurement Method: **Unknown**

Packers: **NEOPRENE 12
NEOPRENE 250
NEOPRENE 580
NEOPRENE 585
NEOPRENE 630
NEOPRENE 635**

Type of Pump: **Submersible**

Pump Depth (ft.): **600**

Well Tests: **Jetted** **Yield: 200 GPM**

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
No Data	No Data

Chemical Analysis Made: **Yes**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **BEE CAVE DRILLING**
185 ANGELFIRE DRIVE
DRIPPING SPRINGS, TX 78620

Driller Name: **JIM BLAIR**License Number: **54416**Apprentice Name: **CESAR RAMOS**Apprentice Number: **3090**Comments: **No Data**

Lithology:
 DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
 BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	TOPSOIL
1	15	CALICHE
15	255	GREY LIMESTONE
255	315	BROWN & GRAY ROCK W/B 15 GPM TDS 1580
315	405	WHITE ROCK
405	475	BLUE SHALE
475	510	RED CLAY
510	520	WHITE ROCK
520	548	BLUE CLAY
548	565	BROWN & WHITE ROCK
565	573	RED CLAY
573	613	BROWN ROCK
613	625	RED CLAY
625	675	BROWN ROCK W/B 200 GPM

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	NEW	PLASTIC	0-595
4.5	NEW	SCREEN MFG.	595-615 .050
4.5	NEW	PLASTIC	615-635
4.5	NEW	SCREEN MFG.	635-675 .050

STATE OF TEXAS WELL REPORT for Tracking #28035

Owner: SHADOWLAKE BUILDERS	Owner Well #: 020
Address: 5004 BEE CREEK RD. SPICEWOOD, TX 78669	Grid #: 57-48-3
Well Location: BEE CREEK RD. @ 71 W. SPICEWOOD, TX 78669	Latitude: 30° 20' 06" N
Well County: Travis	Longitude: 098° 01' 28" W
	Elevation: 940 ft. above sea level
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **9/23/2003** Drilling End Date: **9/23/2003**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	13
	7	13	430

Drilling Method: **Air Hammer**

Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	330	430	Gravel	

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	10	12 CEMENT
	315	330	2 HOLE PLUG

Seal Method: **SLURRIED & POURED**

Distance to Property Line (ft.): **No Data**

Sealed By: **GREG SVETLIK**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **NOT YET INSTALLED**

Surface Completion: **Surface Sleeve Installed**

Water Level: 273 ft. below land surface on 2003-09-24	Measurement Method: Unknown
Packers: PLASTIC 10	
Type of Pump: Submersible	Pump Depth (ft.): 400
Well Tests: Jetted	Yield: 60 GPM

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **BEE CAVE DRILLING, INC.**
185 ANGELFIRE DR.
DRIPPING SPRINGS, TX 78620

Driller Name: **JIM BLAIR** License Number: **54416**

Apprentice Name: **GREG SVETLIK** Apprentice Number: **WWDAPP00001**
734

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	TOPSOIL
1	22	CALICHE W/ SHELF ROCK
22	42	GREY LIMESTONE
42	46	TAN CLAY
46	185	GREY LIMESTONE
185	198	LIGHT GREY ROCK
198	200	GREY SHALE
200	208	GREY LIMESTONE
208	228	LIGHT GREY & TAN LIMESTONE W/B 7 GPM
228	275	GREY LIMESTONE
275	320	LIGHT GREY LIMESTONE
320	360	GREY LIMESTONE
360	405	LIGHT GREY LIMESTONE
405	425	WHITE ROCK W/B 60 GPM
425	430	GREY LIMESTONE

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	NEW	PLASTIC	0 - 360
4.5	NEW	SCREEN MFG.	360 - 420 .10
4.5	NEW	PLASTIC	420 - 430

STATE OF TEXAS WELL REPORT for Tracking #96653

Owner: RICHARD SKINNER	Owner Well #: No Data
Address: 1310 RR 620 S., STE C-15 AUSTIN, TX 78734	Grid #: 57-48-3
Well Location: 4400 BEE CREEK RD. SPICEWOOD, TX 78669	Latitude: 30° 20' 22" N
	Longitude: 098° 01' 12" W
Well County: Travis	Elevation: No Data
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **9/26/2006** Drilling End Date: **9/26/2006**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	13
	6.75	13	670

Drilling Method: **Air Rotary**

Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	2	2
	2	13	8

Seal Method: **SLURRIED & POURED**

Distance to Property Line (ft.): **No Data**

Sealed By: **BOBBY ROBERTS**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **NOT YET INSTALLED**

Surface Completion: **Surface Sleeve Installed**

Water Level: **377 ft. below land surface on 2006-10-18** Measurement Method: **Unknown**

Packers: **NEOPRENE 13
NEOPRENE 555
NEOPRENE 560**

Type of Pump: **Submersible** Pump Depth (ft.): **640**

Well Tests: **Jetted** Yield: **100 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **Yes**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **BEE CAVE DRILLING**
185 ANGELFIRE DR
DRIPPING SPRINGS, TX 78620

Driller Name: **BOBBY ROBERTS 54870**License Number: **54416**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	TOPSOIL
1	13	CALICHE
13	30	YELLOW CLAY
30	205	GRAY LIMESTONE
205	215	BLUE SHALE
215	345	GRAY LIMESTONE
345	450	WHITE ROCK W/B 10 GPM TDS 640
450	455	GRAY CLAY
455	460	GRAY ROCK
460	465	BLUE CLAY
465	475	GRAY ROCK
475	485	BLUE CLAY
485	495	GREY ROCK
495	550	RED SANDSTONE
550	670	RED ROCK W/B 100 GPM TDS 1670

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	NEW	PLASTIC	0-600
4.5	NEW	SCREEN MFG.	600-660 .050
4.5	NEW	PLASTIC	660-670

STATE OF TEXAS WELL REPORT for Tracking #20590

Owner:	TREYCO	Owner Well #:	001
Address:	708 UPSON ST. AUSTIN, TX 78703	Grid #:	57-48-3
Well Location:	ENVOY PLACE SPICEWOOD, TX 78669	Latitude:	30° 20' 51" N
Well County:	Travis	Longitude:	098° 01' 09" W
		Elevation:	No Data

****Plugged Within 48 Hours****

****This well has been plugged****

Plugging Report Tracking #107588

Type of Work: **New Well**

Proposed Use: **Domestic**

Drilling Start Date: **4/9/2003**

Drilling End Date: **4/10/2003**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	20
	6.125	10	310

Drilling Method: **Air Rotary**

Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	0	0

Seal Method: **Unknown**

Distance to Property Line (ft.): **No Data**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **NOT YET INSTALLED**

Surface Completion: **Surface Sleeve Installed**

Water Level: **0 ft. below land surface on 2003-04-15** Measurement Method: **Unknown**

Packers: **NONE**

Type of Pump: **NONE** Pump Depth (ft.): **0**

Well Tests: **Jetted** Yield: **0 GPM**

	<i>Description (number of sacks & material)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Plug Information:	0 0 0 3 2		

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **BEE CAVE DRILLING, INC.**
185 ANGELFIRE DR.
DRIPPING SPRINGS, TX 78620

Driller Name: **BOBBY ROBERTS** License Number: **54416**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	TOPSOIL
1	10	CALICHE
10	15	TAN SAND
15	49	TAN CLAY
49	100	TAN ROCK
100	110	GREY SHALE
110	120	GREY ROCK
120	168	GREY SHALE
168	200	RED CLAY
200	237	RED ROCK
237	240	RED CLAY
240	285	RED ROCK

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
NONE			

STATE OF TEXAS WELL REPORT for Tracking #601467

Owner: Barker Project (Arbogast Homes)	Owner Well #: No Data
Address: 17224 Flintrock Road Austin, TX 78738	Grid #: 57-48-3
Well Location: 17224 Flintrock Road Austin, TX 78738	Latitude: 30° 20' 13.7" N
Well County: Travis	Longitude: 098° 00' 36.76" W
	Elevation: No Data
Type of Work: New Well	Proposed Use: Domestic

Drilling Start Date: **3/16/2022** Drilling End Date: **3/16/2022**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8.75	0	100
	6.25	100	990

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	-1	100	10 cement 4 benseal Bags/Sacks

Seal Method: **Pressure Tremmie**

Distance to Property Line (ft.): **50**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **unknown**

Distance to Septic Tank (ft.): **unknown**

Method of Verification: **owner**

Surface Completion: **Surface Sleeve Installed**

Surface Completion by Driller

Water Level: 682 ft. below land surface on 2022-03-16	Measurement Method: Sonic/Radar
Packers: burlap and plastic 810, 790 burlap and rubber 100	
Type of Pump: Submersible	
Well Tests: Estimated	Yield: 15-20 GPM

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	308	hoston trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Associated Drilling Inc**
PO BOX 673
Dripping Springs, TX 78620

Driller Name: **James Benot** License Number: **4064**

Comments: **Drilled for Geo-Springs DBA Glass Well Services**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	10	white limestone
10	60	tan limestone
60	90	tan lime
90	660	blue lime
660	690	tan white limestone
690	730	grey limestone
730	760	grey lime and shale
760	810	grey white limestone
810	860	red sandstone
860	890	tan limestone
960	980	multi color limestone and clay
980	990	yellow limestone and clay

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5	Blank	New Plastic (PVC)	sdr17	-3	910
4.5	Screen	New Plastic (PVC)	sdr17	910	970
4.5	Blank	New Plastic (PVC)	sdr17	970	990

STATE OF TEXAS WELL REPORT for Tracking #474702

Owner: Weigelt Enterprises	Owner Well #: 3
Address: 1728 S. FM 1626 Buda, TX 78610	Grid #: 57-48-3
Well Location: Highland Village Dr. Lakeway, TX 78734	Latitude: 30° 20' 54.97" N
Well County: Travis	Longitude: 098° 00' 35.43" W
Number of Wells Drilled: 3	Elevation: 863 ft. above sea level

Type of Work: New Well	Proposed Use: Irrigation
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Drilling Start Date: **3/14/2018** Drilling End Date: **3/19/2018**

Borehole:	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
	12	0	10
	10	10	830

Drilling Method: **Air Rotary**

Borehole Completion: **Perforated or Slotted**

Annular Seal Data:	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
	0	40	Cement 18 Bags/Sacks
	40	50	Bentonite 5 Bags/Sacks

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: Surface Sleeve Installed	Surface Completion by Driller
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Water Level: **330 ft. below land surface on 2018-04-04**

Packers: **Rubber at 50 ft.
Rubber at 70 ft.
Rubber at 500 ft.
Rubber at 515 ft.
Rubber at 520 ft.**

Type of Pump: Submersible	Pump Depth (ft.): 756
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Well Tests: **Jetted** **Yield: 80 GPM**

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
No Data	No Data

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Bee Cave Drilling, Inc.**
185 Angel Fire Dr.
Dripping Springs, TX 78620

Driller Name: **Jim Blair**License Number: **54416**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	topsoil
2	15	caliche
15	150	gray limestone
150	180	gray shale
180	475	gray limestone
475	485	gray & brown clay
485	500	gray clay
500	550	gray limestone
550	640	red sandstone
640	735	conglomerate
735	750	broken tan rock
750	772	yellow clay
772	830	black rock

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
6.25	Blank	New Plastic (PVC)	sdr-17	0	600
6.25	Perforated or Slotted	New Plastic (PVC)	sdr-17	600	830

STATE OF TEXAS WELL REPORT for Tracking #474700

Owner: Weigelt Enterprises	Owner Well #: 1
Address: 1728 S. FM 1626 Buda, TX 78610	Grid #: 57-48-3
Well Location: Highland Village Dr. Lakeway, TX 78734	Latitude: 30° 20' 53.76" N
Well County: Travis	Longitude: 098° 00' 34.83" W
	Elevation: 864 ft. above sea level

Type of Work: **Reconditioning** for Tracking #**467734** Proposed Use: **Irrigation**

Drilling Start Date: **2/6/2018** Drilling End Date: **2/12/2018**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	12.25	0	830

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	560	830	Gravel	3/8"

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	40	Cement 25 Bags/Sacks
	40	80	Bentonite 15 Bags/Sacks

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Sleeve Installed**

Surface Completion by Driller

Water Level: **330 ft. below land surface on 2018-02-27**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **Jetted** **Yield: 25 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Bee Cave Drilling, Inc.**
185 Angel Fire Dr.
Dripping Springs, TX 78620

Driller Name: **Jim Blair**License Number: **54416**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

No Data

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
6.25	Blank	New Plastic (PVC)	sdr-17	0	600
6.25	Perforated or Slotted	New Plastic (PVC)	sdr-17	600	830

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #474701

Owner: Weigelt Enterprises	Owner Well #: 2
Address: 1728 S. FM 1626 Buda, TX 78610	Grid #: 57-48-3
Well Location: Highland Village Dr. Lakeway, TX 78734	Latitude: 30° 20' 51.41" N
Well County: Travis	Longitude: 098° 00' 33.24" W
	Elevation: 863 ft. above sea level

Type of Work: **Reconditioning** for Tracking # **467735** Proposed Use: **Irrigation**

Drilling Start Date: **2/19/2018** Drilling End Date: **3/1/2018**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	830

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	600	830	Gravel	3/8"

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	50	Cement 28 Bags/Sacks
	50	70	Bentonite 12 Bags/Sacks

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Sleeve Installed**

Surface Completion by Driller

Water Level: **330 ft. below land surface on 2018-03-06**

Packers: **No Data**

Type of Pump: **Submersible**

Pump Depth (ft.): **756**

Well Tests: **Pump Yield: 100 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Bee Cave Drilling, Inc.**
185 Angel Fire Dr.
Dripping Springs, TX 78620

Driller Name: **Jim Blair**License Number: **54416**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

No Data

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
6.25	Blank	New Plastic (PVC)	sdr-17	0	660
6.25	Perforated or Slotted	New Plastic (PVC)	sdr-17	660	830

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #614344

Owner: Robert Sanchez	Owner Well #: No Data
Address: 4811 Palisade Drive Austin, TX 78731	Grid #: 57-48-3
Well Location: 17216 Flintrock Road Lakeway, TX 78738	Latitude: 30° 20' 18.6" N
Well County: Travis	Longitude: 098° 00' 25.88" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **7/6/2022**Drilling End Date: **7/6/2022**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8.75	0	100
	6.25	100	910

Drilling Method: **Air Rotary**Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	-1	100	10 cement 4 benseal Bags/Sacks

Seal Method: **Pressure Tremmie**Distance to Property Line (ft.): **52**Sealed By: **Driller**Distance to Septic Field or other
concentrated contamination (ft.): **unknown**Distance to Septic Tank (ft.): **unknown**Method of Verification: **owner**Surface Completion: **Surface Sleeve Installed****Surface Completion by Driller**

Water Level: 730 ft. below land surface on 2022-07-06	Measurement Method: Sonic/Radar
Packers: burlap and plastic 810, 790' burlap and rubber 100	
Type of Pump: Submersible	
Well Tests: Estimated	Yield: 15-20 GPM

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	180	hosston trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Associated Drilling Inc**
PO BOX 673
Dripping Springs, TX 78620

Driller Name: **James Benoit**License Number: **4064**Comments: **SWTCGCD**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	10	white caliche
10	45	tan lime
45	605	blue lime
605	670	tan white limestone
670	700	grey limestone
700	735	grey lime and shale
735	805	grey white limestone
805	860	red sandstone
860	890	tan limestone
890	910	multi color limestone

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5	Blank	New Plastic (PVC)	sdr17	-3	850
4.5	Screen	New Plastic (PVC)	sdr17 0.020	850	910

STATE OF TEXAS WELL REPORT for Tracking #460445

Owner: Steven Cox	Owner Well #: No Data
Address: 2281 270th Ct SE Sammamish, WA 98075	Grid #: 57-48-3
Well Location: 17000 Majestic Ridge Lakeway, TX 78738	Latitude: 30° 20' 46.1" N
Well County: Travis	Longitude: 098° 00' 24.4" W
	Elevation: No Data
Type of Work: New Well	Proposed Use: Irrigation

Drilling Start Date: **10/4/2016** Drilling End Date: **10/11/2016**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	20
	8	20	101
	6.5	101	890

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	101	Cement 22 Bags/Sacks

Seal Method: **Tremie**

Distance to Property Line (ft.): **No Data**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **109**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **tape measure**

Surface Completion: **Surface Sleeve Installed**

Water Level: **490 ft. below land surface on 2016-10-11**

Packers: **shale trap at 810 ft.**

Type of Pump: **Submersible**

Pump Depth (ft.): **600**

Well Tests: **Estimated Yield: 10 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

The driller did certify that while drilling, deepening or otherwise altering the above described well, injurious water or constituents was encountered and the landowner or person having the well drilled was informed that such well must be completed or plugged in such a manner as to avoid injury or pollution.

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **TOM ARNOLD DRILLING**
2750 SOUTH A. W. GRIMES BLVD
ROUND ROCK, TX 78664

Driller Name: **Tommy D Arnold** License Number: **2096**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	top soil & loose rock
1	13	yellow limestone
13	44	gray limestone
44	51	blue limestone
51	160	gray limestone
160	177	brown limestone
177	201	gray limestone
201	209	gray limestone
209	350	gray limestone
350	352	fractures
352	510	gray limestone (partial drill returns)
510	890	no drill returns

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5		New Plastic (PVC)		0	890
4.5	Screen	New Plastic (PVC)	0.032	810	870

STATE OF TEXAS WELL REPORT for Tracking #181840

Owner: Duncan Johnson Comm-Word (Owner)	Owner Well #: No Data
Address: 6601-A Bee Cave Road Austin, TX 78746	Grid #: 57-48-3
Well Location: 17824 Serene Hills Pass Austin, TX 78738	Latitude: 30° 20' 36" N
Well County: Travis	Longitude: 098° 00' 22" W
	Elevation: No Data

Type of Work: New Well	Proposed Use: Domestic
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Drilling Start Date: **5/22/2009** Drilling End Date: **5/22/2009**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	50
	6	50	890

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	50	10

Seal Method: **Slurry**

Distance to Property Line (ft.): **50+**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **100+**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Owner**

Surface Completion: **Surface Sleeve Installed**

Water Level: **No Data**

Packers: **6 PVC & Burlap @ 50', 640', 680', 695', 700', 740'**

Type of Pump: **Submersible**

Well Tests: **Jetted** **Yield: 30 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	60	Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Western Water Wells**
500 Southland Dr.
Burnet, TX 78611

Driller Name: **Frank Glass**License Number: **1313**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	Top Soil
1	40	Caliche
40	70	Blue Lime
70	315	Gray Lime
315	375	Brown Lime
375	395	White Soap Stone
395	590	Gray & Brown Lime
590	640	White & Brown
640	690	Hammond
690	748	Sand
740	890	Trinity 30 GPM

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
5 OD New Plastic +2 to 890 SDR 17			
80' Screen			

STATE OF TEXAS WELL REPORT for Tracking #77018

Owner: Gary Simon	Owner Well #: 1
Address: 17003 Flint Rock Rd Austin, TX 78738	Grid #: 57-48-3
Well Location: 17204 Flint Rock Rd Austin, TX 78738	Latitude: 30° 20' 01" N
Well County: Travis	Longitude: 098° 00' 19" W
	Elevation: No Data
Type of Work: New Well	Proposed Use: Domestic

Drilling Start Date: **9/9/2005**Drilling End Date: **9/10/2005**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	20
	6	20	875

Drilling Method: **Air Rotary**Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	20	4 Portland

Seal Method: **Slurry**Distance to Property Line (ft.): **50+**Sealed By: **APEX Drilling**Distance to Septic Field or other
concentrated contamination (ft.): **100+**Distance to Septic Tank (ft.): **No Data**Method of Verification: **landowner**Surface Completion: **Surface Sleeve Installed**Water Level: **No Data**Packers: **Burlap 690', 680', 20'**Type of Pump: **No Data**Well Tests: **Jetted** **Yield: 35 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	675 to 875	Trintiy

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **APEX Drilling, Inc.**
PO Box 867
Marble Falls, TX 78654

Driller Name: **Michael G. Becker, P.G.** License Number: **54516**

Comments: **Amended 2/23/06 Ref.#3007**

Report Amended on by Request #3007

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	32	Tan LS
32	320	Tan & Gry LS
320	440	Tan LS
440	620	Tan & Gry LS
620	675	Gry LS w/ Clay
675	700	Red Clay w/ Sand (H2O)
700	710	Gravel
710	755	Red Sand
755	785	Tan LS
785	840	Red SS
840	860	Wht LS
860	875	Gravel

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5"	New	PVC +2 to 875 SDR17	

STATE OF TEXAS WELL REPORT for Tracking #91305

Owner: Fred Edlin	Owner Well #: No Data
Address: 129 Royal Oaks Lane Lakeway, TX 78734	Grid #: 57-48-3
Well Location: 4313 Travis Vista Lakeway, TX 78734	Latitude: 30° 20' 01" N
Well County: Travis	Longitude: 098° 00' 19" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **9/10/2005** Drilling End Date: **9/11/2005**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	20
	6	20	875

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	20	4 of Portland

Seal Method: **Slurry**

Distance to Property Line (ft.): **50**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **100**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Landowner**

Surface Completion: **Surface Sleeve Installed**

Water Level: **No Data**

Packers: **Burlap 700', 695', 20'**

Type of Pump: **No Data**

Well Tests: **Jetted** **Yield: 35 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	700-875	Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Apex Drilling, Inc**
PO Box 867
Marble Falls, TX 78654

Driller Name: **Michael G Becker P.G.**License Number: **54516**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	32	Tan Limestone
32	320	Tan-Grey Limestone
320	440	Tan Limestone
440	620	Grey & Tan Limestone
620	675	Grey Limestone w/ Clay
675	700	Red Clay w/ Sand H2O
700	710	Gravel
710	755	Red Sand
755	785	Tan Limestone
785	840	Red Sandstone
840	860	White Limestone
860	875	Gravel

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5" (5" OD)	New	PVC	+2' to 775' SDR17
4.5" (5" OD)	New	PVC Slotted	775' to 795' .035
4.5" (5" OD)	New	PVC	795' to 855' SDR17
4.5" (5" OD)	New	PVC Slotted	855' to 875' .035

STATE OF TEXAS WELL REPORT for Tracking #302100

Owner: Mike Meyer	Owner Well #: No Data
Address: 402 Aria Dr Austin, TX 78738	Grid #: 57-48-3
Well Location: 17204 Flint Rock Rd Austin, TX 78738	Latitude: 30° 20' 00" N
Well County: Travis	Longitude: 098° 00' 19" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **9/24/2012** Drilling End Date: **9/25/2012**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	100
	6.5	100	875

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	100	9-Bens 1-Port

Seal Method: **Pressure**

Distance to Property Line (ft.): **20**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **50+**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Landowner**

Surface Completion: **Surface Sleeve Installed**

Water Level: **No Data**

Packers: **Brulap/Neoprene 690', 680', 660', 400', 105', 100'**

Type of Pump: **No Data**

Well Tests: **Jetted** Yield: **15 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	700-875	Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Apex Drilling, Inc.**
P.O. Box 867
Marble Falls, TX 78654

Driller Name: **Michael G. Becker** License Number: **54516**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	Topsoil
1	33	Tan Limestone
33	421	Gray/Tan Limestone
421	435	Tan Limestone
432	557	Gray/Tan Limestone
557	575	Tan/White Limestone
575	615	Gray/Tan Limestone
615	660	Gray Clay
660	700	Red Sandstone
700	705	Gravel
705	747	Red Sandstone
747	756	Gravel
756	860	Red Sandstone **H2O
860	875	Gravel **H2O

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5" (5" OD)	New	PVC	+2' to 795' SDR17
4.5" (5" OD)	New	Slotted PVC	795' to 815' .035
4.5" (5" OD)	New	PVC	815' to 835' SDR17
4.5" (5" OD)	New	Slotted PVC	835' to 855' .035
4.5" (5" OD)	New	PVC	855' to 875' SDR17

STATE OF TEXAS WELL REPORT for Tracking #463997

Owner:	Michael Macs	Owner Well #:	No Data
Address:	17730 Serene Hills Pass Austin, TX 78738	Grid #:	57-48-3
Well Location:	17730 Serene Hills Pass Austin, TX 78738	Latitude:	30° 20' 27.9" N
		Longitude:	098° 00' 16.6" W
Well County:	Travis	Elevation:	1098 ft. above sea level
Type of Work: New Well		Proposed Use: Domestic	

Drilling Start Date: **9/5/2017**Drilling End Date: **9/13/2017**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	10
	6.75	10	888

Drilling Method: **Air Rotary**Borehole Completion: **Perforated or Slotted**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	20	Cement 4 Bags/Sacks
	20	25	Bentonite 2 Bags/Sacks

Seal Method: **Poured**Distance to Property Line (ft.): **No Data**Sealed By: **Driller**Distance to Septic Field or other
concentrated contamination (ft.): **No Data**Distance to Septic Tank (ft.): **No Data**Method of Verification: **No Data**Surface Completion: **Surface Sleeve Installed****Surface Completion by Driller**Water Level: **587 ft. below land surface on 2017-09-16**

Packers: **Rubber at 25 ft.**
Rubber at 510 ft.
Rubber at 730 ft.
Rubber at 735 ft.
Rubber at 740 ft.

Type of Pump: **Submersible**Pump Depth (ft.): **800**Well Tests: **Jetted** **Yield: 18 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Bee Cave Drilling, Inc.**
185 Angel Fire Dr.
Dripping Springs, TX 78620

Driller Name: **Jim Blair**License Number: **54416**Comments: **tds 875**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	topsoil
1	13	caliche
13	287	gray limestone
287	315	gray limestone w/ shale stringers
315	385	gray limestone
385	575	grey & tan rock
575	650	white & tan rock
650	740	grey limestone
740	820	red sandstone
820	880	red sandstone & conglomerate
880	888	grey shale & clay

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5	Blank	New Plastic (PVC)	sdr-17	0	828
4.5	Perforated or Slotted	New Plastic (PVC)	sdr-17	828	888

STATE OF TEXAS WELL REPORT for Tracking #117485

Owner: Mollison Homes c/o Mike Mollison	Owner Well #: No Data
Address: 17115 Majestic Ridge Lakeway, TX 78738	Grid #: 57-48-6
Well Location: 17012 Flint Rock RD Lakeway, TX 78738	Latitude: 30° 19' 59" N
Well County: Travis	Longitude: 098° 00' 14" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **4/25/2007** Drilling End Date: **4/25/2007**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	20
	6.5	20	845

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	20	4 of Portland

Seal Method: **Slurry**

Distance to Property Line (ft.): **50**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **100**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Landowner**

Surface Completion: **Surface Sleeve Installed**

Water Level: **No Data**

Packers: **Neoprene 635', 630', 625', 20**

Type of Pump: **No Data**

Well Tests: **Estimated Yield: 50 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	637-835	Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Apex Drilling, Inc**
PO Box 867
Marble Falls, TX 78654

Driller Name: **Andrew J Johnson** License Number: **54989**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	30	Caliche
30	90	Blue Limestone
90	210	Grey Limestone
210	410	Grey-Tan Limestone
410	450	Tan Limestone
450	525	Grey Limestone
525	560	Tan Limestone
560	580	Grey Limestone / Clay
580	605	Clay
605	637	Grey Sandy Limestone
637	645	Red Sandstone
645	660	Sand
660	704	Red Sandstone
704	715	White Limestone
715	740	Sand
740	782	Tan Limestone
782	835	Sand / Gravel
835	845	Tan Clay

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5" (5" OD)	New	PVC	+2' to 715' SDR17
4.5" (5" OD)	New	Slotted PVC	715' to 735' .035
4.5" (5" OD)	New	PVC	735' to 755' SDR17
4.5" (5" OD)	New	Slotted PVC	755' to 775' .035
4.5" (5" OD)	New	PVC	775' to 795' SDR17
4.5" (5" OD)	New	Slotted PVC	795' to 835' .035
4.5" (5" OD)	New	PVC	835' to 845' SDR17

STATE OF TEXAS WELL REPORT for Tracking #382354

Owner: Matthew Scrivener	Owner Well #: 1
Address: 8920 Business Park Dr. St. 350 Austin, TX 78759	Grid #: 57-48-3
Well Location: 17027 Raynam Hill Dr. Austin, TX 78738	Latitude: 30° 20' 12" N
	Longitude: 098° 00' 14" W
Well County: Travis	Elevation: 1102 ft. above sea level

Type of Work: New Well	Proposed Use: Irrigation
-------------------------------	---------------------------------

Drilling Start Date: **11/25/2014** Drilling End Date: **11/26/2014**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	10
	8	10	20
	6.75	20	870

Drilling Method: **Air Rotary**

Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	50	8 cement

Seal Method: **slurry & pour**

Sealed By: **Steve Stewart**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Pitless Adapter Used**

Water Level: 605 ft. below land surface on 2014-12-01	Measurement Method: Unknown
Packers: neoprene 50, 400, 700, 705, 745, 750	
Type of Pump: Submersible	Pump Depth (ft.): 740
Well Tests: Jetted	Yield: 40 GPM

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Bee Cave Drilling, Inc.**
185 Angel Fire Dr.
Dripping Springs, TX 78620

Driller Name: **Jim Blair** License Number: **54416**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	topsoil
2	15	tan caliche
15	29	tan limestone
29	45	gray limestone
45	60	tan limestone
60	295	gray limestone
295	340	tan & gray limestone
340	380	gray limestone
380	390	white gypsum
390	490	gray limestone
490	580	tan & gray limestone wb 2.5 gpm
580	630	gray clay
630	660	gray sandstone
660	710	gray clay
710	730	gray limestone
730	770	red sandstone wb
770	870	red/tan sandston wb 40 gpm 1800 tds

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	new	sdr-17	0 790
4.5	new	perf	790 870

STATE OF TEXAS WELL REPORT for Tracking #532064

Owner: JOHNNY MORROW	Owner Well #: No Data
Address: 17211 MAJESTIC RIDGE RD. AUSTIN, TX 78738	Grid #: 57-48-3
Well Location: 17211 MAJESTIC RIDGE DRIVE AUSTIN, TX 78738	Latitude: 30° 20' 17.82" N
	Longitude: 098° 00' 10.86" W
Well County: Travis	Elevation: No Data
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **11/27/2019** Drilling End Date: **11/27/2019**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	100
	6.125	100	870

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	100	PORTLAND CEMENT 14 Bags/Sacks

Seal Method: **Pressure**

Distance to Property Line (ft.): **10**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **N/A**

Distance to Septic Tank (ft.): **N/A**

Method of Verification: **OWNER**

Surface Completion: **Surface Sleeve Installed**

Surface Completion by Driller

Water Level: **560 ft. below land surface on 2019-12-04** Measurement Method: **Electric Line**

Packers: **Burlap at 100 ft.
BURLAP & PLASTIC at 120 ft.
BURLAP & PLASTIC at 400 ft.
BURLAP & PLASTIC at 600 ft.
BURLAP & PLASTIC at 750 ft.
BURLAP & PLASTIC at 770 ft.**

Type of Pump: **Submersible**

Pump Depth (ft.): **700**

Well Tests: **Jetted Yield: 20 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	770 - 870	LOWER TRINITY

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Centex Pump & Supply, Inc.**
2520 Hwy. 290 West
Dripping Springs, TX 78620

Driller Name: **MARTIN DALE LINGLE**License Number: **54813**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	ROCK
2	18	CALICHE
18	20	BLUE LIMESTONE
20	85	GRAY LIMESTONE
85	210	GRAY/TAN LIMESTONE
210	270	GRAY LIMESTONE
270	300	TAN LIMESTONE
300	340	GRAY LIMESTONE
340	350	WHITE LIMESTONE
350	390	GRAY LIMESTONE
390	420	BROWN LIMESTONE
420	440	GRAY/TAN LIMESTONE
440	600	BROWN LIMESTONE
600	630	GRAY CLAY
630	645	GRAY SAND
645	660	GRAY/RED CLAY
660	670	GRAY SAND
670	690	GRAY/RED SAND

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5	Blank	New Plastic (PVC)	SDR17	2	770
4.5	Perforated or Slotted	New Plastic (PVC)	SDR17 0.032	770	870

690	710	RED SANDSTONE
710	730	RED SANDSTONE W/GRAVEL
730	750	COLOR
750	770	RED SANDSTONE
770	790	RED SANDSTONE SAND
790	810	GRAVEL COLOR LIMESTONE
810	830	GRAVEL COLOR LIMESTONE
830	850	GRAVEL COLOR LIMESTONE
850	870	GRAVEL COLOR LIMESTONE

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #531625

Owner: DAVID BABIN	Owner Well #: No Data
Address: 17212 MAJESTIC RIDGE RD. AUSTIN, TX 78738	Grid #: 57-48-3
Well Location: 17212 MAJESTIC RIDGE RD. AUSTIN, TX 78738	Latitude: 30° 20' 18.48" N
	Longitude: 098° 00' 07.74" W
Well County: Travis	Elevation: No Data
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **11/26/2019** Drilling End Date: **11/26/2019**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	100
	6.125	100	890

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	100	PORTLAND CEMENT 50 Bags/Sacks

Seal Method: **Pressure**

Distance to Property Line (ft.): **50**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **N/A**

Distance to Septic Tank (ft.): **N/A**

Method of Verification: **OWNER**

Surface Completion: **Surface Sleeve Installed**

Surface Completion by Driller

Water Level: No Data	Measurement Method: Electric Line
Packers: Burlap at 100 ft. BURLAP & PLASTIC at 120 ft. BURLAP & PLASTIC at 400 ft. BURLAP & PLASTIC at 600 ft. BURLAP & PLASTIC at 750 ft. BURLAP & PLASTIC at 770 ft.	
Type of Pump: Submersible	Pump Depth (ft.): 700
Well Tests: Jetted	Yield: 15 GPM

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	770 - 870	LOWER TRINITY

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Centex Pump & Supply, Inc.**
2520 Hwy. 290 West
Dripping Springs, TX 78620

Driller Name: **MARTIN DALE LINGLE**License Number: **54813**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	ROCK
2	18	CALICHE
18	20	BLUE LIMESTONE
20	85	GRAY LIMESTONE
85	210	GRAY/TAN LIMESTONE
210	270	GRAY LIMESTONE
270	300	TAN LIMESTONE
300	340	GRAY LIMESTONE
340	350	WHITE LIMESTONE
350	390	GRAY LIMESTONE
390	420	BROWN LIMESTONE
420	440	GRAY & TAN LIMESTONE
440	600	BROWN LIMESTONE
600	630	GRAY CLAY
630	645	GRAY SAND
645	660	GRAY/RED CLAY
660	670	GRAY SAND
670	690	GRAY/RED SAND

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5	Blank	New Plastic (PVC)	SDR17	2	770
4.5	Perforated or Slotted	New Plastic (PVC)	SDR17 0.032	770	870
4.5	Blank	New Plastic (PVC)	SDR17	870	890

690	710	RED SANDSTONE
710	730	RED SANDSTONE W/GRAVEL
730	750	CONGLOMERATE
750	770	RED SANDSTONE
770	790	RED SANDSTONE
790	810	GRAVEL/CONGLOMERATE
810	830	GRAVEL/CONGLOMERATE
830	850	GRAVEL/CONGLOMERATE
850	870	GRAVEL/CONGLOMERATE
870	890	BROWN CLAY

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #13298

Owner: Harvey Atwell	Owner Well #: No Data
Address: P.O. Box 160996 Austin, TX 78716	Grid #: 57-48-3
Well Location: 17135 Majestic Ridge Lakeway, TX 78738	Latitude: 30° 20' 08" N
Well County: Travis	Longitude: 098° 00' 04" W
	Elevation: 1099 ft. above sea level
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **8/30/2002** Drilling End Date: **8/31/2002**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	7.875	0	120
	6.75	120	820

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	120	38

Seal Method: **pressure cementing**

Sealed By: **ADC**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Sleeve Installed**

Water Level: **520 ft. below land surface on 2002-09-05** Measurement Method: **Unknown**

Packers: **Neoprene/burlap 120 & 680**

Type of Pump: **Submersible** Pump Depth (ft.): **740**

Well Tests: **Estimated** Yield: **55 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	680-820	trinity

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

The driller did certify that while drilling, deepening or otherwise altering the above described well, injurious water or constituents was encountered and the landowner or person having the well drilled was informed that such well must be completed or plugged in such a manner as to avoid injury or pollution.

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Associated Drilling Co.**

**P.O. Box 1060
Manchaca, TX 78652**

Driller Name: **Byron Benoit**License Number: **1955**Apprentice Name: **Byron Benoit**Apprentice Number: **1955**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	3	Topsoil
3	45	caliche
45	130	gray lime
130	160	broken tan lime
160	480	gray lime
480	560	broken tan lime
560	640	gray lime
640	680	shale
680	720	broken red sandstone
720	740	red clay sandstone
740	820	broken red sandstone

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5 N Plastic -2 to 820 SDR 17			
Perf. From 680-820			

STATE OF TEXAS WELL REPORT for Tracking #411492

Owner: Paul Beavers	Owner Well #: No Data
Address: 17003 Flintrock Rd. Austin, TX 78738	Grid #: 57-48-3
Well Location: 17003 Flintrock Rd. Austin, TX 78738	Latitude: 30° 20' 00.91" N
Well County: Travis	Longitude: 098° 00' 02.68" W
	Elevation: 1000 ft. above sea level
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **11/5/2015** Drilling End Date: **11/6/2015**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	9
	8.5	9	20
	6.75	20	780

Drilling Method: **Air Rotary**

Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	50	Cement 7 Bags/Sacks

Seal Method: **Poured**

Distance to Property Line (ft.): **No Data**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Pitless Adapter Used**

Surface Completion by Driller

Water Level: **525 ft. below land surface on 2015-11-09** Measurement Method: **Electric Line**

Packers: **Rubber at 50 ft.
Rubber at 650 ft.
Rubber at 655 ft.**

Type of Pump: **Submersible**

Pump Depth (ft.): **610**

Well Tests: **Jetted** **Yield: 27 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Bee Cave Drilling, Inc.**
185 Angel Fire Dr.
Dripping Springs, TX 78620

Driller Name: **Jim Blair**License Number: **54416**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	9	Tan Lime/Caliche
9	110	Grey Lime
110	130	Grey & Tan Sand
130	330	Grey Sand
330	410	Grey And Tan Sand
410	450	Brown Lime
450	490	Grey Lime
490	510	Tan Lime
510	530	Dark Gray Lime
530	570	Gray and Tan Sand
570	640	Hammett
640	690	Red Sand W/B 650-670
690	750	Trinity Mix W/B 690-710
750	760	Trinity Mix w/ Gravel W/B 27gpm 2000TDS
760	780	Trinity Mix

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5	Blank	New Plastic (PVC)	SDR-17	-2	700
4.5	Perforated or Slotted	New Plastic (PVC)	SDR-17	700	780

STATE OF TEXAS WELL REPORT for Tracking #488707

Owner: Marc Dodge	Owner Well #: No Data
Address: 17119 Majestic Ridge Road Austin, TX 78738	Grid #: 58-41-1
Well Location: 17119 Majestic Ridge Road Austin, TX 78738	Latitude: 30° 20' 15.3" N
Well County: Travis	Longitude: 097° 59' 58.5" W
	Elevation: 1070 ft. above sea level
Type of Work: New Well	Proposed Use: Irrigation

Drilling Start Date: **8/21/2018** Drilling End Date: **8/21/2018**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	50
	6.25	50	910

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	-1	50	6 cement 2 benseal Bags/Sacks

Seal Method: **Slurry**

Sealed By: **Driller**

Distance to Property Line (ft.): **52**

Distance to Septic Field or other
concentrated contamination (ft.): **none**

Distance to Septic Tank (ft.): **none**

Method of Verification: **owner**

Surface Completion: **Surface Sleeve Installed**

Surface Completion by Driller

Water Level: **522 ft. below land surface on 2018-08-21** Measurement Method: **Sonic/Radar**

Packers: **Burlap at 50 ft.
burlap and plastic at 410 ft.
burlap and plastic at 730 ft.
burlap and plastic at 750 ft.**

Type of Pump: **Submersible**

Well Tests: **Estimated Yield: 5 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	750 - 910	lower trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Associated Drilling Inc**
PO Box 673
Dripping Springs, TX 78620

Driller Name: **James Benoit**License Number: **4064**

Comments: **Drilled for Glass Well Service**
SB

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	15	white calachie
15	475	blue lime
475	540	tan lime
540	630	grey lime
630	670	grey shale
670	725	tan grey limestone
725	760	red grey sandstone
760	770	red white sandstone, H2O
770	850	red sandstone
850	870	yellow tan limestone, H2O
870	895	grey limestone
895	910	blue shale

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5	Blank	New Plastic (PVC)	SDR17	-3	750
4.5	blank/screen/stag	New Plastic (PVC)	SDR17 0.020	750	910

STATE OF TEXAS WELL REPORT for Tracking #152651

Owner: Gene Villanueva	Owner Well #: 1
Address: 318 Nautilus Ave Lakeway, TX 78738	Grid #: 58-41-1
Well Location: 3408 Serene Hills Court Lakeway, TX 78738	Latitude: 30° 20' 40" N
Well County: Travis	Longitude: 097° 59' 56" W
	Elevation: 937 ft. above sea level
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **8/29/2008** Drilling End Date: **9/3/2008**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	120
	7	120	850

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	120	36
	640	700	18

Seal Method: **Tremie**

Distance to Property Line (ft.): **50+**

Sealed By: **ADC**

Distance to Septic Field or other
concentrated contamination (ft.): **91**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **measured**

Surface Completion: **Surface Sleeve Installed**

Water Level: **409 ft. below land surface on 2008-09-06** Measurement Method: **Unknown**

Packers: **neophrene 120'**

Type of Pump: **Submersible** Pump Depth (ft.): **700**

Well Tests: **Estimated** Yield: **30 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	740'-850'	Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Associated Drilling Co.**

P.O. Box 1060
Manchaca, TX 78652

Driller Name: **Byron Benoit**License Number: **1955**Apprentice Name: **Frank Barnard**Apprentice Number: **56366**Comments: **No Data**

Lithology:
 DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
 BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	topsoil
1	13	caliche
13	247	gray limestone
247	249	void
249	600	gray limestone
600	640	shale
640	700	hard tan limestone
700	740	red sandstone
740	850	broken red sandstone

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5"	new	plastic	-2' to 850' sdr17
			slotted 740'-850'

STATE OF TEXAS WELL REPORT for Tracking #60485

Owner: Dennis Cook	Owner Well #: 1
Address: 5604 Southwest Parkway Austin, TX 78735	Grid #: 58-41-1
Well Location: 3413 Serene Hill Ct. Austin, TX 78738	Latitude: 30° 20' 29" N
	Longitude: 097° 59' 54" W
Well County: Travis	Elevation: 1022 ft. above sea level

Type of Work: New Well	Proposed Use: Domestic
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Drilling Start Date: **1/14/2005** Drilling End Date: **1/16/2005**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	20
	7	20	860

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	20	5

Seal Method: **Gravity**

Distance to Property Line (ft.): **150**

Sealed By: **ADC**

Distance to Septic Field or other
concentrated contamination (ft.): **100**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **measured**

Surface Completion: **Surface Sleeve Installed**

Water Level: **377 ft. below land surface on 2005-01-18** Measurement Method: **Unknown**

Packers: **neophrene 20'**
neophrene 780'

Type of Pump: **Submersible** Pump Depth (ft.): **740**

Well Tests: **Estimated** Yield: **40 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	780-860	trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **A**
Po Box 1060
Manchaca, TX 78652

Driller Name: **James Benoit** License Number: **4064**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	black topsoil
1	20	tan caliche
20	320	gray limestone
320	420	sandstone
420	520	tan limestone
520	560	red sandstone/ clay
560	640	sandstone
640	780	gray limestone
780	860	broken red sandstone

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	new	plastic -2	860 SDR 17
perf. from 780' to 860'			

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #174386

Owner: David Piland	Owner Well #: No Data
Address: 26 Autumn Oak Austin, TX 78738	Grid #: 58-41-1
Well Location: 3605 Serene Hills Lot 27 Majestic Hills, TX	Latitude: 30° 20' 33" N
Well County: Travis	Longitude: 097° 59' 50" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **7/2/2004**Drilling End Date: **7/2/2004**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	25
	6	25	800

Drilling Method: **Air Rotary**Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	25	5

Seal Method: **Slurry**Distance to Property Line (ft.): **No Data**Sealed By: **Driller**Distance to Septic Field or other
concentrated contamination (ft.): **100+**Distance to Septic Tank (ft.): **No Data**Method of Verification: **owner**Surface Completion: **Unknown**Water Level: **No Data**

Packers: **PVC and burlap, 25'**
PVC and burlap, 660'
PVC and burlap, 670'

Type of Pump: **No Data**Well Tests: **Jetted** **No Test Data Specified**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	40	Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Western Water Wells, LLC**
500 Southland Drive
Burnet, TX 78611

Driller Name: **Frank A. Glass**License Number: **1313**Comments: **Well Test: no returns. \$scd**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	topsoil
1	17	caliche
17	65	blue lime
65	275	gray lime
275	276	fracture--lost returns
276	580	lime
580	635	Hammond
635	670	lime
670	800	Trinity

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
5 OD N plastic +2-800 SDR17&40			

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #125832

Owner: Mark Shimek	Owner Well #: No Data
Address: 2 Tourney Ln. Austin, TX 78738	Grid #: 58-41-1
Well Location: 3701 Serene Hills Dr Austin, TX 78738	Latitude: 30° 20' 28" N
Well County: Travis	Longitude: 097° 59' 49" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **6/3/2004**Drilling End Date: **6/3/2004**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	50
	6.25	50	850

Drilling Method: **Air Rotary**Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	40	6

Seal Method: **Slurry**Distance to Property Line (ft.): **No Data**Sealed By: **CTD**Distance to Septic Field or other
concentrated contamination (ft.): **No Data**Distance to Septic Tank (ft.): **No Data**Method of Verification: **None - Well Drilled
First**Surface Completion: **Surface Sleeve Installed**Water Level: **No Data**Packers: **Rubber,PVC,Burlap 40,620,640**Type of Pump: **Submersible**Well Tests: **Jetted** **Yield: 3 Cave GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	?Cave	Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Central Texas Drilling, Inc.**
2520 Hwy 290 West
Dripping Springs, TX 78620

Driller Name: **Aaron Glass**License Number: **4227**Comments: **Logged by DT\$**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>From (ft)</i>	<i>To (ft)</i>	<i>Description</i>
0-1		Top Soil
1-30		Caliche
30-34		Blue
34-335		Gray
335-337		Fracture?
NO RETURNS		
?590		Hammid Clay
630		No More Clay?
650		Sandstone?
850		Total Depth

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
5 OD N		PVC SDR 17	-2/850 .25

STATE OF TEXAS WELL REPORT for Tracking #363714

Owner: CHRISTOPHER LEVY	Owner Well #: No Data
Address: 2002A GUADALUPE ST. #118 AUSTIN, TX 78705	Grid #: 58-41-1
Well Location: 3505 SERENE HILLS DRIVE AUSTIN, TX 78738	Latitude: 30° 20' 36" N
Well County: Travis	Longitude: 097° 59' 49" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **2/13/2014** Drilling End Date: **2/13/2014**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	100
	6.5	100	770

Drilling Method: **Air Rotary**

Borehole Completion: **CASED**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	100	5 VOLCLAY

Seal Method: **PRESSURE TRIMMIE
CEMENT**

Distance to Property Line (ft.): **N/A**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **N/A**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **WELL DRILLED
FIRST**

Surface Completion: **Surface Sleeve Installed**

Water Level: **431 ft. below land surface on 2014-02-13** Measurement Method: **Unknown**

Packers: **6 BURLPA, PVC 100',560',580',600',
620', 660'**

Type of Pump: **Submersible**

Well Tests: **Jetted** **Yield: 30-35 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	60	TRINITY

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **CENTEX PUMP & SUPPLY, INC.**
2520 HWY. 290 WEST
DRIPPING SPRINGS, TX 78620

Driller Name: **AARON GLASS**License Number: **4227**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>From (ft)</i>	<i>To (ft)</i>	<i>Description</i>
0-1	TOP SOIL	
1-13	CALICHE	
13-18	BLUE/GRAY LIMESTONE	
18-210	GRAY LIMESTONE	
210-310	GRAY W/TAN LIMESTONE	
310-410	TAN W/GRAY LIMESTONE	
410-450	TAN/GRAY SANDSTONE	
450-500	WHITE/TAN LIMESTONE	
500-520	BROWN LIMESTONE	
520-540	GRAY LIMESTONE	
540-575	GRAY LIMESTONE W/HAMMETT	
CLAY		
575-580	GRAY LIMESTONE W/RED CLAY	
580-600	GRAY/TAN LIMESTONE	
600-610	RED SANDSTONE & CLAY	
610-630	SAND & GRAVEL	
630-660	RED SAND W/RED CLAY	
660-760	SAND & GRAVEL	

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
5"	OD	N SDR17 PVC	+3 TO 770
5"	OD	N SDR17 PVC SLOT	680 TO 760 .032

STATE OF TEXAS WELL REPORT for Tracking #363765

Owner: Hurst Creek MUD	Owner Well #: No Data
Address: 102 Trophy Dr. The Hills, TX 78738	Grid #: 58-41-1
Well Location: 102 Trophy Dr. (Rec.Park) The Hills, TX 78738	Latitude: 30° 20' 50" N
Well County: Travis	Longitude: 097° 59' 45" W
	Elevation: No Data
Type of Work: New Well	Proposed Use: Test Well

Drilling Start Date: **4/30/2014** Drilling End Date: **4/30/2014**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	20
	6.25	20	770

Drilling Method: **Air Rotary**

Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	20	3cmt

Seal Method: **hand poured**

Distance to Property Line (ft.): **50+**

Sealed By: **ADC**

Distance to Septic Field or other
concentrated contamination (ft.): **n/a**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **owner**

Surface Completion: **Unknown**

Water Level: **393 ft. below land surface on 2014-04-30** Measurement Method: **Unknown**

Packers: **n/a**

Type of Pump: **No Data**

Well Tests: **Jetted** **Yield: 5-7 GPM**

	<i>Description (number of sacks & material)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Plug Information:	n/a		

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	590-730	Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Associated Drilling Inc.**
PO Box 673
Dripping Springs, TX 78620

Driller Name: **James Benoit** License Number: **4064**

Comments: **Well to be plugged at later date as per owner**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	10	topfill
10	35	white caliche
35	390	gray lime
390	410	tan lime
410	480	tan and white limestone
480	495	gray and white limestone
495	525	gray shale
525	590	tan and white limestone
590	670	red sandstone
670	690	multi-colored limestones
690	730	red sandstone
730	750	yellow limestone and clay
750	770	gray shale

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
6-1/4 id new sch 40 pvc 0 to 20			

STATE OF TEXAS WELL REPORT for Tracking #93219

Owner: J R BOEHL	Owner Well #: No Data
Address: 239 BORA BORA DR GALVESTON, TX 77554	Grid #: 58-41-1
Well Location: 17106 MAJESTIC RIDGE AUSTIN, TX 78738	Latitude: 30° 20' 31" N
Well County: Travis	Longitude: 097° 59' 41" W
	Elevation: 1010 ft. above sea level
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **8/17/2006** Drilling End Date: **8/18/2006**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	13
	6.75	13	795

Drilling Method: **Air Rotary**

Borehole Completion: **Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	2	2
	2	13	8

Seal Method: **SLURRIED & POURED**

Distance to Property Line (ft.): **No Data**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **NOT YET INSTALLED**

Surface Completion: **Surface Sleeve Installed**

Water Level: **540 ft. below land surface on 2006-08-21** Measurement Method: **Unknown**

Packers: **NEOPRENE 13
NEOPRENE 725
NEOPRENE 730**

Type of Pump: **Submersible** Pump Depth (ft.): **700**

Well Tests: **Jetted** Yield: **25 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **Yes**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **BEE CAVE DRILLING**
185 ANGELFIRE DR
DRIPPING SPRINGS, TX 78620

Driller Name: **BOBBY ROBERTS** License Number: **54416**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	TOPSOIL
2	51	TAN LIMESTONE
51	520	GREY LIMESTONE
520	646	GREY ROCK
646	680	GREY SHALE
680	690	GREY ROCK
690	715	TAN ROCK
715	725	BROWN CLAY
725	790	BROWN ROCK W/B 25 GPM TDS 1440
790	795	BLUE CLAY

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	NEW	PLASTIC	0-730
4.5	NEW	SCREEN MFG.	730-790 .050
4.5	NEW	PLASTIC	790-795

STATE OF TEXAS WELL REPORT for Tracking #374747

Owner: HURST CREEK MUD	Owner Well #: No Data
Address: 102 TROPHY DRIVE THE HILLS, TX 78738	Grid #: 58-41-1
Well Location: 102 TROPHY DRIVE 102 TROPHY DRIVE, TX 78738	Latitude: 30° 20' 22" N
Well County: Travis	Longitude: 097° 59' 41" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Irrigation	

Drilling Start Date: **7/16/2014** Drilling End Date: **7/16/2014**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	100
	6.5	100	750

Drilling Method: **Air Rotary**

Borehole Completion: **CASED**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	100	3 VOLCLAY
	0	100	13 CLASS H

Seal Method: **PRESSURE TRIMMIE
CEMENTING**

Distance to Property Line (ft.): **N/A**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **N/A**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **HURST CREEK MUD**

Surface Completion: **Surface Sleeve Installed**

Water Level: **No Data**

Packers: **5 BURLAP,PVC,RUBBER 100',470',490',510',
530'**

Type of Pump: **Submersible**

Well Tests: **Jetted** **Yield: 35-40 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	75	TRINITY

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **CENTEX PUMP & SUPPLY, INC.**
2520 HWY. 290 WEST
DRIPPING SPRINGS, TX 78620

Driller Name: **AARON GLASS**License Number: **4227**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	TOP SOIL & FILL
2	15	CALICHE
15	18	BLUE/GRAY LIMESTONE
18	20	GRAY LIMESTONE
20	70	TAN LIMESTONE
70	290	GRAY LIMESTONE
290	295	WHITE LIMESTONE
295	400	GRAY/TAN LIMESTONE
400	445	TAN/GRAY LIMESTONE
445	450	TAN W/WHITE LIMESTONE
450	460	BROWN LIMESTONE
460	465	GRAY/TAN/BROWN LIMESTONE
465	470	GRAY LIMESTONE
470	505	HAMMETT CLAY
505	520	HAMMETT CLAY W/RED CLAY
520	540	GRAY/TAN LIMESTONE
540	585	RED SANDSTONE

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
5"	OD	N SDR17 PVC	+3 TO 750
5"	OD	N SDR17 PVC SLOT	590 TO 750 .032

585	610	RED SANDSTONE W/GRAVEL
610	690	RED SANDSTONE
690	710	GRAVEL
710	740	RED SAND
740	750	TAN LIMESTONE

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #396533

Owner: **Triple S. Petroleum Co.**Owner Well #: **MW-4**Address: **4911 E. 7th St.
Austin, TX 78704**Grid #: **58-33-7**Well Location: **525 W. Ben White Blvd.
Austin, TX 78704**Latitude: **30° 22' 59" N**Longitude: **097° 59' 03" W**Well County: **Travis**Elevation: **No Data**Type of Work: **New Well**Proposed Use: **Monitor**Drilling Start Date: **12/10/2014** Drilling End Date: **12/10/2014**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8.25	0	25

Drilling Method: **Hollow Stem Auger**Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	4	25	Gravel	20/40

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	1	Cement
	1	4	Bentonite

Seal Method: **Unknown**Distance to Property Line (ft.): **No Data**Sealed By: **Unknown**Distance to Septic Field or other
concentrated contamination (ft.): **No Data**Distance to Septic Tank (ft.): **No Data**Method of Verification: **No Data**Surface Completion: **Alternative Procedure Used**Water Level: **0 ft. below land surface on No Data**Measurement Method: **Unknown**Packers: **No Data**Type of Pump: **No Data**Well Tests: **No Test Data Specified**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	Well was dry	Well was dry

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **Unknown**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **ALPINE FIELD SERVICES**
6830 BARNEY RD
Houston, TX 77092

Driller Name: **Patrick Stephens** License Number: **4850**

Comments: **This report replaces Well Report: Tracking #:389861**
Replaces Tr.# 389861 6/5/15 Ref.# 13450

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>From (ft)</i>	<i>To (ft)</i>	<i>Description</i>
0-1		Asphalt / Fill
1- 6		Dark Gray & Reddish Brown Clay
6-25		Yellow Brown Limestone With Gravel

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
2"	New	Sch. 40 PVC	0.10 Screen Setting From 25' To 5'
2"	New	Sch. 40 PVC	Riser Setting From 5' To 0

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #394242

Owner: Tejas Inc	Owner Well #: MW-4
Address: 1202 Lakeway Lakeway, TX 78734	Grid #: 58-41-1
Well Location: 1202 Lakeway Lakeway, TX 78734	Latitude: 30° 21' 46" N
Well County: Travis	Longitude: 097° 58' 54" W
	Elevation: No Data
Plugged Within 48 Hours	

****This well has been plugged******Plugging Report Tracking #150291**Type of Work: **New Well**Proposed Use: **Monitor**Drilling Start Date: **3/31/2015** Drilling End Date: **3/31/2015**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	3	0	11

Drilling Method: **Driven**Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	4	11	Gravel	12/20

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	2	1 Bag Concrete
	2	4	0.14 Bentonite

Seal Method: **HAND**Distance to Property Line (ft.): **No Data**Sealed By: **Driller**Distance to Septic Field or other
concentrated contamination (ft.): **No Data**Distance to Septic Tank (ft.): **No Data**Method of Verification: **No Data**Surface Completion: **Alternative Procedure Used**Water Level: **No Data**Packers: **No Data**Type of Pump: **No Data**Well Tests: **No Test Data Specified**

Plug Information:

<i>Description (number of sacks & material)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
No casing was left in the well		
0-2 Concrete		
2-11 Bentonite		

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
No Data	No Data

Chemical Analysis Made: **Unknown**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **Unknown**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Vortex Drilling Inc**
4412 Bluemel Road
San Antonio, TX 78240

Driller Name: **James E. Neal**License Number: **4868**Apprentice Name: **David Lozano**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	Asphalt base material clayey sand, tan
2	11	Weathered limestone, dry tan to gray

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
1"	NEW	SCH 40 PVC	.010 11' to 6' Screen
1"	NEW	SCH 40 PVC	6' to 0 Riser
1"	NEW	Top and Bottom Caps	

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STATE OF TEXAS WELL REPORT for Tracking #394241

Owner: Tejas Inc	Owner Well #: MW-3
Address: 1202 Lakeway Lakeway, TX 78734	Grid #: 58-41-1
Well Location: 1202 Lakeway Lakeway, TX 78734	Latitude: 30° 21' 46" N
Well County: Travis	Longitude: 097° 58' 54" W
	Elevation: No Data
	Plugged Within 48 Hours

****This well has been plugged******Plugging Report Tracking #150290**Type of Work: **New Well**Proposed Use: **Monitor**Drilling Start Date: **3/31/2015** Drilling End Date: **3/31/2015**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	3	0	11

Drilling Method: **Driven**Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	4	11	Gravel	12/20

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	2	1 Bag Concrete
	2	4	0.14 Bentonite

Seal Method: **HAND**Distance to Property Line (ft.): **No Data**Sealed By: **Driller**Distance to Septic Field or other
concentrated contamination (ft.): **No Data**Distance to Septic Tank (ft.): **No Data**Method of Verification: **No Data**Surface Completion: **Alternative Procedure Used**Water Level: **No Data**Packers: **No Data**Type of Pump: **No Data**Well Tests: **No Test Data Specified**

Plug Information:

<i>Description (number of sacks & material)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
No casing was left in the well		
0-2 Concrete		
2-11 Bentonite		

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
No Data	No Data

Chemical Analysis Made: **Unknown**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **Unknown**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Vortex Drilling Inc**
4412 Bluemel Road
San Antonio, TX 78240

Driller Name: **James E. Neal**License Number: **4868**Apprentice Name: **David Lozano**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	Asphalt base material clayey sand, tan
2	11	Gravelly rock, dry tan to gray

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
1"	NEW	SCH 40 PVC	.010 11' to 6' Screen
1"	NEW	SCH 40 PVC	6' to 0 Riser
1"	NEW	Top and Bottom Caps	

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(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #394239

Owner: Tejas Inc	Owner Well #: MW-2
Address: 1202 Lakeway Lakeway, TX 78734	Grid #: 58-41-1
Well Location: 1202 Lakeway Lakeway, TX 78734	Latitude: 30° 21' 46" N
Well County: Travis	Longitude: 097° 58' 54" W
	Elevation: No Data
Plugged Within 48 Hours	

****This well has been plugged******Plugging Report Tracking #150289**Type of Work: **New Well**Proposed Use: **Monitor**Drilling Start Date: **3/31/2015** Drilling End Date: **3/31/2015**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	3	0	9

Drilling Method: **Driven**Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	4	9	Gravel	12/20

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	2	1 Bag Concrete
	2	4	1 Bentonite

Seal Method: **HAND**Distance to Property Line (ft.): **No Data**Sealed By: **Driller**Distance to Septic Field or other
concentrated contamination (ft.): **No Data**Distance to Septic Tank (ft.): **No Data**Method of Verification: **No Data**Surface Completion: **Alternative Procedure Used**Water Level: **No Data**Packers: **No Data**Type of Pump: **No Data**Well Tests: **No Test Data Specified**

Plug Information:

<i>Description (number of sacks & material)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
No casing was left in the well		
0-2 Concrete		
2-9 Bentonite		

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
No Data	No Data

Chemical Analysis Made: **Unknown**

Did the driller knowingly penetrate any strata which
contained injurious constituents?: **Unknown**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Vortex Drilling Inc**
4412 Bluemel Road
San Antonio, TX 78240

Driller Name: **James E. Neal**License Number: **4868**Apprentice Name: **David Lozano**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	Asphalt base material clayey sand, tan
2	9	Gravels and caliche, dry tan to gray

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
1"	NEW	SCH 40 PVC	.010 9' to 4' Screen
1"	NEW	SCH 40 PVC	4' to 0 Riser
1"	NEW	Top and Bottom Caps	

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STATE OF TEXAS WELL REPORT for Tracking #394237

Owner:	Tejas Inc	Owner Well #:	MW-1
Address:	1202 Lakeway Lakeway, TX 78734	Grid #:	58-41-1
Well Location:	1202 Lakeway Lakeway, TX 78734	Latitude:	30° 21' 46" N
Well County:	Travis	Longitude:	097° 58' 54" W
		Elevation:	No Data
		Plugged Within 48 Hours	

****This well has been plugged******Plugging Report Tracking #150288**Type of Work: **New Well**Proposed Use: **Monitor**Drilling Start Date: **3/31/2015** Drilling End Date: **3/31/2015**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	3	0	9

Drilling Method: **Driven**Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	4	9	Gravel	12/20

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	2	1 Bag Concrete
	2	4	1 Bentonite

Seal Method: **HAND**Distance to Property Line (ft.): **No Data**Sealed By: **Driller**Distance to Septic Field or other
concentrated contamination (ft.): **No Data**Distance to Septic Tank (ft.): **No Data**Method of Verification: **No Data**Surface Completion: **Alternative Procedure Used**Water Level: **No Data**Packers: **No Data**Type of Pump: **No Data**Well Tests: **No Test Data Specified**

Plug Information:

<i>Description (number of sacks & material)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
No casing was left in the well		
0-2 Concrete		
2-9 Bentonite		

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
No Data	No Data

Chemical Analysis Made: **Unknown**

Did the driller knowingly penetrate any strata which
contained injurious constituents?: **Unknown**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Vortex Drilling Inc**
4412 Bluemel Road
San Antonio, TX 78240

Driller Name: **James E. Neal**License Number: **4868**Apprentice Name: **David Lozano**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	Asphalt base material clayey sand, tan
2	9	Gravelly rock, dry tan to gray

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
1"	NEW	SCH 40 PVC	.010 9' to 4' Screen
1"	NEW	SCH 40 PVC	4' to 0 Riser
1"	NEW	Top and Bottom Caps	

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P.O. Box 12157
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(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #652378

Owner: The Lakeway Church	Owner Well #: 58411LC
Address: 2203 Lakeway Blvd. Lakeway, TX 78734	Grid #: 58-41-1
Well Location: 2203 Lakeway Blvd. Lakeway, TX 78734	Latitude: 30° 21' 17" N
Well County: Travis	Longitude: 097° 58' 51" W
	Elevation: 881 ft. above sea level
Type of Work: New Well	
Proposed Use: Irrigation	

Drilling Start Date: **10/16/2023** Drilling End Date: **10/16/2023**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	100
	6.13	100	690

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	100	Cement 14 Bags/Sacks

Seal Method: **Pressure**

Distance to Property Line (ft.): **50+**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **100+**

Distance to Septic Tank (ft.): **50+**

Method of Verification: **Owner**

Surface Completion: **Surface Sleeve Installed**

Surface Completion by Driller

Water Level: **354 ft. below land surface on 2023-10-16**

Packers: **Burlap
Burlap/Plastic**

Type of Pump: **Submersible**

Well Tests: **Jetted** **Yield: 15 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	590 - 690	Lower Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Centex Pump & Supply, Inc.**
2520 Hwy. 290 West
Dripping Springs, TX 78620

Driller Name: **Martin Lingle**License Number: **54813**Comments: **Glass Well Services to set pump.**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	Top Soil
2	15	Caliche
15	24	Gray Strip Clay
24	170	Gray-Tan
170	190	Gray Strip Clay
190	490	Gray-Tan-White
490	550	Gray Clay
550	580	Red Sand Stone Sm Gravel
580	650	Red Sand Stone
650	670	Red Sand Stone White
670	690	Gravel

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5	Blank	New Plastic (PVC)	SDR17	0	590
4.5	Perforated or Slotted	New Plastic (PVC)	SDR17	590	690

STATE OF TEXAS WELL REPORT for Tracking #137038

Owner: Lakeway Service Center	Owner Well #: MW-1
Address: 2200 Lakeway Boulevard Lakeway, TX 78734	Grid #: 58-41-1
Well Location: 2200 Lakeway Boulevard Lakeway, TX 78734	Latitude: 30° 21' 28" N
Well County: Travis	Longitude: 097° 58' 45" W
	Elevation: No Data
Type of Work: New Well	Proposed Use: Monitor

Drilling Start Date: **2/13/2008** Drilling End Date: **2/13/2008**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	7.875	0	88.5

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	14	88.5	Gravel	16/30

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	2	1 Concrete
	2	14	4 Bentonite

Seal Method: **Gravity**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other
concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Slab Installed**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **Unknown**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Universal Drilling Services of Texas, LLC**
3233 W. 111th Street, Suite 80
Houston, TX 77008

Driller Name: **Keith Barge** License Number: **4786**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>From (ft)</i>	<i>To (ft)</i>	<i>Description</i>
0-2	Clay	
2-17	Limestone, buff to light tan, dry	
17-62	Limestone, medium gray, dry	
62-88.5	Limestone, light gray, dry	

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
2"	New	PVC Slotted	88.5 to 15 .010
2"	New	PVC Blank	15 to 0 40

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STATE OF TEXAS WELL REPORT for Tracking #142808

Owner: Village Service Center	Owner Well #: MW-2
Address: 6607 Whitemarsh Valley Walk Austin, TX 78746	Grid #: 58-41-1
Well Location: 2200 Lakeway Blvd Austin, TX 78734	Latitude: 30° 21' 28" N
Well County: Travis	Longitude: 097° 58' 44" W
	Elevation: No Data
Type of Work: New Well	Proposed Use: Monitor

Drilling Start Date: **5/7/2008**Drilling End Date: **5/7/2008**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	7.875	0	100

Drilling Method: **Air Rotary**Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	58	100	Gravel	8/16

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	2	4 cement
	2	58	29 bentonite

Seal Method: **Poured**Distance to Property Line (ft.): **No Data**Sealed By: **Talon**Distance to Septic Field or other
concentrated contamination (ft.): **No Data**Distance to Septic Tank (ft.): **No Data**Method of Verification: **No Data**Surface Completion: **Surface Slab Installed**Water Level: **No Data**Packers: **No Data**Type of Pump: **No Data**Well Tests: **No Test Data Specified**

Water Quality:	Strata Depth (ft.)	Water Type
	No Data	fresh

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Talon Drilling, LP**
921 N Bivins
Amarillo, TX 79107

Driller Name: **Shane Currie** License Number: **54499**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

From (ft)	To (ft)	Description
0 to 1.5		Brown, 10R 5/4, Fill-Gravelly Clay, Firm, Damp, No Odor
1.5 to 6		Dark Reddish Tan, 5R 2/6, Clay, Moderate Plasticity, Stiff, Stick
		Appearance, Damp, No Odor
6 to 100		Light Tan and White, 10YR 8/2, Limestone, Dense, Massive, Weathered,
		Dry, No Odor

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	new	pvc casing	0 to 60 sch 40
4	new	pvc screen	60 to 100 slot 0.010

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STATE OF TEXAS WELL REPORT for Tracking #142814

Owner: Village Service Center	Owner Well #: MW-3
Address: 6607 Whitemarsh Valley Walk Austin, TX 78746	Grid #: 58-41-1
Well Location: 2200 Lakeway Blvd Austin, TX 78734	Latitude: 30° 21' 28" N
Well County: Travis	Longitude: 097° 58' 44" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Monitor	

Drilling Start Date: **5/8/2008**Drilling End Date: **5/8/2008**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	7.875	0	100

Drilling Method: **Air Rotary**Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	58	100	Gravel	8/16

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	2	4 cement
	2	58	29 bentonite

Seal Method: **Poured**Distance to Property Line (ft.): **No Data**Sealed By: **Talon**Distance to Septic Field or other
concentrated contamination (ft.): **No Data**Distance to Septic Tank (ft.): **No Data**Method of Verification: **No Data**Surface Completion: **Surface Slab Installed**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

Water Quality:	Strata Depth (ft.)	Water Type
	No Data	fresh

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Talon Drilling, LP**
921 N Bivins
Amarillo, TX 79107

Driller Name: **Shane Currie**License Number: **54499**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

From (ft)	To (ft)	Description
0 to 1.5		Brown, 10R 5/4, Top Soil/Fill-Gravelly Clay, Firm, Roots, Damp, No Odor
1.5 to 4		Dark Reddish Tan, 5R 2/6, Clay, Moderate Plasticity, Stiff, Slick
		Appearance, Damp, No Odor
4 to 6		Orange Brown, 5R 2/6, Clay, Moderate Plasticity, Stiff, Stick Appearance,
		Damp, No Odor
6 to 19		Light Tan and White, 10YR 8/2, Limestone, Dense, Massive, Weathered,
		Dry, No Odor
19 to 30		Gray, 10R 6/2, Limestone, Dense, Massive, Weathered, Dry, Becoming
		more Clayey, No Odor
30 to 32		Gray, 10R 6/2, Limestone, Dense, Massive, Weathered, Dry, Becoming
		less Clayey, No Odor
32 to 100		Gray, 10R 6/2, Some dark Gray Speks (Iron?), Limestone, Dense,
		Massive, Weathered, Dry, Becoming more Clayey, No Odor

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	new	pvc casing	0 to 60 sch 40
4	new	pvc screen	60 to 100 slot 0.010

STATE OF TEXAS WELL REPORT for Tracking #142824

Owner: Village Service Center	Owner Well #: MW-4
Address: 6607 Whitemarsh Valley Walk Austin, TX 78746	Grid #: 58-41-1
Well Location: 2200 Lakeway Blvd Austin, TX 78734	Latitude: 30° 21' 28" N
Well County: Travis	Longitude: 097° 58' 44" W
	Elevation: No Data
Type of Work: New Well	Proposed Use: Monitor

Drilling Start Date: **5/6/2008**Drilling End Date: **5/6/2008**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	7.875	0	33

Drilling Method: **Air Rotary**Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	13	30	Gravel	8/16

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	2	4 cement
	2	13	2 bentonite

Seal Method: **Poured**Distance to Property Line (ft.): **No Data**Sealed By: **Talon**Distance to Septic Field or other
concentrated contamination (ft.): **No Data**Distance to Septic Tank (ft.): **No Data**Method of Verification: **No Data**Surface Completion: **Surface Slab Installed**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

Water Quality:	Strata Depth (ft.)	Water Type
	No Data	fresh

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Talon Drilling, LP**
921 N Bivins
Amarillo, TX 79107

Driller Name: **Shane Currie**License Number: **54499**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

From (ft)	To (ft)	Description
0 to 2"	BLack, 5R 2/2, Topsoil, Loam, Damp	
2" to 1.5	Orange/Brown, 10R 5/4, Clay, High Plasticity, Firm, 35% Angular Gravel	
(2cm-21cm), Damp, No Odor		
1.5 to 3.5	Reddish Brown, 5R 3/4, GRavelly Clay, High Plasticity, Firm, 25% (>1	
Rich), White Angular Limestone Gravel, Likely Weathered Limestone,		
Damp, Slight Odor		
3.5 to 4.5	Orange Red, 10R 4/6, Gravelly Clay, Similar to above, Thick Limestone	
Lenses From 3.5-4.5, Damp, No Odor		
4.5 to 18	Light Tan-White, Limestone, 10YR 8/2, Massive, Hard with Some Friable	
Layers, Dry, No Odor		
18 to 23	GRay, 10R 6/2, Becoming More Weathered, Clayey	
23 to 33	Some Fossils-no Rock Core or Spoon Possible Due to Friability	

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
2 new pvc casing	0 to 10	sch 40	
2 new pvc screen	10 to 30	slot 0.010	

STATE OF TEXAS WELL REPORT for Tracking #142817

Owner: Village Service Center	Owner Well #: MW-5
Address: 6607 Whitemarsh Valley Walk Austin, TX 78746	Grid #: 58-41-1
Well Location: 2200 Lakeway Blvd Austin, TX 78734	Latitude: 30° 21' 28" N
Well County: Travis	Longitude: 097° 58' 44" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Monitor	

Drilling Start Date: **5/8/2008**Drilling End Date: **5/8/2008**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	7.875	0	100

Drilling Method: **Air Rotary**Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	58	100	Gravel	8/16

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	2	4 cement
	2	58	29 bentonite

Seal Method: **Poured**Distance to Property Line (ft.): **No Data**Sealed By: **Talon**Distance to Septic Field or other
concentrated contamination (ft.): **No Data**Distance to Septic Tank (ft.): **No Data**Method of Verification: **No Data**Surface Completion: **Surface Slab Installed**Water Level: **No Data**Packers: **No Data**Type of Pump: **No Data**Well Tests: **No Test Data Specified**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	fresh

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Talon Drilling, LP**
921 N Bivins
Amarillo, TX 79107

Driller Name: **Shane Currie** License Number: **54499**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>From (ft)</i>	<i>To (ft)</i>	<i>Description</i>
0	to 1.5	Brown, 10R 5/4, Top Soil/Fill-Gravelly Clay, Firm, Roots, Damp, No Odor
1.5	to 6	Dark Reddish Tan, 5R 2/6, Clay, Moderate Plasticity, Stiff, Stick
Appearance, Damp, No Odor		
6	to 100	Dark Reddish Tan, 5R 2/6, Clay, Moderate Plasticity, Stiff, Stick
Appearance, At 20 Becomes Clayey and Gray, 10R 6/2, Damp, No Odor		

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4	new	pvc casing	0 to 60 sch 40
4	new	pvc screen	60 to 100 slot 0.010

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #142819

Owner: Village Service Center	Owner Well #: MW-6
Address: 6607 Whitemarsh Valley Walk Austin, TX 78746	Grid #: 58-41-1
Well Location: 2200 Lakeway Blvd Austin, TX 78734	Latitude: 30° 21' 28" N
Well County: Travis	Longitude: 097° 58' 44" W
	Elevation: No Data
Type of Work: New Well	Proposed Use: Monitor

Drilling Start Date: **5/7/2008**Drilling End Date: **5/7/2008**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	7.875	0	100

Drilling Method: **Air Rotary**Borehole Completion: **Filter Packed**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	58	100	Gravel	8/16

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	2	4 cement
	2	58	29 bentonite

Seal Method: **Poured**Distance to Property Line (ft.): **No Data**Sealed By: **Talon**Distance to Septic Field or other
concentrated contamination (ft.): **No Data**Distance to Septic Tank (ft.): **No Data**Method of Verification: **No Data**Surface Completion: **Surface Slab Installed**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **No Test Data Specified**

Water Quality:	Strata Depth (ft.)	Water Type
	No Data	fresh

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Talon Drilling, LP**
921 N Bivins
Amarillo, TX 79107

Driller Name: **Shane Currie**License Number: **54499**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

From (ft)	To (ft)	Description
0 to 2	Dark Brown, 10R 3/4, Clayey Gravel, Moderate Plasticity, Soft to Firm,	
	Damp, No Odor	
2 to 3	Dark Reddish Tan, 5R 2/6, Clay, Moderate Plasticity, Stiff, Slick	
	Appearance, Damp, No Odor	
3 to 19	Light Tan-White, 10YR 8/2, Weathered Limestone, Dense, Massive, Dry,	
	No Odor	
19 to 23	Becomes More Clayey And GRay, 10R 6/2	
23 to 60	Reddish Brown, 10R 4/6, Weathered Limestone, Some Weathered Clay,	
	No Odor	
	Rock To Friable to Get a Rock Core Sample	
60 to 100	Becomes Gray, 10R 6/2, More Clayey, Less Dense	

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	new	pvc casing	0 to 60 sch 40
4	new	pvc screen	60 to 100 slot 0.010

STATE OF TEXAS WELL REPORT for Tracking #355570

Owner: Ralph and Virginia Moss	Owner Well #: No Data
Address: 506 Explorer Lakeway, TX 78734	Grid #: 58-33-7
Well Location: 506 Explorer Lakeway, TX 78734	Latitude: 30° 22' 44" N
Well County: Travis	Longitude: 097° 58' 29" W
	Elevation: No Data
Type of Work: New Well	Proposed Use: Irrigation

Drilling Start Date: **2/13/2014** Drilling End Date: **2/13/2014**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	100
	6.25	100	390

Drilling Method: **Air Rotary**

Borehole Completion: **cased; Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	1	105	13cmt 6gel

Seal Method: **pressure pumped /
tremmie**

Distance to Property Line (ft.): **20**

Sealed By: **ADC**

Distance to Septic Field or other
concentrated contamination (ft.): **n/a**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **owner / city of
Lakeway**

Surface Completion: **Surface Sleeve Installed**

Water Level: **257 ft. below land surface on 2014-02-13** Measurement Method: **Unknown**

Packers: **burlap,plastic,rubber @ 270,250,110,105**

Type of Pump: **Submersible** Pump Depth (ft.): **0**

Well Tests: **Jetted** Yield: **20-25 GPM**

	<i>Description (number of sacks & material)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Plug Information:	n/a		

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	285-390	glen rose

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Associated Drilling Inc.**
PO Box 673
Dripping Springs, TX 78620

Driller Name: **James Benoit** License Number: **4064**

Comments: **Glass Well Service**
City of Lakeway Permit

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	2	sandy loam (sod)
2	5	white chalk
5	15	tan lime
15	285	gray lime
285	370	tan and white limestone
370	390	gray and white limestone

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
5	od new	sdr17 pvc	-3 to 330
5	od new	sdr17 pvc (.032)	screen 330 to 390

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #416172

Owner: BLAKE & ABIGAIL RUE	Owner Well #: No Data
Address: 3002 KERBEY LN AUSTIN, TX 78733	Grid #: 58-41-1
Well Location: 1451 PATTERSON AUSTIN, TX 78703	Latitude: 30° 22' 29" N
Well County: Travis	Longitude: 097° 58' 29" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Irrigation	

Drilling Start Date: **11/18/2015** Drilling End Date: **11/20/2015**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	9	0	19
	6.5	19	850

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	9	Cement 7 Bags/Sacks

Seal Method: **HAND POURED**

Distance to Property Line (ft.): **No Data**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **110**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **TAPE MEASURE -
FROM PROPOSED
SITE**

Surface Completion: **Surface Sleeve Installed**

Water Level: **434 ft. below land surface on 2015-11-20**

Packers: **SHALE TRAP at 20 ft.
SHALE TRAP at 590 ft.
SHALE TRAP at 790 ft.
SHALE TRAP at 810 ft.**

Type of Pump: **No Data**

Well Tests: **Estimated Yield: 20 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **TOM ARNOLD DRILLING**
2750 SOUTH A. W. GRIMES BLVD
ROUND ROCK, TX 78664

Driller Name: **TOMMY D ARNOLD**License Number: **2096**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	TOP SOIL & LOOSE ROCK
1	14	YELLOW LIMESTONE
14	27	GRAY LIMESTONE
27	31	BROWN LIMESTONE
31	54	GRAY LIMESTONE
54	61	YELLOW LIMESTONE
61	232	GRAY LIMESTONE
232	234	WHITE LIMESTONE
234	314	GRAY LIMESTONE
314	430	BROWN LIMESTONE
430	440	BROWN & WHITE LIMESTONE
440	500	GRAY LIMESTONE
500	530	GRAY LIMESTONE & SHALE
530	620	GRAY LIMESTONE
620	630	BROWN SANDSTONE
630	710	RED SANDSTONE
710	750	RED SHALE & SANDSTONE

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5		New Plastic (PVC)		0	850
	Screen		0.032	810	830

750	765	RED SANDSTONE
765	795	RED SANDSTONE & SAND STRIPS
795	810	RED SANDSTONE
810	820	RED SAND
820	850	GRAY LIMESTONE & SHALE

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #99878

Owner: Daniel Straub	Owner Well #: No Data
Address: 15207 Sutton Dr. Austin, TX 78734	Grid #: 58-41-1
Well Location: Lot 13 Cardinal Hills Est. Unit 14 Lakeway, TX 78734	Latitude: 30° 21' 46" N
Well County: Travis	Longitude: 097° 58' 07" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **2/2/2004** Drilling End Date: **2/4/2004**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	500

Drilling Method: **Air Hammer**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	100	20

Seal Method: **Trimie Pressure Cement**

Distance to Property Line (ft.): **No Data**

Sealed By: **B. Strong**

Distance to Septic Field or other
concentrated contamination (ft.): **140**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Measuring Wheel**

Surface Completion: **Surface Sleeve Installed**

Water Level: **432 ft. below land surface on 2004-02-02** Measurement Method: **Unknown**

Packers: **Rubber 100**

Type of Pump: **No Data**

Well Tests: **Estimated** Yield: **20 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	No Data

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Highland Drilling, Inc.**
309 Frazier St.
Tow, TX 78672

Driller Name: **Bryan Strong** License Number: **54563**

Comments: **Logged by DT\$**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	Top Soil
1	18	Caliche
18	280	Blue Shale
280	325	Sandstone
325	342	Blue Shale
342	442	Sandstone
442	463	Blue Shale
463	467	Sand
467	475	Sandstone
475	500	Blue Shale

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
5 N	PVC	0/460	Sch 40
5 N	Perf.	460/480	Sch 40
5 N	PVC	480/500	Sch 40

STATE OF TEXAS WELL REPORT for Tracking #282628

Owner:	Mike Glubke	Owner Well #:	No Data
Address:	19209 Sean Avery Path Spicewood, TX 78669	Grid #:	57-48-3
Well Location:	Bee Creek Est. - 19209 Sean Avery Path Spicewood, TX 78669	Latitude:	30° 20' 50" N
Well County:	Travis	Longitude:	098° 01' 56" W
Elevation:	No Data	GPS Brand Used:	e-Trax
Type of Work: New Well		Proposed Use: Domestic	

Drilling Date: Started: **12/20/2011**
Completed: **12/20/2011**

Diameter of Hole: Diameter: **8 in From Surface To 20 ft**
Diameter: **6.5 in From 20 ft To 620 ft**

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

Annular Seal Data: 1st Interval: **From 0 ft to 20 ft with 4 of Portland (#sacks and material)**
2nd Interval: **No Data**
3rd Interval: **No Data**
Method Used: **Slurry**
Cemented By: **Apex Drilling, Inc.**
Distance to Septic Field or other Concentrated Contamination: **100 ft**
Distance to Property Line: **50 ft**
Method of Verification: **Landowner**
Approved by Variance: **No Data**

Surface Completion: **Surface Sleeve Installed**

Water Level: Static level: **No Data**
Artesian flow: **No Data**

Packers: **Burlap/Neoprene 450, 460, 20**

Plugging Info: Casing or Cement/Bentonite left in well: **No Data**

Type Of Pump: **No Data**

Well Tests: **Jetted**
Yield: **40 GPM with (No Data) ft drawdown after (No Data) hours**

Water Quality: Type of Water: **Trinity**
Depth of Strata: **445-618 ft.**
Chemical Analysis Made: **No**
Did the driller knowingly penetrate any strata which contained undesirable constituents: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: **Apex Drilling, Inc.**
P.O. Box 867
Marble Falls , TX 78654

Driller License Number: **54989**

Licensed Well Driller Signature: **Andrew Jackson Johnson**

Registered Driller Apprentice Signature: **No Data**

Apprentice Registration Number: **No Data**

Comments: **No Data**

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P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft)	To (ft)	Description
000	001	Top Soil
001	021	Tan Limestone
021	298	Tan/Grey Limestone
298	315	Tan/White Limestone
315	351	Tan/Grey Limestone
351	375	Tan/White Limestone
375	410	Tan/Grey Limestone
410	445	Grey Clay
445	569	Red Sandstone
569	618	Gravel
618	620	Tan Clay

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
4.5"	(5" OD)	New PVC + 2'	to 560' SDR17
4.5"	(5" OD)	New Slotted PVC	560' to 620' .035

STATE OF TEXAS WELL REPORT for Tracking #302877

Owner: Bob Teaford	Owner Well #: 1
Address: 155 Contrails Way Spicewood, TX 78669	Grid #: 57-48-3
Well Location: 19111 hwy 71 W. Spicewood, TX 78669	Latitude: 30° 20' 20" N
Well County: Travis	Longitude: 098° 02' 10" W
	Elevation: 760 ft. above sea level
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **9/5/2012**Drilling End Date: **9/5/2012**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	10	0	10
	8	10	130

Drilling Method: **Air Hammer; Air Rotary**Borehole Completion: **Filter Packed; Open Hole**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Filter Material</i>	<i>Size</i>
Filter Pack Intervals:	12	130	Gravel	3/8

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	10	4 cement
	10	12	1 bentonite

Seal Method: **slurry & poured**Distance to Property Line (ft.): **12**Sealed By: **Steve Stewart**Distance to Septic Field or other
concentrated contamination (ft.): **150**Variance Number: **no**Distance to Septic Tank (ft.): **No Data**Method of Verification: **measured**Surface Completion: **Surface Sleeve Installed**Water Level: **12 ft. below land surface on 2012-09-05** Measurement Method: **Unknown**Packers: **none**Type of Pump: **No Data**Well Tests: **Estimated** Yield: **10 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	No Data	Fresh

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Bee Cave Drilling**
185 Angelfire Dr
Dripping Springs, TX 78620

Driller Name: **Jim Blair** License Number: **54416**

Apprentice Name: **Steve Stewart** Apprentice Number: **11049501**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>From (ft)</i>	<i>To (ft)</i>	<i>Description</i>
0	2	Topsoil
2	7	Pink limestone
Lost circulation, porous rock		
total depth 130 ft, 800 Tds		

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5	New	Plastic	+1 to 60 sdr 17
4.5	New	Plastic / perf 1/4"	60 to 130 sdr 17

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #529957

Owner: Travis County	Owner Well #: No Data
Address: 500 Lavaca Street austin , TX 78701	Grid #: 57-48-3
Well Location: 4520 Bee Creek Rd Spicewood, TX	Latitude: 30° 20' 43.1" N
Well County: Travis	Longitude: 098° 02' 01.1" W
Number of Wells Drilled: 2	Elevation: No Data

Type of Work: New Well	Proposed Use: Irrigation
-------------------------------	---------------------------------

Drilling Start Date: **8/20/2019** Drilling End Date: **8/23/2019**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	100
	6.75	100	640

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

Annular Seal Data: **No Data**

Seal Method: **Pressure**

Sealed By: **Driller**

Distance to Property Line (ft.): **100+**

Distance to Septic Field or other
concentrated contamination (ft.): **na**

Distance to Septic Tank (ft.): **na**

Method of Verification: **owner**

Surface Completion: **Surface Sleeve Installed**

Surface Completion by Driller

Water Level: **373 ft. below land surface on 2019-09-09** Measurement Method: **Electric Line**

Packers:

- Rubber at 100 ft.**
- Plastic at 101 ft.**
- Rubber at 180 ft.**
- Plastic at 181 ft.**
- Rubber at 240 ft.**
- Plastic at 241 ft.**
- Rubber at 360 ft.**
- Plastic at 361 ft.**
- Rubber at 400 ft.**
- Plastic at 401 ft.**

Rubber at 420 ft.**Plastic at 421 ft.**Type of Pump: **Submersible**Pump Depth (ft.): **600**Well Tests: **Pump** **Yield: 20 GPM after 48 hours, no drawdown specified**

Water Quality:

<i>Strata Depth (ft.)</i>	<i>Water Type</i>
420 - 620	GOOD

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Texan Water**
1107 FM 1431 suit 286
Marble Falls, TX 78654

Driller Name: **Brice Bormann**License Number: **54855**Apprentice Name: **Colton Sordahl, Justin Bounds**Apprentice Number: **59880, 60110**Comments: **No Data****Report Amended on 12/30/2019 by Request #29522**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	20	calichie
20	80	limestone with streaks of clay
80	100	grey limestone with shale streaks
100	240	grey limestone
240	280	grey limestone with tan streaks
280	360	tan limestone
360	390	grey limestone
390	420	clay
420	440	grey limestone

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5	Blank	New Plastic (PVC)	SDR 17	0	580
4.5	Screen	New Plastic (PVC)	SDR 17 0.032	580	620

440	580	red sandstone with gravel streaks
580	620	multi colored limestone
620	640	blue and red shale

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #529956

Owner: Travis County	Owner Well #: 2
Address: 500 Lavaca Street austin , TX 78701	Grid #: 57-48-3
Well Location: 4520 Bee Creek Rd Spicewood, TX 78669	Latitude: 30° 20' 43" N
Well County: Travis	Longitude: 098° 02' 01" W
Number of Wells Drilled: 2	Elevation: No Data

Type of Work: New Well	Proposed Use: Irrigation
-------------------------------	---------------------------------

Drilling Start Date: **8/26/2019** Drilling End Date: **8/29/2019**

	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
Borehole:	8	0	100
	6.75	100	400

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
Annular Seal Data:	0	10	Cement 6 Bags/Sacks
	10	60	Bentonite 30 Bags/Sacks

Seal Method: **Pressure**

Distance to Property Line (ft.): **100+**

Sealed By: **Driller**

Distance to Septic Field or other
concentrated contamination (ft.): **na**

Distance to Septic Tank (ft.): **na**

Method of Verification: **owner**

Surface Completion: **Surface Sleeve Installed**

Surface Completion by Driller

Water Level: **225 ft. below land surface on 2019-09-11** Measurement Method: **Electric Line**

Packers:

- Rubber at 60 ft.**
- Plastic at 61 ft.**
- Rubber at 80 ft.**
- Plastic at 81 ft.**
- Rubber at 140 ft.**
- Plastic at 141 ft.**
- Rubber at 180 ft.**
- Plastic at 181 ft.**

Type of Pump: **Submersible**Pump Depth (ft.): **360**Well Tests: **Pump****Yield: 40 GPM after 48 hours, no drawdown specified**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	200 - 390	GOOD

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Texan Water**
1107 FM 1431 suit 286
Marble Falls, TX 78654

Driller Name: **Brice Bormann**License Number: **54855**Apprentice Name: **Colton Sordahl, Justin Bounds**Apprentice Number: **59880, 60110**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	20	calichie
20	80	limestone with streaks of clay
80	100	grey limestone with shale streaks
100	240	grey limestone
240	280	grey limestone with tan streaks
280	360	tan limestone
360	390	grey limestone
390	400	clay

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
4.5	Blank	New Plastic (PVC)	SDR 17	0	360
4.5	Screen	New Plastic (PVC)	SDR 17 0.032	360	400

STATE OF TEXAS WELL REPORT for Tracking #342739

Owner: Tim Lowe	Owner Well #: 2
Address: 65 Treehaven Ct The Hills, TX 78738	Grid #: 57-48-3
Well Location: 19208 Shawn Avery Path Spicewood, TX 78669	Latitude: 30° 20' 50" N
Well County: Travis	Longitude: 098° 01' 54" W
	Elevation: No Data
Type of Work: New Well	
Proposed Use: Domestic	

Drilling Start Date: **6/27/2013** Drilling End Date: **6/27/2013**

	<i>Diameter (in.)</i>	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>
Borehole:	8	0	20
	6.5	20	645

Drilling Method: **Air Rotary**

Borehole Completion: **Straight Wall**

	<i>Top Depth (ft.)</i>	<i>Bottom Depth (ft.)</i>	<i>Description (number of sacks & material)</i>
Annular Seal Data:	0	20	4 Portland

Seal Method: **Slurry**

Distance to Property Line (ft.): **50**

Sealed By: **APEX Drilling Inc.**

Distance to Septic Field or other
concentrated contamination (ft.): **100**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Land Owner**

Surface Completion: **Surface Sleeve Installed**

Water Level: **No Data**

Packers: **Burlap 500,485,480,20**

Type of Pump: **No Data**

Well Tests: **Jetted** **Yield: 35-40 GPM**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	460-640	Trinity

Chemical Analysis Made: **No**Did the driller knowingly penetrate any strata which
contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **APEX Drilling INC>**
P O Box 867
Marble Falls, TX 78654

Driller Name: **Michael G Becker, PG**License Number: **54516**Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
0	1	Tan Sand
1	8	Tan Limestone
8	40	Gray Limestone
40	180	Gray Tan Limestone
180	265	Tan Limestone-Gray
265	290	Tan
290	300	Gray
300	335	White
335	352	Gray
352	381	White Limestone
381	410	Gray Limestone with Clay
410	445	Gray Clay
445	460	Gray Sand Limestone
460	515	Red Sandstone
515	525	Sand Gravel
525	585	Sandstone
585	640	Gravel
640	645	Tan Clay

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
4.5" (5OD)	New	PVC +2' to 585	SDR 17
4.5" (5OD)	New	Slotted 585 to 645	.035

ATTACHMENT Q

USDA Soils Information

(Domestic Worksheet 3.0, Sections 7 and 8)

Contents:

Q1. Cedar Tract Area

Q2. Live Oak Golf Course

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United States
Department of
Agriculture

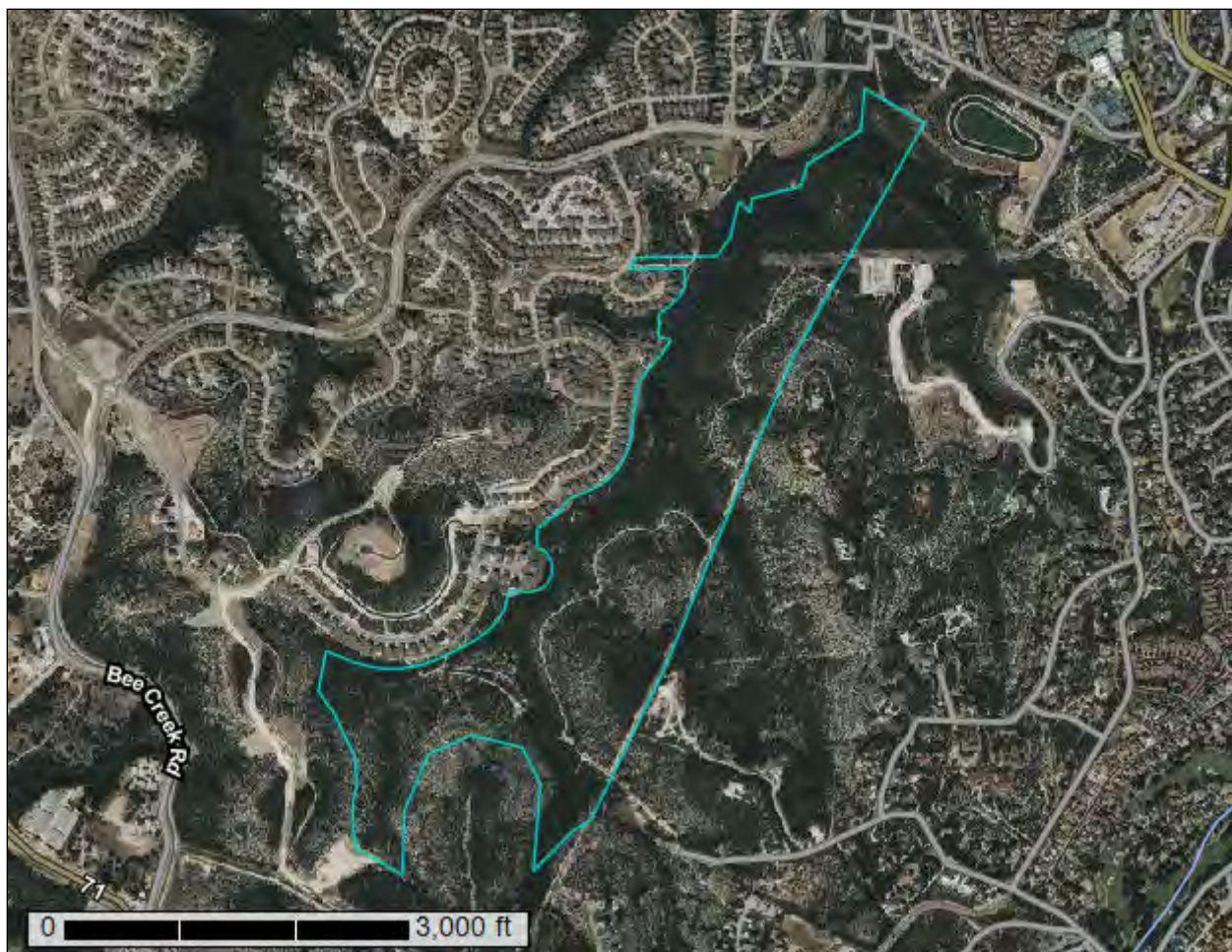
NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Travis County, Texas**

**S-5 WRP Permit Amendment
2023**



March 12, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
Travis County, Texas.....	13
BID—Brackett-Rock outcrop complex, 1 to 12 percent slopes.....	13
BoF—Brackett-Rock outcrop-Real complex, 8 to 30 percent slopes.....	15
TdF—Eckrant-Rock outcrop complex, 18 to 50 percent slopes.....	17
Soil Information for All Uses	20
Soil Reports.....	20
Soil Physical Properties.....	20
Physical Soil Properties (Cedar Irrigation Tract).....	20
References	26

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

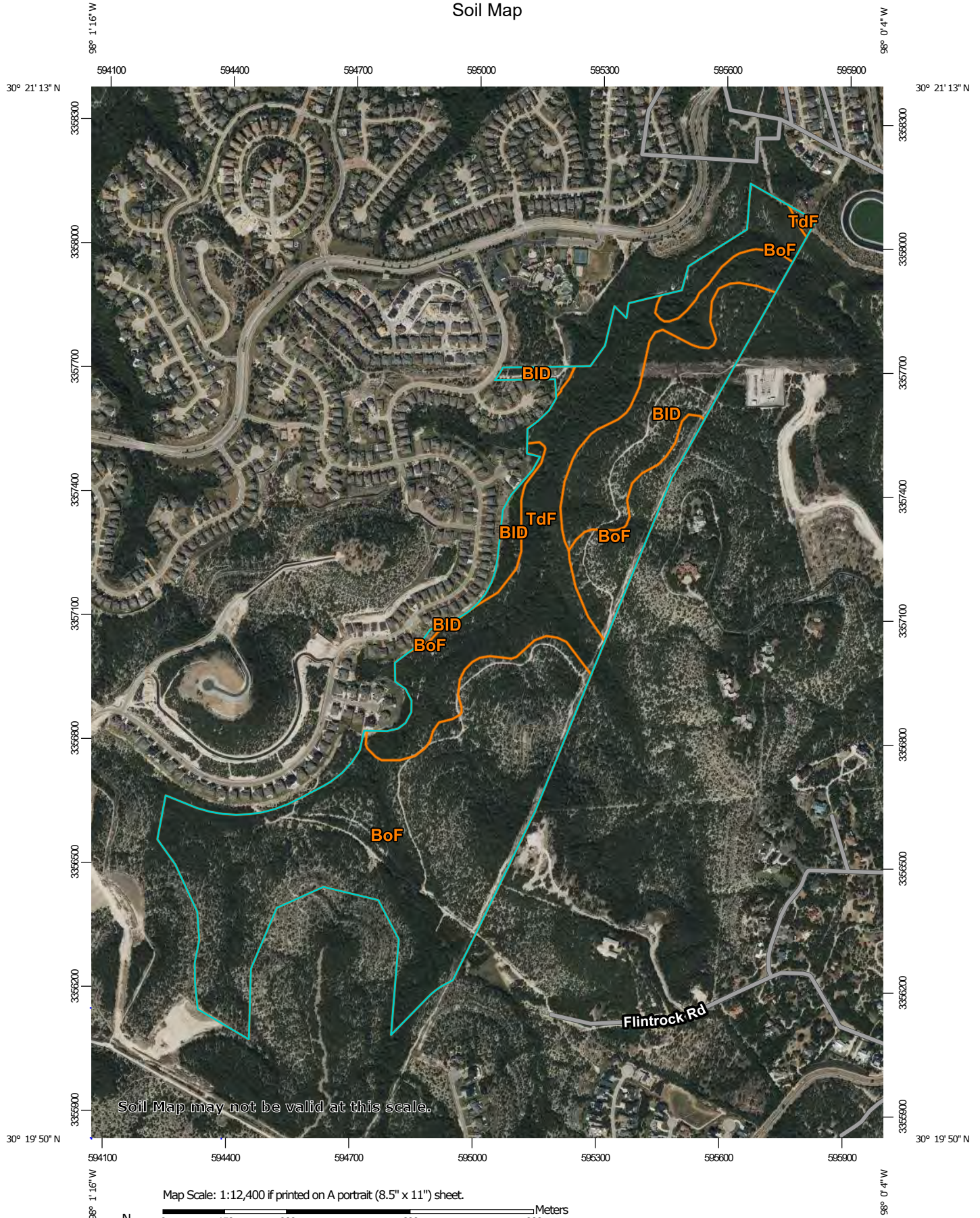
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

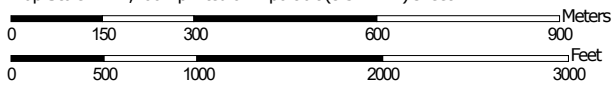
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:12,400 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)


Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features

 Blowout


 Borrow Pit

 Clay Spot


 Closed Depression

 Gravel Pit


 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop


 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals


Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Travis County, Texas
Survey Area Data: Version 25, Sep 5, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BID	Brackett-Rock outcrop complex, 1 to 12 percent slopes	31.7	15.5%
BoF	Brackett-Rock outcrop-Real complex, 8 to 30 percent slopes	124.1	60.5%
TdF	Eckrant-Rock outcrop complex, 18 to 50 percent slopes	49.4	24.1%
Totals for Area of Interest		205.3	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Travis County, Texas

BID—Brackett-Rock outcrop complex, 1 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2yltz
Elevation: 820 to 1,330 feet
Mean annual precipitation: 33 to 37 inches
Mean annual air temperature: 65 to 69 degrees F
Frost-free period: 220 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Brackett and similar soils: 68 percent
Rock outcrop: 20 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brackett

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from limestone

Typical profile

A - 0 to 6 inches: gravelly clay loam
Bw - 6 to 18 inches: clay loam
Cr - 18 to 60 inches: bedrock

Properties and qualities

Slope: 1 to 12 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 90 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R081CY355TX - Adobe 29-35 PZ
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone

Typical profile

R - 0 to 48 inches: bedrock

Properties and qualities

Slope: 3 to 12 percent
Depth to restrictive feature: 0 to 2 inches to lithic bedrock
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 1.98 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

San saba

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R081CY356TX - Blackland 29-35 PZ
Hydric soil rating: No

Volente

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Eckrant

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R081CY363TX - Steep Rocky 29-35 PZ
Hydric soil rating: No

BoF—Brackett-Rock outcrop-Real complex, 8 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2t2m3
Elevation: 470 to 1,900 feet
Mean annual precipitation: 32 to 37 inches
Mean annual air temperature: 66 to 68 degrees F
Frost-free period: 230 to 265 days
Farmland classification: Not prime farmland

Map Unit Composition

Brackett and similar soils: 38 percent
Rock outcrop: 25 percent
Real and similar soils: 22 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brackett

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from limestone

Typical profile

A - 0 to 6 inches: gravelly clay loam
Bk - 6 to 14 inches: gravelly clay loam
Cr - 14 to 60 inches: bedrock

Properties and qualities

Slope: 8 to 30 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 90 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Custom Soil Resource Report

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: D

Ecological site: R081CY362TX - Steep Adobe 29-35 PZ

Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Ridges

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Side slope, base slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Limestone

Typical profile

R - 0 to 80 inches: bedrock

Properties and qualities

Slope: 8 to 30 percent

Depth to restrictive feature: 0 to 2 inches to lithic bedrock

Runoff class: High

*Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 1.98 in/hr)*

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D

Hydric soil rating: No

Description of Real

Setting

Landform: Ridges

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Side slope, base slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from limestone

Typical profile

A - 0 to 4 inches: gravelly loam

Ak - 4 to 14 inches: extremely gravelly loam

Cr - 14 to 40 inches: bedrock

Properties and qualities

Slope: 8 to 30 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: 8 to 19 inches to paralithic bedrock

Drainage class: Well drained

Runoff class: Medium

*Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 1.98 in/hr)*

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 70 percent

Custom Soil Resource Report

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: R081CY362TX - Steep Adobe 29-35 PZ

Hydric soil rating: No

Minor Components

Eckrant

Percent of map unit: 10 percent

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder, backslope, footslope

Landform position (three-dimensional): Crest

Down-slope shape: Linear

Across-slope shape: Convex

Ecological site: R081BY350TX - Steep Rocky 23-31 PZ

Hydric soil rating: No

Volente

Percent of map unit: 5 percent

Landform: Drainageways

Landform position (two-dimensional): Footslope, toeslope, backslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Concave

Ecological site: R081CY357TX - Clay Loam 29-35 PZ

Hydric soil rating: No

TdF—Eckrant-Rock outcrop complex, 18 to 50 percent slopes

Map Unit Setting

National map unit symbol: 2ylv7

Elevation: 500 to 1,300 feet

Mean annual precipitation: 33 to 37 inches

Mean annual air temperature: 65 to 69 degrees F

Frost-free period: 220 to 260 days

Farmland classification: Not prime farmland

Map Unit Composition

Eckrant and similar soils: 55 percent

Rock outcrop: 35 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eckrant

Setting

Landform: Ridges

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Side slope, base slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from limestone

Typical profile

A1 - 0 to 5 inches: very stony clay

A2 - 5 to 8 inches: extremely flaggy clay

R - 8 to 30 inches: bedrock

Properties and qualities

Slope: 18 to 50 percent

Depth to restrictive feature: 6 to 14 inches to lithic bedrock

Drainage class: Well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 40 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: D

Ecological site: R081CY363TX - Steep Rocky 29-35 PZ

Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Ridges

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Side slope, base slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Limestone

Typical profile

R - 0 to 80 inches: bedrock

Properties and qualities

Slope: 18 to 50 percent

Depth to restrictive feature: 0 to 2 inches to lithic bedrock

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)

Custom Soil Resource Report

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Brackett

Percent of map unit: 10 percent

Landform: Ridges

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Side slope, base slope

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: R081CY362TX - Steep Adobe 29-35 PZ

Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Physical Soil Properties (Cedar Irrigation Tract)

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is

given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (*K_{sat}*), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

*Saturated hydraulic conductivity (*K_{sat}*)* refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (*K_{sat}*) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause

Custom Soil Resource Report

damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (K_w and K_f) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and K_{sat} . Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor K_w indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor K_f indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (<http://soils.usda.gov>)

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Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties—Travis County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
BID—Brackett-Rock outcrop complex, 1 to 12 percent slopes														
Brackett	0-6	20-33- 45	20-37- 53	27-30- 35	1.30-1.40-1.50	4.00-9.00-14.00	0.09-0.13-0.16	1.6- 3.3- 5.6	1.0- 2.0- 4.0	.17	.24	2	5	56
	6-18	20-32- 50	15-38- 53	18-30- 35	1.30-1.43-1.55	4.00-9.00-14.00	0.09-0.13-0.16	0.2- 3.0- 5.1	0.5- 1.3- 2.0	.24	.24			
	18-60	—	—	—	—	0.42-2.70-14.00	—	—	—					
Rock outcrop	0-48	—	—	—	—	0.42-2.70-14.00	—	—	—					
Eckrant	—	—	—	—	—	—	—	—	—					
San saba	—	—	—	—	—	—	—	—	—					
Volente	—	—	—	—	—	—	—	—	—					

Custom Soil Resource Report

Physical Soil Properties—Travis County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
BoF—Brackett-Rock outcrop-Real complex, 8 to 30 percent slopes														
Brackett	0-6	20-34- 45	20-36- 53	26-30- 35	1.30-1.40-1.50	4.00-9.00-14.00	0.09-0.13-0.16	1.2- 2.6- 4.5	1.0- 2.0- 4.0	.15	.20	2	8	0
	6-14	20-34- 50	15-36- 53	18-30- 35	1.30-1.43-1.55	4.00-9.00-14.00	0.09-0.13-0.16	0.5- 2.3- 4.3	0.5- 1.3- 2.0	.10	.20			
	14-60	—	—	—	—	0.42-7.20-14.00	—	—	—					
Rock outcrop	0-80	—	—	—	—	0.42-7.00-14.00	—	—	—				8	0
Real	0-4	20-35- 45	28-40- 55	22-25- 27	1.25-1.40-1.55	4.00-9.00-14.00	0.05-0.08-0.10	0.8- 1.9- 2.7	2.0- 6.0- 9.0	.10	.20	2	8	0
	4-14	20-35- 45	15-40- 53	22-25- 40	1.25-1.40-1.55	4.00-9.00-14.00	0.05-0.08-0.10	0.2- 0.8- 3.3	1.0- 4.5- 8.0	.05	.20			
	14-40	—	—	—	—	0.42-7.70-14.00	—	—	—					
Eckrant	—	—	—	—	—	—	—	—	—					
Volente	—	—	—	—	—	—	—	—	—					

Custom Soil Resource Report

Physical Soil Properties—Travis County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
TdF—Eckrant-Rock outcrop complex, 18 to 50 percent slopes														
Eckrant	0-5	3-22- 25	20-28- 50	40-50- 60	1.10-1.25-1.40	1.40-2.70-4.00	0.02-0.05-0.10	2.7- 4.4- 9.1	2.0- 4.5- 7.0	.05	.15	1	6	48
	5-8	5-22- 25	20-28- 50	40-50- 60	1.10-1.25-1.40	1.40-2.70-4.00	0.01-0.04-0.07	1.0- 3.1- 7.6	2.0- 4.5- 7.0	.02	.15			
	8-30	—	—	—	—	0.42-2.70-14.00	—	—	—					
Rock outcrop	0-80	—	—	—	—	0.42-2.70-14.00	—	—	—				8	0
Brackett	—	—	—	—	—	—	—	—	—					

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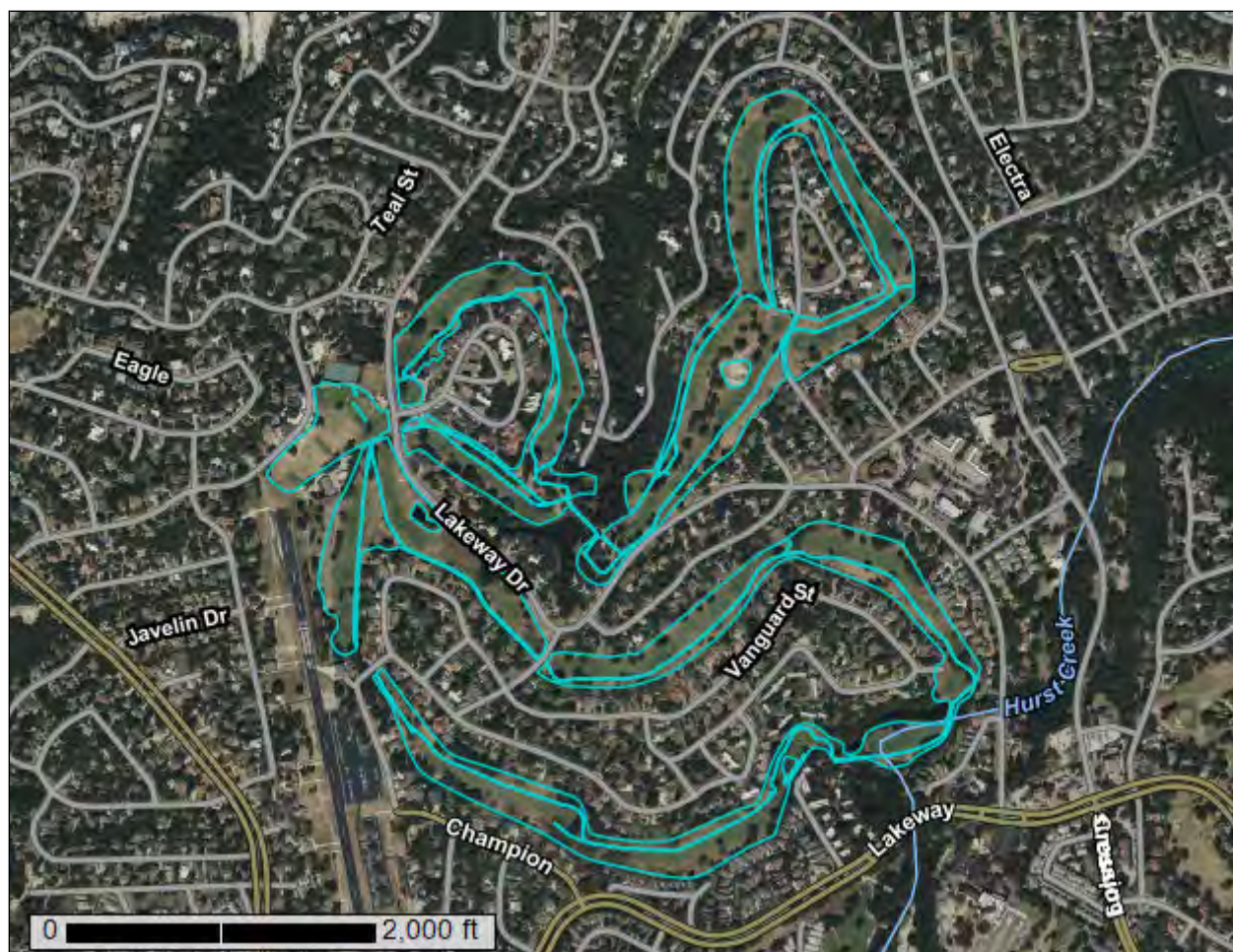
NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Travis County, Texas**

**S-5 WRP Permit Amendment
2023**



March 12, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
Travis County, Texas.....	13
BID—Brackett-Rock outcrop complex, 1 to 12 percent slopes.....	13
TcA—Eckrant and Speck soils, 0 to 2 percent slopes.....	15
VoD—Volente silty clay loam, 1 to 8 percent slopes.....	17
Soil Information for All Uses	20
Soil Reports.....	20
Soil Physical Properties.....	20
Physical Soil Properties (Live Oak Golf Course).....	20
References	26

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


Custom Soil Resource Report Soil Map




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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)


Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features

 Blowout


 Borrow Pit

 Clay Spot


 Closed Depression

 Gravel Pit


 Gravelly Spot


 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot


 Sinkhole


 Slide or Slip

 Sodic Spot


 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails


 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Travis County, Texas
Survey Area Data: Version 25, Sep 5, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BID	Brackett-Rock outcrop complex, 1 to 12 percent slopes	61.3	54.3%
TcA	Eckrant and Speck soils, 0 to 2 percent slopes	48.4	42.8%
VoD	Volente silty clay loam, 1 to 8 percent slopes	3.2	2.8%
Totals for Area of Interest		112.9	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Travis County, Texas

BID—Brackett-Rock outcrop complex, 1 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2yltz
Elevation: 820 to 1,330 feet
Mean annual precipitation: 33 to 37 inches
Mean annual air temperature: 65 to 69 degrees F
Frost-free period: 220 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Brackett and similar soils: 68 percent
Rock outcrop: 20 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brackett

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from limestone

Typical profile

A - 0 to 6 inches: gravelly clay loam
Bw - 6 to 18 inches: clay loam
Cr - 18 to 60 inches: bedrock

Properties and qualities

Slope: 1 to 12 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 90 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R081CY355TX - Adobe 29-35 PZ
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Limestone

Typical profile

R - 0 to 48 inches: bedrock

Properties and qualities

Slope: 3 to 12 percent
Depth to restrictive feature: 0 to 2 inches to lithic bedrock
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 1.98 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

San saba

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R081CY356TX - Blackland 29-35 PZ
Hydric soil rating: No

Volente

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Eckrant

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R081CY363TX - Steep Rocky 29-35 PZ
Hydric soil rating: No

TcA—Eckrant and Speck soils, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2ylv5
Elevation: 800 to 1,300 feet
Mean annual precipitation: 33 to 37 inches
Mean annual air temperature: 65 to 69 degrees F
Frost-free period: 220 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Eckrant and similar soils: 63 percent
Speck and similar soils: 32 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eckrant

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from limestone

Typical profile

A1 - 0 to 5 inches: very stony clay
A2 - 5 to 8 inches: extremely flaggy clay
R - 8 to 30 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 6 to 14 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D

Custom Soil Resource Report

Ecological site: R081CY360TX - Low Stony Hill 29-35 PZ

Hydric soil rating: No

Description of Speck

Setting

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Residuum weathered from limestone

Typical profile

A - 0 to 14 inches: clay loam

Bt - 14 to 18 inches: gravelly clay

R - 18 to 40 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: 14 to 20 inches to lithic bedrock

Drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: D

Ecological site: R081CY361TX - Redland 29-35 PZ

Hydric soil rating: No

Minor Components

Crawford

Percent of map unit: 3 percent

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R081CY358TX - Deep Redland 29-35 PZ

Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

VoD—Volente silty clay loam, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2ynhg
Elevation: 400 to 1,400 feet
Mean annual precipitation: 32 to 35 inches
Mean annual air temperature: 65 to 69 degrees F
Frost-free period: 230 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Volente and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Volente

Setting

Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Calcareous clayey colluvium and/or alluvium derived from limestone

Typical profile

A - 0 to 22 inches: silty clay loam
BA - 22 to 36 inches: silty clay
Bw - 36 to 46 inches: silty clay
Ck - 46 to 59 inches: clay loam

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Minor Components

Lewisville

Percent of map unit: 15 percent
Landform: Ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Brackett

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R081CY355TX - Adobe 29-35 PZ
Hydric soil rating: No

Eckrant

Percent of map unit: 2 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R081CY360TX - Low Stony Hill 29-35 PZ
Hydric soil rating: No

Orif

Percent of map unit: 2 percent
Landform: Drainageways
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R081CY561TX - Loamy Bottomland 29-35 PZ
Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent
Landform: Ridges
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Physical Soil Properties (Live Oak Golf Course)

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is

given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (*K_{sat}*), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (K_{sat}) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (*K_{sat}*) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause

Custom Soil Resource Report

damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (K_w and K_f) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and K_{sat} . Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor K_w indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor K_f indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (<http://soils.usda.gov>)

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Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties—Travis County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
BID—Brackett-Rock outcrop complex, 1 to 12 percent slopes														
Brackett	0-6	20-33- 45	20-37- 53	27-30- 35	1.30-1.40-1.50	4.00-9.00-14.00	0.09-0.13-0.16	1.6- 3.3- 5.6	1.0- 2.0- 4.0	.17	.24	2	5	56
	6-18	20-32- 50	15-38- 53	18-30- 35	1.30-1.43-1.55	4.00-9.00-14.00	0.09-0.13-0.16	0.2- 3.0- 5.1	0.5- 1.3- 2.0	.24	.24			
	18-60	—	—	—	—	0.42-2.70-14.00	—	—	—					
Rock outcrop	0-48	—	—	—	—	0.42-2.70-14.00	—	—	—					
Eckrant	—	—	—	—	—	—	—	—	—					
San saba	—	—	—	—	—	—	—	—	—					
Volente	—	—	—	—	—	—	—	—	—					

Custom Soil Resource Report

Physical Soil Properties—Travis County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
TcA—Eckrant and Speck soils, 0 to 2 percent slopes														
Eckrant	0-5	3-22- 25	20-28- 50	40-50- 60	1.10-1.23-1.40	1.40-2.70-4.00	0.02-0.05-0.10	2.7- 5.1- 8.4	2.0- 4.5- 7.0	.05	.15	1	8	0
	5-8	5-22- 25	20-28- 50	40-50- 60	1.10-1.24-1.40	1.40-2.70-4.00	0.01-0.04-0.07	1.0- 2.8- 6.5	2.0- 4.5- 7.0	.02	.15			
	8-30	—	—	—	—	0.42-2.70-14.00	—	—	—					
Speck	0-14	20-34- 35	26-36- 53	25-30- 39	1.40-1.53-1.65	1.40-2.70-4.00	0.10-0.14-0.18	3.1- 4.4- 6.4	1.0- 2.0- 3.0	.32	.32	1	8	0
	14-18	10-23- 30	10-29- 52	35-48- 60	1.20-1.35-1.50	0.42-1.00-1.40	0.10-0.12-0.15	3.5- 5.8-11.4	0.5- 1.8- 3.0	.10	.24			
	18-40	—	—	—	—	0.42-2.70-14.00	—	—	—					
Crawford	—	—	—	—	—	—	—	—	—					
Rock outcrop	—	—	—	—	—	—	—	—	—					

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Physical Soil Properties—Travis County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
VoD—Volente silty clay loam, 1 to 8 percent slopes														
Volente	0-22	5-15- 22	40-49- 66	28-36- 42	1.25-1.33-1.40	1.40-2.70-4.00	0.15-0.18-0.20	2.5- 4.3- 5.7	1.0- 2.5- 4.0	.24	.24	5	5	56
	22-36	5-13- 30	35-44- 60	35-43- 50	1.30-1.38-1.45	0.42-2.70-4.00	0.15-0.18-0.20	3.4- 5.6- 7.4	1.0- 2.0- 3.5	.28	.28			
	36-46	5-13- 30	35-44- 60	35-43- 50	1.30-1.38-1.45	0.42-0.91-4.00	0.15-0.18-0.20	3.1- 5.3- 7.2	0.5- 0.8- 1.0	.24	.24			
	46-59	5-25- 35	30-36- 58	35-39- 50	1.35-1.43-1.50	0.42-2.70-4.00	0.13-0.17-0.20	2.5- 4.0- 6.9	0.1- 0.3- 0.5	.28	.28			
Lewisville	—	—	—	—	—	—	—	—	—					
Brackett	—	—	—	—	—	—	—	—	—					
Eckrant	—	—	—	—	—	—	—	—	—					
Orif	—	—	—	—	—	—	—	—	—					
Rock outcrop	—	—	—	—	—	—	—	—	—					

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- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

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United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

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ATTACHMENT R

Soils Analyses

(Domestic Worksheet 3.0, Section 8)

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LAKEWAY MUNICIPAL UTILITY DISTRICT

97 Lohmans Crossing • Austin, TX • 78734-4459
(512) 261-6222 • Fax (512) 261-6681



August 25, 2023

Jan Sills
Database and Administration Team (MC-224)
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087

Re: Soil Samples

Dear Ms. Sills:

Lakeway Municipal Utility District is unable to extract soil samples from the 18"-36" zone, because there is only limestone present at this depth.

Please contact me at (512)261-9870 should you have any questions on this matter.

A handwritten signature in blue ink, which appears to read "M. James", is positioned above the word "Sincerely,".

Sincerely,

Marshall James
Wastewater Plant Supervisor



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Annual Soil Sample Reporting

WQ0011495-001 / 36 - Sub samples of 0-6" depth to complete 2 composite samples of 0-6" depth.

36- Sub samples of 6-13" depth to complete 2 composite samples of 6-13" depth.

Other reuse customers / 42- Sub samples of 0-6" depth to complete 1 composite sample of 0-6" depth.

42-Sub samples of 6-13" depth to complete 1 composite sample of 6-13" depth.

WQ0011435-006 / 36- Sub samples of 0-6" depth to complete 2 composite samples of 0-6" depth.

36- Sub samples of 6-13" depth to complete 2 composite samples of 6-13" depth.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

P.O. Box 13087, Austin, Texas 78711-3087

MONTHLY EFFLUENT REPORT

Live Oak #1
O-L"

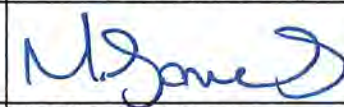
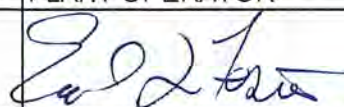
LAKEWAY MUD
1097 LOHMANS CROSSING RD
AUSTIN TX 78734-4459

40B	WQ0011495-006	02	23	8	12852
SYS	PERMIT NUMBER	SET	Year	MO.	EID

THIS REPORT TO BE USED FOR SOIL MON 101 ANN 0-6
SEE BACK FOR INSTRUCTIONS AND DEFINITIONS.
PLEASE RETAIN A PHOTOCOPY FOR YOUR RECORDS.

PARAMETER	EFFLUENT CONDITION			NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE	
		VALUE	UNITS				
004006080 PH	REPORTED	8.1					
MAXIMUM	PERMITTED		STD UNIT		22 1/YEAR	04	24 - HR COMP
006001430 TOT NIT	REPORTED	2800					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
006651430 TOT. PHOS	REPORTED	40					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
009371430 P SSIUM	REPORTED	369					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
009504280 CNDUCTVY	REPORTED	223					
MAXIMUM	PERMITTED		MICMHOS		22 1/YEAR	04	24 - HR COMP
NUMBER OF OPERATOR	REPORTED	WW0057422					
CERTIFICATE	PERMITTED		NUMBER		01 01	NA	NA
EXPIRATION OF OPERATOR	REPORTED	Nov 15,2023					
CERTIFICATE	PERMITTED		DATE		01 01	NA	NA
CLASS OF OPERATOR	REPORTED	B					
CERTIFICATE	PERMITTED		LETTER		01 01	NA	NA
	REPORTED						
	PERMITTED						
	REPORTED						
	PERMITTED						

COMMENTS AND EXPLANATIONS (REFERENCE ALL ATTACHMENTS HERE)

I CERTIFY THAT I AM FAMILIAR WITH THE INFORMATION CONTAINED IN THIS REPORT AND THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF SUCH INFORMATION IS TRUE AND COMPLETE AND ACCURATE			NAME	SIGNATURE	DATE
			MARSHALL JAMES		23 8 25
TELEPHONE NUMBER			PLANT OPERATOR	PLANT OPERATOR	YEAR MO. DAY
512	261	6222	EARL FOSTER		23 8 25
AREA CODE	NUMBER		EXECUTIVE OFFICER	EXECUTIVE OFFICER	YEAR MO. DAY

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

P.O. Box 13087, Austin, Texas 78711-3087

MONTHLY EFFLUENT REPORT

LOE samples
Live OAL #1
6-13" #1

LAKEWAY MUD
1097 LOHMANS CROSSING RD
AUSTIN TX 78734-4459

40B
SYS

WQ0011495-006
PERMIT NUMBER

02
SET

23 8
Year MO.


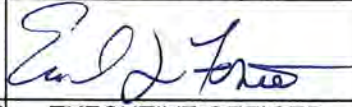
12853
EID

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SOIL MON 201 ANN 6-18

PARAMETER	EFFLUENT CONDITION			NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE	
		VALUE	UNITS				
004006080 PH MAXIMUM	REPORTED PERMITTED	8.4	STD UNIT		22 1/YEAR	04	24 - HR COMP
006001430 TOT NIT IND GRAB	REPORTED PERMITTED	1080					
006651430 TOT. PHOS IND GRAB	REPORTED PERMITTED	38	MG/KG		22 1/YEAR	04	24 - HR COMP
009371430 P SSIMUM IND GRAB	REPORTED PERMITTED	296					
009504280 CNDUCTVY MAXIMUM	REPORTED PERMITTED	221	MICMHOS		22 1/YEAR	04	24 - HR COMP
NUMBER OF OPERATOR CERTIFICATE	REPORTED PERMITTED	WW0057422					
EXPIRATION OF OPERATOR CERTIFICATE	REPORTED PERMITTED	Nov 15, 2023	DATE		01 01	NA	NA
CLASS OF OPERATOR CERTIFICATE	REPORTED PERMITTED	B					
	REPORTED PERMITTED		LETTER		01 01	NA	NA
	REPORTED PERMITTED						
	REPORTED PERMITTED						
	REPORTED PERMITTED						

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			MARSHALL JAMES		23 8 25
TELEPHONE NUMBER			PLANT OPERATOR	PLANT OPERATOR	YEAR MO. DAY
512	261	6222	EARL FOSTER		23 8 25
AREA CODE	NUMBER		EXECUTIVE OFFICER	EXECUTIVE OFFICER	YEAR MO. DAY

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

P.O. Box 13087, Austin, Texas 78711-3087

MONTHLY EFFLUENT REPORT

Live Oak #2
O-L6"

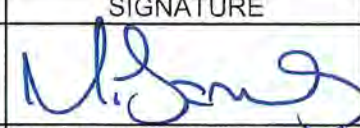

LAKEWAY MUD
1097 LOHMANS CROSSING RD
AUSTIN TX 78734-4459

40B	WQ0011495-006	02	23	8	12852
SYS	PERMIT NUMBER	SET	Year	MO.	EID

THIS REPORT TO BE USED FOR SOIL MON 101 ANN 0-6
SEE BACK FOR INSTRUCTIONS AND DEFINITIONS.
PLEASE RETAIN A PHOTOCOPY FOR YOUR RECORDS.

PARAMETER	EFFLUENT CONDITION			NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE	
		VALUE	UNITS				
004006080 PH	REPORTED	8					
MAXIMUM	PERMITTED		STD UNIT		22 1/YEAR	04	24 - HR COMP
006001430 TOT NIT	REPORTED	1020					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
006651430 TOT. PHOS	REPORTED	60					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
009371430 P SSIMUM	REPORTED	117					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
009504280 CNDUCTVY	REPORTED	108					
MAXIMUM	PERMITTED		MICMHOS		22 1/YEAR	04	24 - HR COMP
NUMBER OF OPERATOR	REPORTED	WW0057422					
CERTIFICATE	PERMITTED		NUMBER		01 01	NA	NA
EXPIRATION OF OPERATOR	REPORTED	Nov 15,2023					
CERTIFICATE	PERMITTED		DATE		01 01	NA	NA
CLASS OF OPERATOR	REPORTED	B					
CERTIFICATE	PERMITTED		LETTER		01 01	NA	NA
	REPORTED						
	PERMITTED						
	REPORTED						
	PERMITTED						

COMMENTS AND EXPLANATIONS (REFERENCE ALL ATTACHMENTS HERE)

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			MARSHALL JAMES		23 8 25
TELEPHONE NUMBER			PLANT OPERATOR	PLANT OPERATOR	YEAR MO. DAY
512	261	6222	EARL FOSTER		23 8 25
AREA CODE	NUMBER		EXECUTIVE OFFICER	EXECUTIVE OFFICER	YEAR MO. DAY

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

P.O. Box 13087, Austin, Texas 78711-3087

MONTHLY EFFLUENT REPORT

Live Oak #2
6-18"

LAKEWAY MUD
1097 LOHMANS CROSSING RD
AUSTIN TX 78734-4459

40B
SYS

WQ0011495-006
PERMIT NUMBER

02
SET

23 8
Year MO.

12853
EID

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SOIL MON 201 ANN 6-18

PARAMETER	EFFLUENT CONDITION			NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE	
		VALUE	UNITS				
004006080 PH	REPORTED	8.2					
MAXIMUM	PERMITTED		STD UNIT		22 1/YEAR	04	24 - HR COMP
006001430 TOT NIT	REPORTED	1200					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
006651430 TOT. PHOS	REPORTED	25					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
009371430 P SSIMUM	REPORTED	123					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
009504280 CONDUCTVY	REPORTED	181					
MAXIMUM	PERMITTED		MICMHOS		22 1/YEAR	04	24 - HR COMP
NUMBER OF OPERATOR	REPORTED	WW0057422					
CERTIFICATE	PERMITTED		NUMBER		01 01	NA	NA
EXPIRATION OF OPERATOR	REPORTED	Nov 15,2023					
CERTIFICATE	PERMITTED		DATE		01 01	NA	NA
CLASS OF OPERATOR	REPORTED	B					
CERTIFICATE	PERMITTED		LETTER		01 01	NA	NA
	REPORTED						
	PERMITTED						
	REPORTED						
	PERMITTED						

COMMENTS AND EXPLANATIONS (REFERENCE ALL ATTACHMENTS HERE)

I CERTIFY THAT I AM FAMILIAR WITH THE INFORMATION
CONTAINED IN THIS REPORT AND THAT TO THE BEST OF MY
KNOWLEDGE AND BELIEF SUCH INFORMATION IS TRUE AND
C COMPLETE AND ACCURATE

NAME
MARSHALL JAMES

SIGNATURE


DATE

23 | 8 | 25

TELEPHONE NUMBER

PLANT OPERATOR

PLANT OPERATOR

YEAR MO. DAY

512

261

6222

EARL FOSTER



23 | 8 | 25

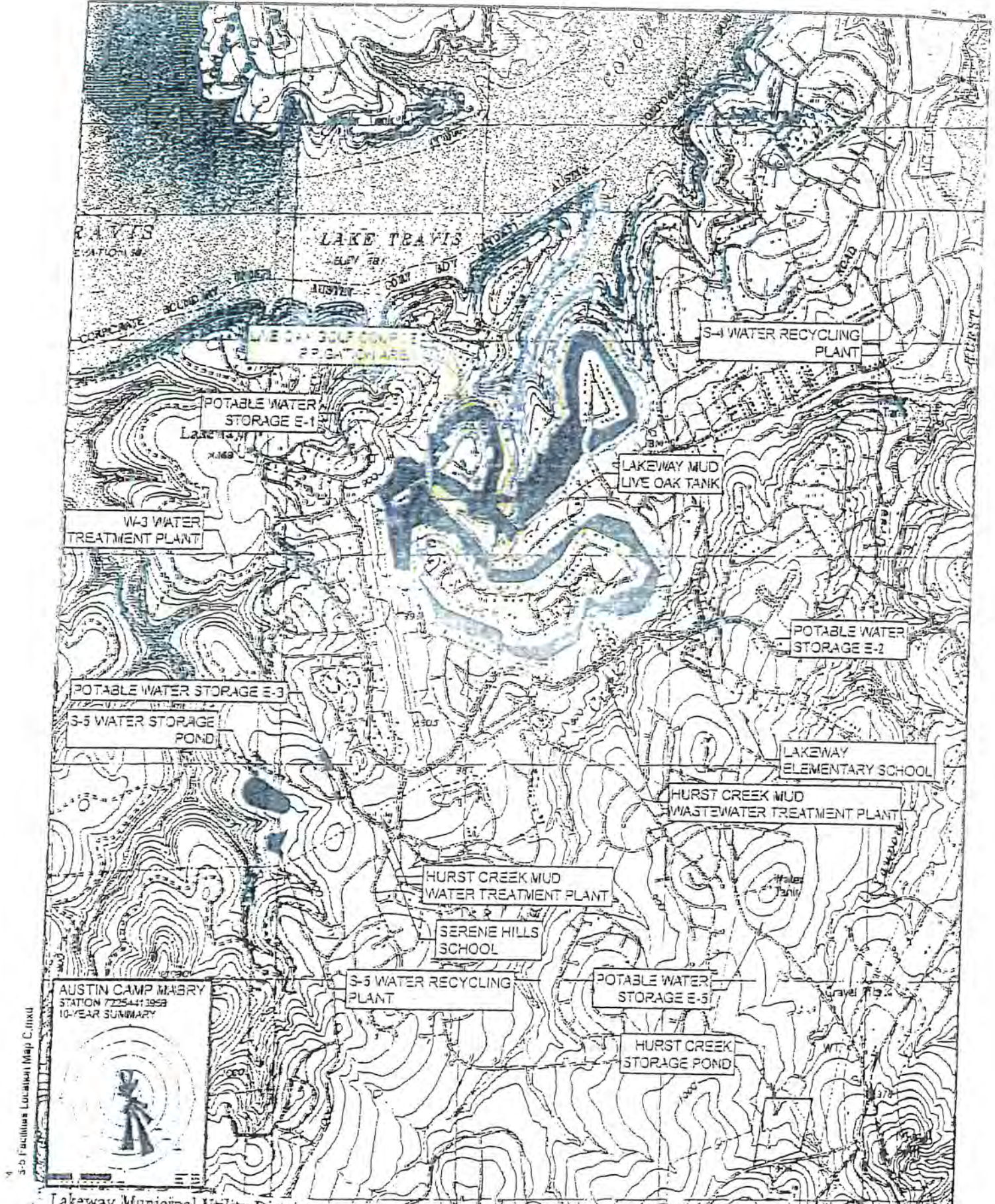
AREA CODE

NUMBER

EXECUTIVE OFFICER

EXECUTIVE OFFICER

YEAR MO. DAY



AUSTIN CAMP MABRY
STATION 722544119506
10-YEAR SUMMARY



Lakeway Municipal Utility District
TCEQ Permit No. WQ0011495006 ATTACHMENT A

THIS DOCUMENT IS RELEASED
FOR THE PURPOSE OF REVIEW
UNDER THE AUTHORITY OF
CHRISTIANNE CASTLEBERRY
TEXAS P.E. NO. 12719
DATE MAY 28, 2014

LAKEWAY M.U.D.
PERMIT #11495-006
S-5 WATER RECYCLING PLANT
FACILITIES LOCATION MAP

Date	May 2014
Attachment No.	

4
3-5 Facilities Location Map C.txd
5/22/2014
D:\GIS\Delivery\MapC...

Email information for report date:
2/13/23 12:40

G002023

LAKEWAY MUD

Attn: Marshall James
jhenderson@lakewaymud.org
1097 LOHMANS CROSSING
AUSTIN, TX 78734

Please contact us for your sampling needs or if you have any questions. Some convenient contacts are listed below. You can also access your results and reports through our ClientConnect™ portal on our website (www.aqua-techlabs.com).

For sampling questions:

samplingbryan@aqua-techlabs.com (Bryan area)
samplingaustin@aqua-techlabs.com (Austin area)
reporting@aqua-techlabs.com (report questions)

Aqua-Tech values you as a customer and encourages you to speak with our staff at 979-778-3707 or the above emails if you have questions.

Thank you for your business,
June M. Brien
Executive Technical Director



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Fax: (979) 778-3193

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Fax: (512) 301-9552

The analyses summarized in this report were performed by Aqua-Tech Laboratories, Inc. unless otherwise noted. Aqua-Tech Laboratories, Inc. holds accreditation from the State of Texas in accordance with TNI and/or through the TCEQ Drinking Water Commercial Laboratory Approval Program.

The following abbreviations indicate certification status:

NEL	TNI accredited parameter.
ANR	Accreditation not offered by the State of Texas.
DWP	Approval through the TCEQ Drinking Water Commercial Laboratory Approval Program.
INF	Aqua-Tech Laboratories, Inc. is not accredited for this parameter. It is reported on an informational basis only.

Subcontracted data summarized in this report is indicated by "Sub" in the Lab column.

General Definitions:

NR	Not Reported.
RPD	Relative Percent Difference.
% R	Percent Recovery.
dry	Results with the "dry" unit designation are reported on a "dry weight" basis.
SQL	The Sample Quantitation Limit is the value below which the parameter cannot reliably be detected. The SQL includes all sample preparations, dilutions and / or concentrations.
Adj MDL	The Adjusted Method Detection Limit is the MDL value adjusted for any sample dilutions or concentrations.
MDL	The Method Detection Limit is the lowest theoretical value that is statistically different from zero for a specific method, taking into account all preparation steps and instrument settings.

All samples are reported on an "as received" basis unless the designation "dry" is added to the reported unit.

Copies of Aqua-Tech Laboratories, Inc. procedures and individual sampling plans are available upon request. Note that samples are collected by Aqua-Tech Laboratories, Inc. personnel unless otherwise noted in the "Sample Collected" field of this report as "Client" or "CLT".

Samples included in this report were received in acceptable condition according to Aqua-Tech Laboratories, Inc. procedures and 40 CFR, Chapter I, Subchapter D, Part 136.3, TABLE II - *Required containers, preservation techniques, and holding times*, unless otherwise noted in this report.

Record Retention:

All reports, raw data, and associated quality control data are kept on file for 10 years before being destroyed. Any client that would like copies of records must contact Aqua-Tech Laboratories, Inc. no later than six months prior to the scheduled disposal. An administrative fee for retrieval and distribution will apply.

This report was approved by:

June M. Brien, Technical Director

corp@aqua-techlabs.com

www.aqua-techlabs.com

T104704371-21-24



TCEQ DW Lab ID TX 239



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Analytical Report

LAKEWAY MUD

Report Printed: 2/13/23 12:40

G002023

See attached subcontract report for additional analysis and fertilizer recommendations.

Lakeway WQ0011495 Reuse Customers Soil 0-6 Inches

Lab ID# G002023-01

General Chemistry

% Solids

Total Kjeldahl Nitrogen as N

Plant Available Parameters

Total Nitrogen

Please see the attached subcontract report for subcontracted data.

Collected: 01/11/23 10:00 by CLIENT
Received: 01/11/23 15:10 by Denise Boler

Units

g/100g (%)

mg/kg dry

mg/kg dry wt.

Result

77.5

2020

2040

MDL

0.10

0.12

Adj MDL

0.10

39.4

Type

Comp

Lab

Austin

Bryan

Analyzed

01/12/23 14:03 ATA

01/19/23 13:57 KMA

Matrix

Solid

Method

SM2540 G 2015

SM4500-NH3 G 2011

C-O-C #

G002023

Batch

M155386

M155544

NEL

ANR

ANR

Lakeway WQ0011495 Reuse Customers Soil 6-18 Inches

Lab ID# G002023-02

General Chemistry

% Solids

Total Kjeldahl Nitrogen as N

Plant Available Parameters

Total Nitrogen

Please see the attached subcontract report for subcontracted data.

Collected: 01/11/23 10:00 by CLIENT
Received: 01/11/23 15:10 by Denise Boler

Units

g/100g (%)

mg/kg dry

mg/kg dry wt.

Result

81.3

1890

1910

MDL

0.10

0.12

Adj MDL

0.10

72.6

Type

Comp

Lab

Austin

Bryan

Analyzed

01/12/23 14:03 ATA

01/19/23 13:57 KMA

Matrix

Solid

Method

SM2540 G 2015

SM4500-NH3 G 2011

C-O-C #

G002023

Batch

M155386

M155544

NEL

ANR

ANR

Lakeway Yaupon Soil Sample 1 0-6 Inches

Lab ID# G002023-03

General Chemistry

% Solids

Total Kjeldahl Nitrogen as N

Plant Available Parameters

Total Nitrogen

Please see the attached subcontract report for subcontracted data.

Collected: 01/10/23 14:30 by CLIENT
Received: 01/11/23 15:10 by Denise Boler

Units

g/100g (%)

mg/kg dry

mg/kg dry wt.

Result

78.2

1900

1910

MDL

0.10

0.12

Adj MDL

0.10

38.4

Type

Comp

Lab

Austin

Bryan

Analyzed

01/12/23 14:03 ATA

01/19/23 13:57 KMA

Matrix

Solid

Method

SM2540 G 2015

SM4500-NH3 G 2011

C-O-C #

G002023

Batch

M155386

M155544

NEL

ANR

ANR



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Analytical Report

LAKEWAY MUD

Report Printed: 2/13/23 12:40

G002023

Lakeway Yaupon Soil Sample 1 6-18 Inches

Collected: 01/10/23 14:30 by CLIENT
Received: 01/11/23 15:10 by Denise Boler

Lab ID#	G002023-04	Result	Units	Notes	MDL	Adj MDL	SQL	Type	Lab	Analyzed	Matrix	Method	C-O-C #	Batch
General Chemistry														
% Solids		83.2	g/100g (%)		0.10	0.10	0.10	0.10	Austin	01/12/23 14:03	ATA	SM2540 G 2015	G002023	M155386
Total Kjeldahl Nitrogen as N		1630	mg/kg dry		0.12	37.5	60.0	60.0	Bryan	01/19/23 13:57	KMA	SM4500-NH3 G 2011		M155544
Plant Available Parameters														
Total Nitrogen		1660	mg/kg dry wt.			N/A	N/A	N/A	Calc	02/07/23 12:24	PMY	Calculation		M156390

Please see the attached subcontract report for subcontracted data.

Lakeway Yaupon Soil Sample 2 0-6 Inches

Collected: 01/10/23 14:30 by CLIENT
Received: 01/11/23 15:10 by Denise Boler

Lab ID#	G002023-05	Result	Units	Notes	MDL	Adj MDL	SQL	Type	Lab	Analyzed	Matrix	Method	C-O-C #	Batch
General Chemistry														
% Solids		81.7	g/100g (%)	C-02	0.10	0.10	0.10	0.10	Austin	01/12/23 14:03	ATA	SM2540 G 2015	G002023	M155386
Total Kjeldahl Nitrogen as N		1670	mg/kg dry		0.12	37.3	59.6	59.6	Bryan	01/19/23 13:57	KMA	SM4500-NH3 G 2011		M155544
Plant Available Parameters														
Total Nitrogen		1690	mg/kg dry wt.			N/A	N/A	N/A	Calc	02/07/23 12:24	PMY	Calculation		M156390

Please see the attached subcontract report for subcontracted data.

Lakeway Yaupon Soil Sample 2 6-18 Inches

Collected: 01/10/23 14:30 by CLIENT
Received: 01/11/23 15:10 by Denise Boler

Lab ID#	G002023-06	Result	Units	Notes	MDL	Adj MDL	SQL	Type	Lab	Analyzed	Matrix	Method	C-O-C #	Batch
General Chemistry														
% Solids		84.6	g/100g (%)		0.10	0.10	0.10	0.10	Austin	01/12/23 14:03	ATA	SM2540 G 2015	G002023	M155386
Total Kjeldahl Nitrogen as N		1430	mg/kg dry		0.12	36.5	58.3	58.3	Bryan	01/19/23 13:57	KMA	SM4500-NH3 G 2011		M155544
Plant Available Parameters														
Total Nitrogen		1470	mg/kg dry wt.			N/A	N/A	N/A	Calc	02/07/23 12:24	PMY	Calculation		M156390

Please see the attached subcontract report for subcontracted data.



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Analytical Report

LAKEWAY MUD

Report Printed: 2/13/23 12:40

G002023

Lakeway Live Oak Soil Sample 1 0-6 Inches

Lab ID# G002023-07

General Chemistry

% Solids

Total Kjeldahl Nitrogen as N

Plant Available Parameters

Total Nitrogen

Please see the attached subcontract report for subcontracted data.

Collected: 01/10/23 11:00 by CLIENT
Received: 01/11/23 15:10 by Denise Boler

Units

g/100g (%)

mg/kg dry

mg/kg dry wt.

Result

69.1

2780

2800

Type

comp

Lab

Austin

Bryan

Calc

Analyzed

01/12/23 14:03 ATA

01/19/23 13:57 KMA

02/07/23 12:24 PMY

Matrix

Solid

Method

SM2540 G 2015

SM4500-NH3 G 2011

Calculation

C-O-C #

G002023

Batch

M155386

M155544

M156390

NEL

AMP

AMP

Lakeway Live Oak Soil Sample 1 6-18 Inches

Lab ID# G002023-08

General Chemistry

% Solids

Total Kjeldahl Nitrogen as N

Plant Available Parameters

Total Nitrogen

Please see the attached subcontract report for subcontracted data.

Collected: 01/10/23 11:00 by CLIENT
Received: 01/11/23 15:10 by Denise Boler

Units

g/100g (%)

mg/kg dry

mg/kg dry wt.

Result

80.9

1070

1080

Type

Comp

Lab

Austin

Bryan

Calc

Analyzed

01/12/23 14:03 ATA

01/19/23 13:57 KMA

02/07/23 12:24 PMY

Matrix

Solid

Method

SM2540 G 2015

SM4500-NH3 G 2011

Calculation

C-O-C #

G002023

Batch

M155386

M155544

M156390

NEL

AMP

AMP

Lakeway Live Oak Soil Sample 2 0-6 Inches

Lab ID# G002023-10

General Chemistry

% Solids

Total Kjeldahl Nitrogen as N

Plant Available Parameters

Total Nitrogen

Please see the attached subcontract report for subcontracted data.

Collected: 01/10/23 11:00 by CLIENT
Received: 01/11/23 15:10 by Denise Boler

Units

g/100g (%)

mg/kg dry

mg/kg dry wt.

Result

87.6

1020

1030

Type

Comp

Lab

Austin

Bryan

Calc

Analyzed

01/12/23 14:03 ATA

01/19/23 13:57 KMA

02/07/23 12:24 PMY

Matrix

Solid

Method

SM2540 G 2015

SM4500-NH3 G 2011

Calculation

C-O-C #

G002023

Batch

M155386

M155544

M156390

NEL

AMP

AMP



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Analytical Report

LAKEWAY MUD

Report Printed: 2/13/23 12:40

G002023

Lakeway Live Oak Soil Sample 2 6-18

Inches

Lab ID# G002023-11

Collected: 01/10/23 11:00 by CLIENT
Received: 01/11/23 15:10 by Denise Boler

Result

Units

Notes

MDL

Adj MDL

SQL

Lab

Analyzed

Matrix
Solid

Method

C-O-C #
G002023

Batch

General Chemistry

% Solids

Total Kjeldahl Nitrogen as N

Plant Available Parameters

Total Nitrogen

Please see the attached subcontract report for subcontracted data.

87.3

g/100g (%)

1180

mg/kg dry

1200

mg/kg dry wt.

0.10

0.10

0.10

Austin

01/12/23 14:03 ATA

SM2540 G 2015

01/19/23 13:57 KMA

SM4500-NH3 G 2011

M155386

0.12

35.8

57.3

Bryan

02/07/23 12:24 PMY

Calculation

M155544

M155386

M155386

NEL

AWR

AWR

Explanation of Notes

C-02

Result confirmed by re-analysis.

General Chemistry - Quality Control

% Solids - SM2540 G 2015

Blank <0.10 g/100g (%)

Duplicate 81.9 %

Duplicate 81.9 g/100g (%)

Total Kjeldahl Nitrogen as N - SM4500-NH3 G 2011

Low Cal Check 0.20 mg/L

Blank <0.20 mg/kg wet

LCS 8.05 mg/kg wet

LCS Dup 7.84 mg/kg wet

Matrix Spike 6570 mg/kg dry

Matrix Spike Dup 6800 mg/kg dry

MRL Check 0.20 mg/kg wet

Reference 6.41 mg/kg wet

MDL

SQL

Analyzed

Spike
Amount

%R

%R Limits

RPD

RPD
Limit

Batch

0.10

0.10

0.10

81.7

81.7

0.257

0.257

5.81

13.3

Austin

0.10

0.10

0.10

0.200

98.6

70 - 130

2301222

M155386

M155386

Austin

0.10

0.10

0.10

8.00

101

85 - 115

M155544

M155544

M155544

Bryan

0.12

0.12

0.12

8.00

98.0

85 - 115

M155544

M155544

M155544

Bryan

0.12

0.12

0.12

4640

101

70 - 130

M155544

M155544

M155544

Bryan

72.6

72.6

72.6

4640

106

70 - 130

M155544

M155544

M155544

Bryan

0.12

0.12

0.12

0.200

98.6

70 - 130

M155544

M155544

M155544

Bryan



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Analytical Report

LAKEWAY MUD

2/13/23 12:40

G002023

Report Printed:

Sample Preparation Summary

Sample	Method	Prepared	Lab	Bottle	Initial	Units	Final	Units	External Dilution Factor	Batch
G002023-01										
% Solids	SM2540 G 2015	1/12/23 14:03 ATA	Austin	C	10.0	g	10.0	mL	1	M155386
Subcontract	Sub Contract Data Entry	2/6/23 15:50 PMY	Bryan	-	-	-	-	-	-	M156359
Total Kjeldahl Nitrogen as N	SM4500-NH3 G 2011	1/17/23 10:41 KMA	Bryan	A	0.107	g	26.0	mL	1	M155544
Total Nitrogen	Calculation	2/7/23 12:24 PMY			1.00	g	1.00	mL	1	M156390
G002023-02										
% Solids	SM2540 G 2015	1/12/23 14:03 ATA	Austin	C	10.0	g	10.0	mL	1	M155386
Subcontract	Sub Contract Data Entry	2/6/23 15:50 PMY	Bryan	-	-	-	-	-	-	M156359
Total Kjeldahl Nitrogen as N	SM4500-NH3 G 2011	1/17/23 10:41 KMA	Bryan	A	0.0530	g	25.0	mL	1	M155544
Total Nitrogen	Calculation	2/7/23 12:24 PMY			1.00	g	1.00	mL	1	M156390
G002023-03										
% Solids	SM2540 G 2015	1/12/23 14:03 ATA	Austin	C	10.0	g	10.0	mL	1	M155386
Subcontract	Sub Contract Data Entry	2/6/23 15:50 PMY	Bryan	-	-	-	-	-	-	M156359
Total Kjeldahl Nitrogen as N	SM4500-NH3 G 2011	1/17/23 10:41 KMA	Bryan	A	0.104	g	25.0	mL	1	M155544
Total Nitrogen	Calculation	2/7/23 12:24 PMY			1.00	g	1.00	mL	1	M156390
G002023-04										
% Solids	SM2540 G 2015	1/12/23 14:03 ATA	Austin	C	10.0	g	10.0	mL	1	M155386
Subcontract	Sub Contract Data Entry	2/6/23 15:50 PMY	Bryan	-	-	-	-	-	-	M156359
Total Kjeldahl Nitrogen as N	SM4500-NH3 G 2011	1/17/23 10:41 KMA	Bryan	A	0.100	g	25.0	mL	1	M155544
Total Nitrogen	Calculation	2/7/23 12:24 PMY			1.00	g	1.00	mL	1	M156390
G002023-05										
% Solids	SM2540 G 2015	1/12/23 14:03 ATA	Austin	C	10.0	g	10.0	mL	1	M155386
Subcontract	Sub Contract Data Entry	2/6/23 15:50 PMY	Bryan	-	-	-	-	-	-	M156359
Total Kjeldahl Nitrogen as N	SM4500-NH3 G 2011	1/17/23 10:41 KMA	Bryan	A	0.103	g	25.0	mL	1	M155544
Total Nitrogen	Calculation	2/7/23 12:24 PMY			1.00	g	1.00	mL	1	M156390
G002023-06										
% Solids	SM2540 G 2015	1/12/23 14:03 ATA	Austin	C	10.0	g	10.0	mL	1	M155386
Subcontract	Sub Contract Data Entry	2/6/23 15:50 PMY	Bryan	-	-	-	-	-	-	M156359
Total Kjeldahl Nitrogen as N	SM4500-NH3 G 2011	1/17/23 10:41 KMA	Bryan	A	0.101	g	25.0	mL	1	M155544
Total Nitrogen	Calculation	2/7/23 12:24 PMY			1.00	g	1.00	mL	1	M156390
G002023-07										
% Solids	SM2540 G 2015	1/12/23 14:03 ATA	Austin	C	10.0	g	10.0	mL	1	M155386
Subcontract	Sub Contract Data Entry	2/6/23 15:50 PMY	Bryan	-	-	-	-	-	-	M156359
Total Kjeldahl Nitrogen as N	SM4500-NH3 G 2011	1/17/23 10:41 KMA	Bryan	A	0.107	g	25.0	mL	1	M155544
Total Nitrogen	Calculation	2/7/23 12:24 PMY			1.00	g	1.00	mL	1	M156390

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Analytical Report

LAKEWAY MUD

Report Printed: 2/13/23 12:40

G002023

Sample Preparation Summary

Sample	Method	Prepared	Lab	Bottle	Initial	Units	Final	Units	External Dilution Factor	Batch
G002023-08										
% Solids	SM2540 G 2015	1/12/23 14:03 ATA	Austin	C	10.0	g	10.0	mL	1	M155386
Subcontract	Sub Contract Data Entry	2/6/23 15:50 PMY	Bryan	-	-	-	-	-	-	M156359
Total Kjeldahl Nitrogen as N	SM4500-NH3 G 2011	1/17/23 10:41 KMA	Bryan	A	0.103	g	25.0	mL	1	M155544
Total Nitrogen	Calculation	2/7/23 12:24 PMY			1.00	g	1.00	mL	1	M156390
G002023-10										
% Solids	SM2540 G 2015	1/12/23 14:03 ATA	Austin	C	10.0	g	10.0	mL	1	M155386
Subcontract	Sub Contract Data Entry	2/6/23 15:50 PMY	Bryan	-	-	-	-	-	-	M156359
Total Kjeldahl Nitrogen as N	SM4500-NH3 G 2011	1/17/23 10:41 KMA	Bryan	A	0.101	g	25.0	mL	1	M155544
Total Nitrogen	Calculation	2/7/23 12:24 PMY			1.00	g	1.00	mL	1	M156390
G002023-11										
% Solids	SM2540 G 2015	1/12/23 14:03 ATA	Austin	C	10.0	g	10.0	mL	1	M155386
Subcontract	Sub Contract Data Entry	2/6/23 15:50 PMY	Bryan	-	-	-	-	-	-	M156359
Total Kjeldahl Nitrogen as N	SM4500-NH3 G 2011	1/17/23 10:41 KMA	Bryan	A	0.100	g	25.0	mL	1	M155544
Total Nitrogen	Calculation	2/7/23 12:24 PMY			1.00	g	1.00	mL	1	M156390

Chain-of-Custody and Analysis Request

Client / Project Name:	LAKELAND MUD Lakeland MUD Soil REC		Reagent tracking is available upon request.
	Name Marshall James Address 1097 LOHMAN'S CROSSING City AUSTIN State TX Zip 78734 Phone (512) 261-6222 email	Definitions DW Drinking Water NP Non-Potable Water S Solid CM Custody Maintained CTU Custody Transfer Unbroken CT Corrected Temperature	

Analyses Requested: "A" prefix indicates Austin, all others Bryan or Subcontracted, indicated by [SUB].
Name format Analysis-Matrix-Technology-Method.

[NEL] = NELAP accredited parameter	[CNRF] = No NELAP accreditation required or available
[SUB] = NELAP accredited subcontracted parameter	[INF] = Informational only (not NELAC certified)

By relinquishing the samples listed below to Aqua-Tech laboratories, Inc. (ATL), the client agrees to the following terms. Samples will be analyzed by a method that is within ATL's NELAP fields of accreditation (FOA). Analyses requiring an accredited method that is not within ATL's FOA will be subcontracted to a NELAP lab that is accredited for that method. Clients will be notified of the subcontract lab's details. Other analyses not requiring accreditation will be analyzed by a compendial method. If a specific method is required, the client will note the method in the "Analysis Requested" column. The client approves all method modifications documented by ATL or the subcontract lab.

A current list of ATL's NELAC fields of accreditation and other methods are available on request.

Comments:	- LAB RECEIPT -	AQU5
	Temperature - CT (C):	4.0
	Preservation Correct:	Yes
	Post-Preservatives:	N/A
	Thermometer ID:	0715672
	pH Paper ID:	0789433

Field Sample ID	Date	Start Time	Date	End Time	Comments
Lakeway WQ0011495 Reuse Customers Soil 0-6 inches	4/11/23	8:00AM	1/11/23	10:00 AM	Cond SL (1/2) Probe TAMU CNR (SUB) N Total TAMU CALC ENTRY (CNR)
A TS SL Grav SM2540 G (NEL) N Total SL PKG TAMU (CNR)					K TAMU Plant Available Moisture NO3N TAMU Extractable Nitrate

P TAMU Plant Available Mehlich 3 CNR [SUB]	SUB pH SL TAMU (1:2) CNR	Y Billing N Total Calc	Solids, Dry Weight	Y Billing N Total Calc
TKN SL AUTO SM4500 NH3 G [CNR]				
Lakeway WQ0011495 Reuse	11/11/23	8:00 AM	11/11/23	10:00 AM
Customers Soil 6-18 Inches				
A T S SL Grav SM2540 G [NEL]	Cond SL (1:2) Probe TAMU CNR [SUB]			
N Total SL PKG TAMU [CNR]	N Total TAMU CALC ENTRY [CNR]			
P TAMU Plant Available Mehlich 3 CNR [SUB]	SUB pH SL TAMU (1:2) CNR	Y Billing N Total Calc	Solids, Dry Weight	Y Billing N Total Calc
TKN SL AUTO SM4500 NH3 G [CNR]				

11/10/23	1:00 pm	11/10/23	2:30 pm
A TS SL Grav SM2540 G [NEL] N Total SL PKG TAMU [CNR] P TAMU Plant Available Mehlich 3 CNR [SUB] TKN SL AUTO SM4500 NH3 G [CNR]		Cond SL (1:2) Probe TAMU CNR [SUB] N Total TAMU CALC ENTRY [CNR] Solids, Dry Weight Y Billing N Total Calc	
K TAMU Plant Available M		K TAMU Plant Available M	
NO3N TAMU Extradable		NO3N TAMU Extradable	
SUB pH SL TAMU (1:2) C		SUB pH SL TAMU (1:2) C	

1

AQUA-TECH
LABORATORIES, INC.

LAKEWAY MUD

Wong # 58
1-13-22

ked box indicates bottle arrived in lab)
- Type - Preservative)

Field Sample ID	Date	Start Time	Date	End Time	Composite Type	Sample Matrix	Container (Checked box indicates bottle arrived in lab) (Volume - Type - Preservative)	Lab ID
Lakeway Yaupon Soil Sample 1 6-18 Inches	1/10/23	1:00 pm	1/10/23	2:30 pm	Comp	S	<input checked="" type="checkbox"/> A SOIL 1LP	F040711-04 wring# 6/6/23
A TS SL Grav SM2540 G [NEL] N Total SL PKG TAMU [CNR] P TAMU Plant Available Mehlich 3 CNR [SUB] TKN SL AUTO SM4500 NH3 G [CNR]		Cond SL (1:2) Probe TAMU CNR [SUB] N Total TAMU CALC ENTRY [CNR] Solids, Dry Weight Y Billing N Total Calc		K TAMU Plant Available Mehlich 3 CNR [SUB] NO3N TAMU Extractable Mehlich 3 CNR [SUB] SUB pH SL TAMU (1:2) CNR [SUB]				
Lakeway Yaupon Soil Sample 2 0-6 Inches	1/10/23	1:00 pm	1/10/23	2:30 pm	Comp	S	<input checked="" type="checkbox"/> A SOIL 1LP	F040711-05 wring# 6/6/23
A TS SL Grav SM2540 G [NEL] N Total SL PKG TAMU [CNR] P TAMU Plant Available Mehlich 3 CNR [SUB] TKN SL AUTO SM4500 NH3 G [CNR]		Cond SL (1:2) Probe TAMU CNR [SUB] N Total TAMU CALC ENTRY [CNR] Solids, Dry Weight Y Billing N Total Calc		K TAMU Plant Available Mehlich 3 CNR [SUB] NO3N TAMU Extractable Mehlich 3 CNR [SUB] SUB pH SL TAMU (1:2) CNR [SUB]				
Lakeway Yaupon Soil Sample 2 6-18 Inches	1/10/23	8:00 am	1/10/23	2:30 pm	Comp	S	<input checked="" type="checkbox"/> A SOIL 1LP	F040744-06 wring# 6/6/23
A TS SL Grav SM2540 G [NEL] N Total SL PKG TAMU [CNR] P TAMU Plant Available Mehlich 3 CNR [SUB] TKN SL AUTO SM4500 NH3 G [CNR]		Cond SL (1:2) Probe TAMU CNR [SUB] N Total TAMU CALC ENTRY [CNR] Solids, Dry Weight Y Billing N Total Calc		K TAMU Plant Available Mehlich 3 CNR [SUB] NO3N TAMU Extractable Mehlich 3 CNR [SUB] SUB pH SL TAMU (1:2) CNR [SUB]				
Lakeway Live Oak Soil Sample 1 0-6 Inches	1/10/23	8:00 am	1/10/23	9:00 am	comp	S	<input checked="" type="checkbox"/> A SOIL 1LP	F040744-07 wring# 6/6/23
A TS SL Grav SM2540 G [NEL] N Total SL PKG TAMU [CNR] P TAMU Plant Available Mehlich 3 CNR [SUB] TKN SL AUTO SM4500 NH3 G [CNR]		Cond SL (1:2) Probe TAMU CNR [SUB] N Total TAMU CALC ENTRY [CNR] Solids, Dry Weight Y Billing N Total Calc		K TAMU Plant Available Mehlich 3 CNR [SUB] NO3N TAMU Extractable Mehlich 3 CNR [SUB] SUB pH SL TAMU (1:2) CNR [SUB]				
Lakeway Live Oak Soil Sample 1 6-18 Inches	1/10/23	8:00 am	1/10/23	11:00 am	Comp	S	<input checked="" type="checkbox"/> A SOIL 1LP	F040711-08 wring# 6/6/23
A TS SL Grav SM2540 G [NEL] N Total SL PKG TAMU [CNR] P TAMU Plant Available Mehlich 3 CNR [SUB] TKN SL AUTO SM4500 NH3 G [CNR]		Cond SL (1:2) Probe TAMU CNR [SUB] N Total TAMU CALC ENTRY [CNR] Solids, Dry Weight Y Billing N Total Calc		K TAMU Plant Available Mehlich 3 CNR [SUB] NO3N TAMU Extractable Mehlich 3 CNR [SUB] SUB pH SL TAMU (1:2) CNR [SUB]				
Lakeway Live Oak Soil Sample 1 18-30 Inches	1/10/23	8:00 am	1/10/23	11:00 am	Comp	S	<input checked="" type="checkbox"/> A SOIL 1LP	F040711-09 wring# 6/6/23
A TS SL Grav SM2540 G [NEL] N Total SL PKG TAMU [CNR] P TAMU Plant Available Mehlich 3 CNR [SUB] TKN SL AUTO SM4500 NH3 G [CNR]		Cond SL (1:2) Probe TAMU CNR [SUB] N Total TAMU CALC ENTRY [CNR] Solids, Dry Weight Y Billing N Total Calc		K TAMU Plant Available Mehlich 3 CNR [SUB] NO3N TAMU Extractable Mehlich 3 CNR [SUB] SUB pH SL TAMU (1:2) CNR [SUB]				
Lakeway Live Oak Soil Sample 2 0-6 Inches	1/10/23	8:00 am	1/10/23	11:00 am	Comp	S	<input checked="" type="checkbox"/> A SOIL 1LP	F040744-10 wring# 6/6/23
A TS SL Grav SM2540 G [NEL] N Total SL PKG TAMU [CNR] P TAMU Plant Available Mehlich 3 CNR [SUB] TKN SL AUTO SM4500 NH3 G [CNR]		Cond SL (1:2) Probe TAMU CNR [SUB] N Total TAMU CALC ENTRY [CNR] Solids, Dry Weight Y Billing N Total Calc		K TAMU Plant Available Mehlich 3 CNR [SUB] NO3N TAMU Extractable Mehlich 3 CNR [SUB] SUB pH SL TAMU (1:2) CNR [SUB]				
Lakeway Live Oak Soil Sample 2 6-18 Inches	1/10/23	8:00 am	1/10/23	11:00 am	Comp	S	<input checked="" type="checkbox"/> A SOIL 1LP	F040744-11 wring# 6/6/23
A TS SL Grav SM2540 G [NEL] N Total SL PKG TAMU [CNR] P TAMU Plant Available Mehlich 3 CNR [SUB] TKN SL AUTO SM4500 NH3 G [CNR]		Cond SL (1:2) Probe TAMU CNR [SUB] N Total TAMU CALC ENTRY [CNR] Solids, Dry Weight Y Billing N Total Calc		K TAMU Plant Available Mehlich 3 CNR [SUB] NO3N TAMU Extractable Mehlich 3 CNR [SUB] SUB pH SL TAMU (1:2) CNR [SUB]				

Chain-of-Custody and Analysis Request

Client: LAKEWAY MUD

Field Sample ID	Date	Start Time	Date	End Time	Composite Type	Sample Matrix	Container (Checked box indicates bottle arrived in lab) (Volume - Type - Preservative)	Lab ID
Lakeway Live Oak Soil Sample 2 18-30 inches					Comp	S	<input type="checkbox"/> A SOIL 1LP	F040744-12
<p>A TS SL Grav SM2540 G [NEL] N Total SL PKG TAMU [CNR] P TAMU Plant Available Mehlich 3 CNR [SUB] TKA-CLAUTO SM4500 NH3 G [CNR]</p> <p>Cond SL (1:2) Probe TAMU [CNR] [SUB] N Total TAMU CALC ENTRY [CNR] Solids, Dry Weight Y Billing N Total Calc</p> <p>K TAMU Plant Available Mehlich 3 CNR [SUB] NO3N TAMU Extractable Mehlich 3 CNR [SUB] SUB pH SL TAMU (1:2) CNR [SUB]</p>								

6002023
wrong # 54
HB-13
6002023
F040744
page # 28
Page 3 of 3

23-1540 C 2/1

Results Requested By:

Wednesday, January 11, 2023 2:45:51 PM
Page 1 of 2

POWERED BY
HORIZON
v13.1.0

23-1540c

2/2

LCRA Chain of Custody

Document: 45452656 - HBN 136494

Chain of Custody - Required Limits

Document: 45452656 - HBN 136494

Method	Analyte	LOD	RL	MCL	LOQ Check Standard Required?
SM5210B BOD	Biochemical Oxygen Demand	1 mg/L	1 mg/L		No



Report generated for:
Aqua-Tech Laboratories, Inc.
635 Phil Gramm Blvd
BRYAN, TX 77807

Soil Analysis Report
Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU
College Station, TX 77843-2478
979-845-4816 (phone)
979-845-5958 (FAX)
Visit our website: <http://soiltesting.tamu.edu>

Sample received on: 1/18/2023
Printed on: 2/2/2023
Area Represented: 47 acres
SWFTL recommends <40 acres/sample

Travis County
Laboratory Number: 620468
Customer Sample ID: G002023-01A

Crop Grown: TURF FAIRWAYS, ATHLETIC FIELDS, ETC.

Analysis	Results	CL*	Units	Ex.Low	Low	Mod	High	Excess	Fertilizer Recommended
pH	8.1	(6.2)	-	Mod. Alkaline					
Conductivity	174	(-)	umho/cm	None					
Nitrate-N	15	(-)	ppm**						30 lbs N/acre
Phosphorus	20	(50)	ppm						30 lbs P2O5/acre
Potassium	169	(160)	ppm						0 lbs K2O/acre
Calcium	16,689	(180)	ppm						0 lbs Ca/acre
Magnesium	286	(50)	ppm						0 lbs Mg/acre
Sulfur	17	(13)	ppm						0 lbs S/acre
Sodium	59	(-)	ppm						
Iron									
Zinc									
Manganese									
Copper									
Boron									
Limestone Requirement									0.00 tons 100ECCE/acre

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply suggested nitrogen rate and then apply 40 lbs/A of nitrogen every 4 to 6 weeks as needed.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates.
<http://soiltesting.tamu.edu/webpages/calculator.html>

Methods: pH and conductivity / 2.1; nitrate-N/Cdred.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/Na by ICP.

Procedures: 2.19

Report generated for:
Aqua-Tech Laboratories, Inc.
635 Phil Gramm Blvd
BRYAN, TX 77807

Soil Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU

College Station, TX 77843-2478

979-845-4816 (phone)

979-845-5958 (FAX)

Visit our website: <http://soiltesting.tamu.edu>

Sample received on: 1/18/2023

Printed on: 2/2/2023

Area Represented: 47 acres

SWFTL recommends <40 acres/sample

Travis County

Laboratory Number: 620469

Customer Sample ID: G002023-02A

Crop Grown: TURF FAIRWAYS, ATHLETIC FIELDS, ETC.

Analysis	Results	CL*	Units	ExLow	VLow	Low	Mod	High	VHigh	Excess
pH	8.2	(6-2)	-	Mod. Alkaline						
Conductivity	139	(-)	umho/cm	None						
Nitrate-N	16	(-)	ppm**							
Phosphorus	37	(50)	ppm							
Potassium	239	(160)	ppm							
Calcium	16,018	(180)	ppm							
Magnesium	298	(50)	ppm							
Sulfur	20	(13)	ppm							
Sodium	79	(-)	ppm							
Iron										
Zinc										
Manganese										
Copper										
Boron										
Limestone Requirement										0.00 tons 100CCE/acre

Fertilizer Recommended
25 lbs N/acre
10 lbs P2O5/acre
0 lbs K2O/acre
0 lbs Ca/acre
0 lbs Mg/acre
0 lbs S/acre

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply suggested nitrogen rate and then apply 40 lbs/A of nitrogen every 4 to 6 weeks as needed.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates.
<http://soiltesting.tamu.edu/webpages/calculator.html>

Methods: pH and conductivity/2:1; nitrate-N/Cd-rod; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/Na water by ICP.

Procedures 2.1g



Report generated for:
Aqua-Tech Laboratories, Inc.
635 Phil Gramm Blvd
BRYAN, TX 77807

Soil Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU

College Station, TX 77843-2478

979-845-4816 (phone)

979-845-5958 (FAX)

Visit our website: <http://soiltesting.tamu.edu>

Travis County
Laboratory Number: 620470
Customer Sample ID: G002023-03A

Crop Grown: TURF FAIRWAYS, ATHLETIC FIELDS, ETC.

Sample received on: 1/18/2023

Printed on: 2/2/2023

Area Represented: 47 acres

SWFTL recommends <40 acres/sample

Analysis Results CL* Units

	8.1	(6.2)		Ex Low	V Low	Low	Mod	High	V High	Excess
pH	192	(-)	umho/cm							
Conductivity	8	(-)	ppm**							
Nitrate-N	22	(50)	ppm							
Phosphorus	242	(160)	ppm							
Potassium	20,318	(180)	ppm							
Calcium	299	(50)	ppm							
Magnesium	21	(13)	ppm							
Sulfur	78	(-)	ppm							
Sodium										
Iron										
Zinc										
Manganese										
Copper										
Boron										
Limestone Requirement										

Fertilizer Recommended
40 lbs N/acre
30 lbs P2O5/acre
0 lbs K2O/acre
0 lbs Ca/acre
0 lbs Mg/acre
0 lbs S/acre

0.00 tons 100ECCE/acre

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply suggested nitrogen rate and then apply 40 lbs/A of nitrogen every 4 to 6 weeks as needed.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates.
<http://soiltesting.tamu.edu/webpages/calculator.html>

Methods: pH and conductivity/ 2.1; nitrate-N/Cd-red; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/Hot water by ICP.

Photo: J. R. R. 2/19



Report generated for:
Aqua-Tech Laboratories, Inc.
635 Phil Gramm Blvd
BRYAN, TX 77807

Soil Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU

College Station, TX 77843-2478
979-845-4816 (phone)
979-845-5958 (FAX)

Visit our website: <http://soiltesting.tamu.edu>

Sample received on: 1/18/2023

Printed on: 2/2/2023

Area Represented: 127.4 acres

SWFTL recommends <40 acres/sample

Travis County

Laboratory Number: 620472

Customer Sample ID: G002023-05A

Crop Grown: TURF FAIRWAYS, ATHLETIC FIELDS, ETC.

Analysis	Results	CL*	Units	ExLow	VLow	Low	Mod	High	VHigh	Excess
pH	8.3	(6.2)	-							
Conductivity	151	(-)	umho/cm							
Nitrate-N	17	(-)	ppm**							
Phosphorus	35	(50)	ppm							
Potassium	276	(160)	ppm							
Calcium	19,922	(180)	ppm							
Magnesium	319	(50)	ppm							
Sulfur	22	(13)	ppm							
Sodium	88	(-)	ppm							
Iron										
Zinc										
Manganese										
Copper										
Boron										
Limestone Requirement										0.00 tons 100ECCE/acre

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply suggested nitrogen rate and then apply 40 lbs/A of nitrogen every 4 to 6 weeks as needed.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates.
<http://soiltesting.tamu.edu/webpages/calculator.html>

Methods: pH and conductivity/ 2:1; nitrate-N/Cd-red.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and Bhot water by ICP.

Procedures: 2.18



Report generated for:
Aqua-Tech Laboratories, Inc.
635 Phil Gramm Blvd
BRYAN, TX 77807

Soil Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU
College Station, TX 77843-2478
979-845-4816 (phone)
979-845-5958 (FAX)
Visit our website: <http://soiltesting.tamu.edu>

Sample received on: 1/18/2023

Printed on: 2/2/2023

Area Represented: 127.4 acres

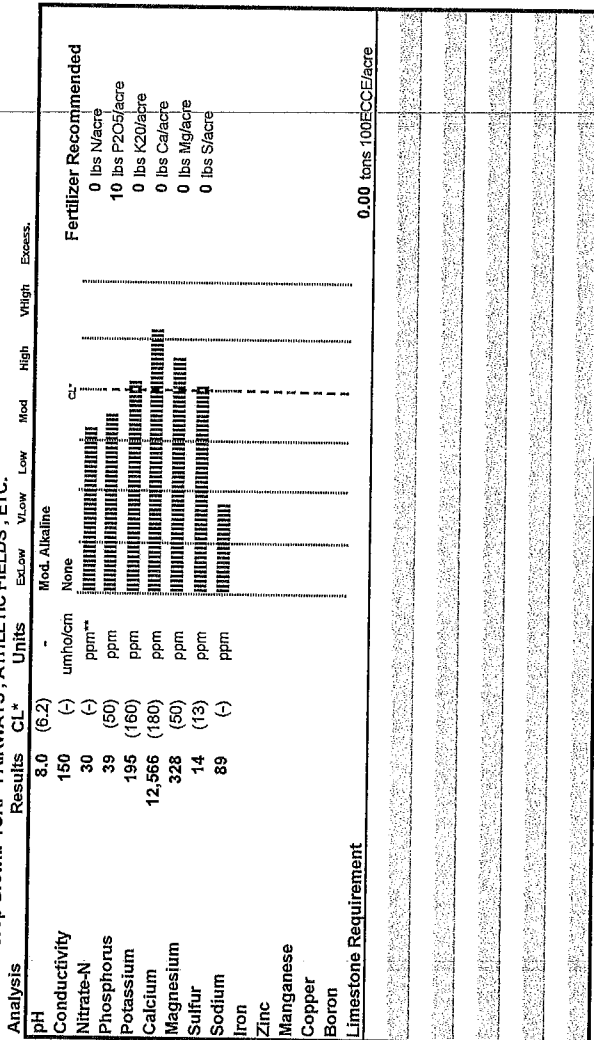
SWFTL recommends <40 acres/sample

Travis County

Laboratory Number: 620473

Customer Sample ID: G002023-06A

Crop Grown: TURF FAIRWAYS, ATHLETIC FIELDS, ETC.



*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply suggested nitrogen rate and then apply 40 lbs/A of nitrogen every 4 to 6 weeks as needed.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates.
<http://soiltesting.tamu.edu/webpages/calculator.html>

Methods: pH and conductivity/ 2:1; nitrate-N/Cd-red.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/Hot water by ICP.

Procedures 2.19



Report generated for:
Aqua-Tech Laboratories, Inc.
635 Phil Gramm Blvd
BRYAN, TX 77807

Soil Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU

College Station, TX 77843-2478
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979-845-5958 (FAX)
Visit our website: <http://soiltesting.tamu.edu>

Sample received on: 1/18/2023

Printed on: 2/2/2023

Area Represented: 117 acres

SWFTL recommends <40 acres/sample

Travis County
Laboratory Number: 620475
Customer Sample ID: G002023-08A

Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)

Analysis	Results	CL*	Units	ExLow	Low	Mod	High	Excess	Fertilizer Recommended
pH	8.4	(5.8)	-						
Conductivity	221	(-)	umho/cm						
Nitrate-N	12	(-)	ppm**						75 lbs N/acre
Phosphorus	38	(50)	ppm						30 lbs P2O5/acre
Potassium	296	(150)	ppm						0 lbs K2O/acre
Calcium	20,543	(180)	ppm						0 lbs Ca/acre
Magnesium	288	(50)	ppm						0 lbs Mg/acre
Sulfur	23	(13)	ppm						0 lbs S/acre
Sodium	102	(-)	ppm						
Iron									
Zinc									
Manganese									
Copper									
Boron									
Limestone Requirement									0.00 tons 100ECE/acre

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates.
<http://soiltesting.tamu.edu/webpages/calculator.html>

Methods: pH and conductivity/ Z-1; nitrate-N/Cd-red; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/Hot water by ICP.

Phosphorus 2.0g

Report generated for:
Aqua-Tech Laboratories, Inc.
635 Phil Gramm Blvd
BRYAN, TX 77807

Soil Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU

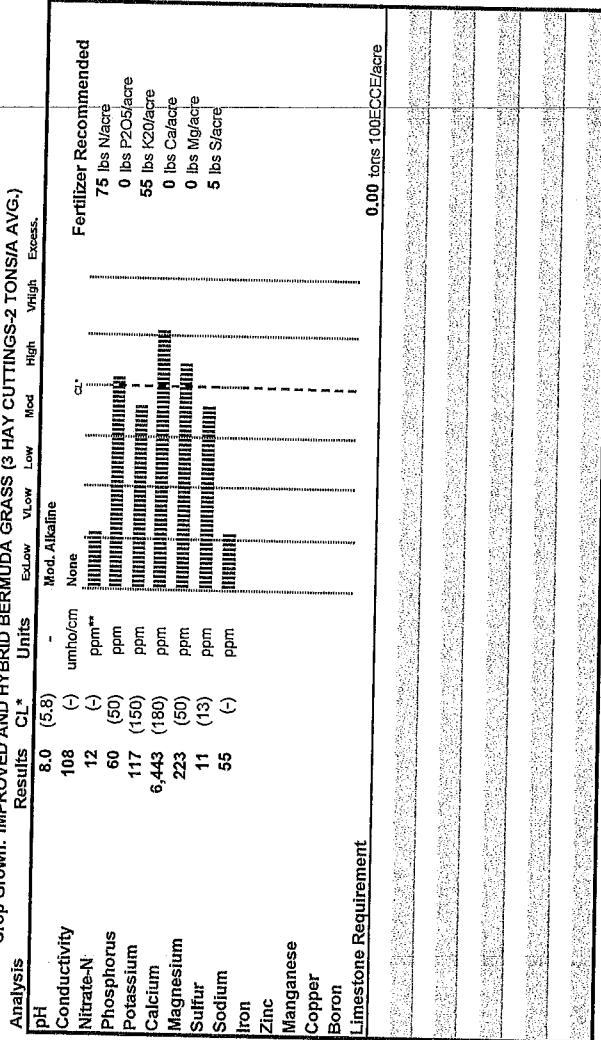
College Station, TX 77843-2478
979-845-4815 (phone)
979-845-5958 (FAX)
Visit our website: <http://soiltesting.tamu.edu>

Sample received on: 1/18/2023
Printed on: 2/2/2023

Area Represented: 117 acres
SWFTL recommends <40 acres/sample

Travis County
Laboratory Number: 620476
Customer Sample ID: G002023-10A

Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)



*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

Sulfur: Available sulfur may be found deeper in soil profile, thus limiting any response to added sulfur.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates.
<http://soiltesting.tamu.edu/webpages/calculator.html>

Report generated for:
Aqua-Tech Laboratories, Inc.
635 Phil Gramm Blvd
BRYAN, TX 77807

Soil Analysis Report

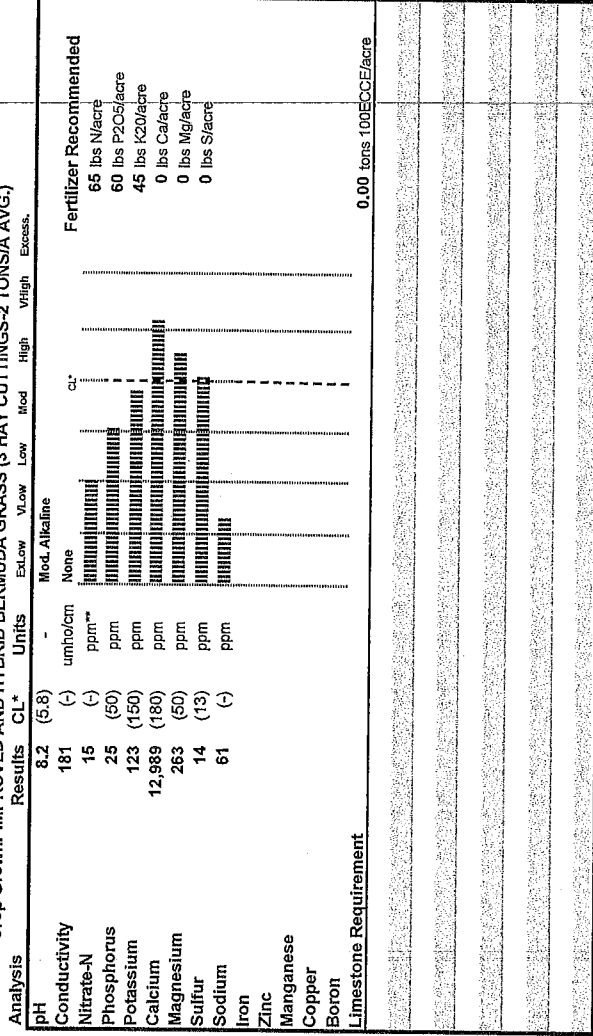
Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU
College Station, TX 77843-2478
979-845-4816 (phone)
979-845-5958 (FAX)
Visit our website: <http://soiltesting.tamu.edu>

Sample received on: 1/18/2023
Printed on: 2/2/2023
Area Represented: 117 acres
SWFTL recommends <40 acres/sample

Travis County

Laboratory Number: 620477
Customer Sample ID: G002023-11A

Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)



*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates. <http://soiltesting.tamu.edu/webpages/calculator.html>

AQUA-TECH LABORATORIES		Chain-of-Custody and Analysis Request		Aqua-Tech Laboratories, Inc.		COC #	
All analyses must be performed by a TML approved method certified by the TCEQ. Contact ATL's sample custodian via voice and email if your methods do not meet this criteria. TAMU - Soil Lab 2610 F&B Road College Station, TX 77845 Phone: (979) 845-4816		DEFINITIONS P Plastic G Glass L Litter CM Custody Maintained CTU Custody Transfer Unbroken ATL Aqua-Tech Laboratories, Inc.		Austin 3512 Montopolis Dr. Suite A Austin, TX 78744 512.301.5859 Test results must all accreditations/requirements unless stated otherwise.		735 - G002023 Page 1 of 2 seo ATL TAMU 011821	
SHIPPED TO				Sample Custody			
Comments:				Picked up and sealed by: <u>Bridley E. Laid</u> Date: <u>11/23/23</u> Time: <u>11:02</u> Picked up and sealed by: <u>Mike Gores</u> Date: <u>11/23/23</u> Time: <u>05:05</u> Picked up and sealed by: <u>Mike Gores</u> Date: <u>11/23/23</u> Time: <u>08:35</u> Picked up and sealed by: <u>James F. 12</u> Date: <u>11/23/23</u> Time: <u>07:26</u> Picked up and sealed by: <u>James F. 12</u> Date: <u>11/23/23</u> Time: <u>14:07</u> Picked up and sealed by: <u>James F. 12</u> Date: <u>11/23/23</u> Time: <u>14:07</u> Picked up and sealed by: <u>James F. 12</u> Date: <u>11/23/23</u> Time: <u>14:07</u>			
Please use Sample ID as PO# and email reports to reporting@aquatechlabs.com.				(ATL indicates cooler number in parentheses for each container - only required if more than one cooler used above.) () G002023-01 [A] - SOIL 1LP () G002023-02 [A] - SOIL 1LP () G002023-03 [A] - SOIL 1LP () G002023-04 [A] - SOIL 1LP			
Lines below document condition at receipt in lab (shipped to) listed above.				Lab ID			
Sample ID	Temp Read (C)	Corrected Temp (C)	Thermometer ID	Analysis Request			
G002023-01	01/11/23 10:00			Mellich 3 - TAMU NO3N Extractable TAMU - T2 Soil Extract Conductivity (1:2) P Plant Available pH			
G002023-02	01/11/23 10:00			Mellich 3 - TAMU NO3N Extractable TAMU - T2 Soil Extract Conductivity (1:2) P Plant Available pH			
G002023-03	01/10/23 14:30			Mellich 3 - TAMU NO3N Extractable TAMU - T2 Soil Extract Conductivity (1:2) P Plant Available pH			
G002023-04	01/10/23 14:30			Mellich 3 - TAMU NO3N Extractable TAMU - T2 Soil Extract Conductivity (1:2) P Plant Available pH			

AQUA-TECH LABORATORY, INC.			Chain-of-Custody and Analysis Request		COC# 735 - G002023
SHIPPED TO: TAMU - Soil Lab					Page 2 of 2
Sample ID Sampled / Matrix	Analysis Request		(ATL indicates cooler number in parenthesis for each container - only required if more than one cooler listed above.)	Lab ID	
G002023-05 01/10/23 14:30 Soil	P Plant Available pH	Mehlich 3 - TAMU NO3N Extractable TAMU - 1/2 Soil Extract Conductivity (1:2)	() G002023-05 [A] - SOIL 1LP		
G002023-06 01/10/23 14:30 Soil	P Plant Available pH	Mehlich 3 - TAMU NO3N Extractable TAMU - 1/2 Soil Extract Conductivity (1:2)	() G002023-06 [A] - SOIL 1LP		
G002023-07 01/10/23 11:00 Soil	P Plant Available pH	Mehlich 3 - TAMU NO3N Extractable TAMU - 1/2 Soil Extract Conductivity (1:2)	() G002023-07 [A] - SOIL 1LP		
G002023-08 01/10/23 11:00 Soil	P Plant Available pH	Mehlich 3 - TAMU NO3N Extractable TAMU - 1/2 Soil Extract Conductivity (1:2)	() G002023-08 [A] - SOIL 1LP		
G002023-10 01/10/23 11:00 Soil	P Plant Available pH	Mehlich 3 - TAMU NO3N Extractable TAMU - 1/2 Soil Extract Conductivity (1:2)	() G002023-10 [A] - SOIL 1LP		
G002023-11 01/10/23 11:00 Soil	P Plant Available pH	Mehlich 3 - TAMU NO3N Extractable TAMU - 1/2 Soil Extract Conductivity (1:2)	() G002023-11 [A] - SOIL 1LP		

Email information for report date:

9/1/23 14:22

G028939

LAKEWAY MUD

Attn: Earl Foster

efoster@lakewaymud.org

1097 LOHMANS CROSSING

AUSTIN, TX 78734

August 2023 price increase.

Due to the increase in operational costs, Aqua-Tech Laboratories will be implementing a slight price increase. The new price list will be effective August 1, 2023.

Aqua-Tech values you as a customer and encourages you to reach out to our accounting staff at accounting@aquatechlabs.com if you have questions.

Thank you for your business,
June M. Brien
Executive Technical Director

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Bryan, TX 77807
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Fax: (979) 778-3193



AUSTIN FACILITY
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Austin, TX 78744
Phone: (512) 301-9559
Fax: (512) 301-9552

The analyses summarized in this report were performed by Aqua-Tech Laboratories, Inc. unless otherwise noted. Aqua-Tech Laboratories, Inc. holds accreditation from the State of Texas in accordance with TNI and/or through the TCEQ Drinking Water Commercial Laboratory Approval Program.

The following abbreviations indicate certification status:

NEL TNI accredited parameter.
ANR Accreditation not offered by the State of Texas.
DWP Approval through the TCEQ Drinking Water Commercial Laboratory Approval Program.
INF Aqua-Tech Laboratories, Inc. is not accredited for this parameter. It is reported on an informational basis only.

Subcontracted data summarized in this report is indicated by "Sub" in the Lab column.

General Definitions:

NR Not Reported.
RPD Relative Percent Difference.
% R Percent Recovery.
dry Results with the "dry" unit designation are reported on a "dry weight" basis.
SQL The Sample Quantitation Limit is the value below which the parameter cannot reliably be detected. The SQL includes all sample preparations, dilutions and / or concentrations.
Adj MDL The Adjusted Method Detection Limit is the MDL value adjusted for any sample dilutions or concentrations.
MDL The Method Detection Limit is the lowest theoretical value that is statistically different from zero for a specific method, taking into account all preparation steps and instrument settings.

All samples are reported on an "as received" basis unless the designation "dry" is added to the reported unit.

Copies of Aqua-Tech Laboratories, Inc. procedures and individual sampling plans are available upon request. Note that samples are collected by Aqua-Tech Laboratories, Inc. personnel unless otherwise noted in the "Sample Collected" field of this report as "Client" or "CLT".

Samples included in this report were received in acceptable condition according to Aqua-Tech Laboratories, Inc. procedures and 40 CFR, Chapter I, Subchapter D, Part 136.3, TABLE II. - Required containers, preservation techniques, and holding times, unless otherwise noted in this report.

Record Retention:

All reports, raw data, and associated quality control data are kept on file for 10 years before being destroyed. Any client that would like copies of records must contact Aqua-Tech Laboratories, Inc. no later than six months prior to the scheduled disposal. An administrative fee for retrieval and distribution will apply.

This report was approved by:

June M. Brien
June M. Brien, Technical Director

corp@aquatechlabs.com

www.aquatechlabs.com

Certificate: T104704371-22-26



TCEQ Lab ID T104704371

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Analytical Report

LAKEWAY MUD
9/1/23 14:22

Report Printed:
G028939

Lakeway S-4 Effluent Irrigation

Lab ID# G028939-01

General Chemistry

Nitrate as N	12	mg/L	Collected: 08/24/23 10:30 by Client	Units	Notes	MDL	Adj MDL	SQL	Type	Lab	Analyzed	Matrix	C-O-C #	Batch
Nitrite as N	<0.01	mg/L	Received: 08/24/23 13:15 by Mark Asher			0.002	0.17	0.20	Grab	Calc	08/30/23 11:55 MSA	Non Potable	G028939	
Nitrate/Nitrite as N	12	mg/L				0.02	0.17	0.20		Austin	08/25/23 11:00 MSA			[CALC]
Nitrogen, Total	12	mg/L								Bryan	08/30/23 11:55 KMA			M165752
Specific Conductance (adjusted to 25.0°C)	993	uS/cm				2.00	0.40	0.40		Calc	08/30/23 11:55 KMA			M165913
							2.00	2.00		Austin	08/28/23 07:40 MSA			[CALC]
														M165788

G028939-01 - re-analysis

General Chemistry

Total Kjeldahl Nitrogen as N	<0.20	mg/L	Collected: 08/24/23 10:10 by Client	Units	Notes	MDL	Adj MDL	SQL	Type	Lab	Analyzed	Matrix	C-O-C #	Batch
			Received: 08/24/23 13:15 by Mark Asher			0.13	0.13	0.20	Grab	Bryan	08/31/23 11:17 KMA	Non Potable	G028939	

Lakeway S-5 Effluent Irrigation

Lab ID# G028939-02

General Chemistry

Nitrate as N	9.8	mg/L	Collected: 08/24/23 10:10 by Client	Units	Notes	MDL	Adj MDL	SQL	Type	Lab	Analyzed	Matrix	C-O-C #	Batch
Nitrite as N	2.9	mg/L	Received: 08/24/23 13:15 by Mark Asher			0.002	0.05	0.25	Grab	Calc	08/30/23 11:55 MSA	Non Potable	G028939	
Nitrate/Nitrite as N	13	mg/L				0.02	0.17	0.20		Austin	08/25/23 11:00 MSA			[CALC]
Nitrogen, Total	17	mg/L								Bryan	08/30/23 11:55 KMA			M165752
Specific Conductance (adjusted to 25.0°C)	1190	uS/cm				2.00	0.40	0.40		Calc	08/30/23 11:55 KMA			M165913
							2.00	2.00		Austin	08/28/23 07:40 MSA			[CALC]
														M165788

G028939-02 - re-analysis

General Chemistry

Total Kjeldahl Nitrogen as N	3.66	mg/L	Collected: 08/24/23 10:10 by Client	Units	Notes	MDL	Adj MDL	SQL	Type	Lab	Analyzed	Matrix	C-O-C #	Batch
			Received: 08/24/23 13:15 by Mark Asher			0.13	0.13	0.20	Grab	Bryan	08/31/23 11:17 KMA	Non Potable	G028939	

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Analytical Report

LAKEWAY MUD

Report Printed: 9/1/23 14:22

G028939

General Chemistry - Quality Control

Nitrate/Nitrite as N - SM4500-NO3-F 2011

Result	Units	Notes	MDL	SQL	Analyzed	Spike Amount	Source Result	%R	%R Limits	RPD	RPD Limit	Batch
Initial Cal Check	1.2	mg/L			08/30/23 11:55 KMA	1.18		103	90 - 110			2308357
Low Cal Check	0.02	mg/L			08/30/23 11:55 KMA	0.0200		105	70 - 130			2308357
Blank	<0.02	mg/L			08/30/23 11:55 KMA							M165913
LCS	0.50	mg/L	0.02	0.02	08/30/23 11:55 KMA	0.500		99.2	90.1 - 115			M165913
LCS Dup	0.50	mg/L	0.02	0.02	08/30/23 11:55 KMA	0.500		100	90.1 - 115	0.803	6.1	M165913
Matrix Spike	12	mg/L	0.17	0.20	08/30/23 11:55 KMA	5.00	7.4	99.6	84.8 - 120			M165913
Matrix Spike Dup	12	mg/L	0.17	0.20	08/30/23 11:55 KMA	5.00	7.4	99.1	84.8 - 120	0.423	8.35	M165913

Nitrite as N - SM4500 NO2- B 2011

Blank	0.09	mg/L			08/25/23 11:00 MSA	0.0800		107	90 - 110			2308322
LCS	<0.01	mg/L	0.002	0.01	08/25/23 11:00 MSA							M165752
LCS Dup	0.08	mg/L	0.002	0.01	08/25/23 11:00 MSA	0.0800		101	90 - 110			M165752
Matrix Spike	0.08	mg/L	0.002	0.01	08/25/23 11:00 MSA	0.0800		100	90 - 110	0.850	6.71	M165752
Matrix Spike Dup	0.08	mg/L	0.002	0.01	08/25/23 11:00 MSA	0.0800	0.009	90.1	74.6 - 107			M165752
MRL Check	0.01	mg/L	0.002	0.01	08/25/23 11:00 MSA	0.0800	0.009	90.5	74.6 - 107	0.473	4.22	M165752
Initial Cal Check	0.11	mg/L	0.002	0.01	08/25/23 11:00 MSA	0.0100		107	70 - 130			M165752
					10/05/22 12:13 BEB	0.100		107	90 - 110			2210037

Specific Conductance (adjusted to 25.0°C) - SM2510 B 2011

Blank	525	uS/cm			08/28/23 07:40 MSA	545		96.3	90 - 110			2308325
Duplicate	<2.00	uS/cm	2.00	2.00	08/28/23 07:40 MSA							M165788
LCS	995	uS/cm	2.00	2.00	08/28/23 07:40 MSA		993			0.201	1.79	M165788
	1410	uS/cm	2.00	2.00	08/28/23 07:40 MSA	1410		99.9	96.2 - 104			M165788

Total Kjeldahl Nitrogen as N - EPA 351.2 R2.0

Initial Cal Check	9.06	mg/L			08/29/23 13:50 KMA	9.12		99.4	90 - 110			2308341
Low Cal Check	0.18	mg/L			08/29/23 13:50 KMA	0.200		88.5	70 - 130			2308341
Initial Cal Check	8.85	mg/L			08/31/23 11:17 KMA	9.12		97.1	90 - 110			2308372
Low Cal Check	0.18	mg/L			08/31/23 11:17 KMA	0.200		90.0	70 - 130			2308372
Blank	<0.20	mg/L	0.13	0.20	08/31/23 11:17 KMA							M165939
LCS	7.97	mg/L	0.13	0.20	08/31/23 11:17 KMA	8.00		99.6	90 - 110			M165939
LCS Dup	8.34	mg/L	0.13	0.20	08/31/23 11:17 KMA	8.00		104	90 - 110	4.61	10	M165939
Matrix Spike	8.61	mg/L	0.13	0.20	08/31/23 11:17 KMA	8.00	0.60	100	70 - 130			M165939
Matrix Spike Dup	8.73	mg/L	0.13	0.20	08/31/23 11:17 KMA	8.00	0.60	102	70 - 130	1.48	20	M165939

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Analytical Report

LAKEWAY MUD

Report Printed: 9/1/23 14:22

G028939

Sample Preparation Summary

Sample	Method	Prepared	Lab	Bottle	Initial	Units	Final	Units	External Dilution Factor	Batch
G028939-01										
Nitrate/Nitrite as N	SM4500-NO3-F 2011	8/30/23 9:41 KMA	Bryan	C	1.00	mL	10.0	mL	1	M165913
Nitrite as N	SM4500 NO2- B 2011	8/25/23 11:00 MSA	Austin	B	25.0	mL	25.0	mL	1	M165752
Specific Conductance (adjusted to 25.0°C) SM2510 B 2011		8/28/23 7:40 MSA	Austin	A	25.0	mL	25.0	mL	1	M165788
G028939-01RE1										
Total Kjeldahl Nitrogen as N	EPA 351.2 R2.0	8/30/23 12:46 KMA	Bryan	C	25.0	mL	25.0	mL	1	M165939
G028939-02										
Nitrate/Nitrite as N	SM4500-NO3-F 2011	8/30/23 9:41 KMA	Bryan	C	1.00	mL	10.0	mL	1	M165913
Nitrite as N	SM4500 NO2- B 2011	8/25/23 11:00 MSA	Austin	B	1.00	mL	25.0	mL	1	M165752
Specific Conductance (adjusted to 25.0°C) SM2510 B 2011		8/28/23 7:40 MSA	Austin	A	25.0	mL	25.0	mL	1	M165788
G028939-02RE1										
Total Kjeldahl Nitrogen as N	EPA 351.2 R2.0	8/30/23 12:46 KMA	Bryan	C	25.0	mL	25.0	mL	1	M165939

Chain-of-Custody and Analysis Request

Client /

Project Name:

Name Earl Foster
Address 1097 LOHMAN'S CROSSING
City AUSTIN
State TX Zip 78734
Phone (512) 261-6222
email

Definitions

Lakeway Irrigation Annual with Soil

DW Drinking Water
NP Non-Potable Water
S Solid
CM Custody Maintained
CTU Custody Transfer Unbroken
CT Corrected Temperature

Reagent tracking is available upon request.

Analyses Requested: "A" prefix indicates Austin, all others Bryan or Subcontracted, indicated by (SUB).
Name format Analysis-Matrix-Technology-Method.

[NEL] = NELAP accredited parameter
[SUB] = NELAP accredited subcontracted parameter

By relinquishing the samples listed below to Aqua-Tech Laboratories, Inc. (ATL), the client agrees to the following terms. Samples will be analyzed by a method that is within ATL's NELAP fields of accreditation (FOA). Analytes requiring an accredited method that is not within ATL's FOA will be subcontracted to a NELAP lab that is accredited for that method. Clients will be notified of the subcontract lab's details. Other analyses not requiring accreditation will be analyzed by a compendial method. If a specific method is required, the client will note the method in the "Analysis Requested" column. The client approves all method modifications documented by ATL or the subcontract lab.
A current list of ATL's NELAP fields of accreditation and other methods are available on request.

Comments:

Plut DW EOD Thurs. 08/31/23 4:47

G028939 - LAB RECEIPT - R604

Temperature - CT (C): 5.4

Preservation Correct: Yes

Post-Preservatives: N/A

Thermometer ID: 0715672

pH Paper ID: 0802385

rintrwko_A.COC 042120.rpt

Field Sample ID

Date

Start Time

End Time

Composite Type

Sample Matrix

Container (Checked box indicates bottle arrived in lab)

Volume - Type - Preservative

Lab ID

Lakeway S-4 Effluent Irrigation

8/24/23

10:30 AM

- N/A -

- N/A -

Grab

NP

Cond 0.25LP
NO2 0.25LP
NO3 TKN 0.25LP H2SO4 pH 2.2

G028939-01

A NO2N NP Spec SM4500 NO2 B [NEL]
N Total Calc NP [CNR]
Y Billing N Total Calc

A NO3N NP CALC SM4500 [NEL]
NO3N + NO2N NP RFA SM4500 NO3 F [CNR]

Cond Probe SM2510 B [NEL]
TKN NP AUTO EPA 351.2 [NEL]

- N/A -

- N/A -

Grab

NP

Cond 0.25LP
NO2 0.25LP
NO3 TKN 0.25LP H2SO4 pH 2.2

G028939-02

A NO2N NP Spec SM4500 NO2 B [NEL]
N Total Calc NP [CNR]
Y Billing N Total Calc

A NO3N NP CALC SM4500 [NEL]
NO3N + NO2N NP RFA SM4500 NO3 F [CNR]

Cond Probe SM2510 B [NEL]
TKN NP AUTO EPA 351.2 [NEL]

- N/A -

- N/A -

Grab

NP

Cond 0.25LP
NO2 0.25LP
NO3 TKN 0.25LP H2SO4 pH 2.2

G028939-02



TCEQ LAB ID:
T104704371

Test results meet all accreditation/certification requirements unless stated otherwise.

Sample Custody

Relinquished (print & sign)	David Ybarra	Sample	<input checked="" type="checkbox"/> ATL Field	Date	8/24/23	Load / Refill	<input checked="" type="checkbox"/> Sealed
Received (print & sign)	Mark Asher	Client	<input checked="" type="checkbox"/> ATL Field	Date	8/24/23	Load / Refill	<input checked="" type="checkbox"/> Sealed
Relinquished (print & sign)		Client	<input type="checkbox"/> ATL Field	Date	11/50	Load / Refill	<input type="checkbox"/> Sealed
Received (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Relinquished (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Received (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Relinquished (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
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Relinquished (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Received (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Relinquished (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Received (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Relinquished (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Received (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Relinquished (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
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Relinquished (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Received (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Relinquished (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
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Relinquished (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Received (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Relinquished (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Received (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Relinquished (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Received (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
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Relinquished (print & sign)		Client	<input type="checkbox"/> ATL Field	Date		Load / Refill	<input type="checkbox"/> Sealed
Received (print & sign)		Client	<input type="checkbox"/>				

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

P.O. Box 13087, Austin, Texas 78711-3087

MONTHLY EFFLUENT REPORT

S-4

72-300 samples
1 Core
Reverse Customers
0-6"

LAKEWAY MUD
1097 LOHMANS CROSSING RD
AUSTIN TX 78734-4459

40B
SYS

WQ0011495-001
PERMIT NUMBER

02
SET

23 8
Year MO.

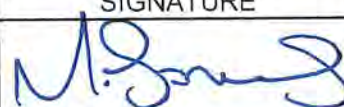
10729
EID

THIS REPORT TO BE USED FOR
SEE BACK FOR INSTRUCTIONS AND DEFINITIONS.
PLEASE RETAIN A PHOTOCOPY FOR YOUR RECORDS.

SOIL MON 101 ANN 0-6

PLEASE RETAIN A PHOTOGRAPH FOR YOUR RECORDS							
PARAMETER	EFFLUENT CONDITION			NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE	
		VALUE	UNITS				
004006080 PH MAXIMUM	REPORTED	8.1	STD UNIT				
	PERMITTED				22	1/YEAR	04
006001430 TOT NIT IND GRAB	REPORTED	2040	MG/KG				
	PERMITTED				22	1/YEAR	04
006651430 TOT. PHOS IND GRAB	REPORTED	20	MG/KG				
	PERMITTED				22	1/YEAR	04
009371430 P SSIMUM IND GRAB	REPORTED	169	MG/KG				
	PERMITTED				22	1/YEAR	04
009504280 CNDUCTVY MAXIMUM	REPORTED	174	MICMHOS				
	PERMITTED				22	1/YEAR	04
NUMBER OF OPERATOR CERTIFICATE	REPORTED	WW0057422	NUMBER				
	PERMITTED				01	01	NA
EXPIRATION OF OPERATOR CERTIFICATE	REPORTED	Nov 15,2023	DATE				
	PERMITTED				01	01	NA
CLASS OF OPERATOR CERTIFICATE	REPORTED	B	LETTER				
	PERMITTED				01	01	NA
	REPORTED						
	PERMITTED						
	REPORTED						
	PERMITTED						

COMMENTS AND EXPLANATIONS (REFERENCE ALL ATTACHMENTS HERE)

I CERTIFY THAT I AM FAMILIAR WITH THE INFORMATION CONTAINED IN THIS REPORT AND THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF SUCH INFORMATION IS TRUE AND CLETE AND ACCURATE			NAME	SIGNATURE	DATE
			MARSHALL JAMES PLANT OPERATOR		23 8 25
TELEPHONE NUMBER			512 261 6222	EARL FOSTER EXECUTIVE OFFICER	23 8 25
AREA CODE			NUMBER	EXECUTIVE OFFICER	YEAR MO. DAY

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

P.O. Box 13087, Austin, Texas 78711-3087

MONTHLY EFFLUENT REPORT

7-12-2023 10:00 AM
1 core
Reuse 6-18"

LAKEWAY MUD
1097 LOHMANS CROSSING RD
AUSTIN TX 78734-4459



40B	WQ0011495-001	02	23	8	10730
SYS	PERMIT NUMBER	SET	Year	MO.	EID

THIS REPORT TO BE USED FOR
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PLEASE RETAIN A PHOTOCOPY FOR YOUR RECORDS.

SOIL MON 201 ANN 6-18

PARAMETER	EFFLUENT CONDITION		NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE	
	VALUE	UNITS				
004006080 PH	REPORTED 8.2	STD UNIT		22	1/YEAR	04
MAXIMUM	PERMITTED					
006001430 TOT NIT	REPORTED 1910	MG/KG		22	1/YEAR	04
IND GRAB	PERMITTED					
006651430 TOT. PHOS	REPORTED 37	MG/KG		22	1/YEAR	04
IND GRAB	PERMITTED					
009371430 P. SSIMUM	REPORTED 239	MG/KG		22	1/YEAR	04
IND GRAB	PERMITTED					
009504280 CNDUCTVY	REPORTED 139	MICMHOS		22	1/YEAR	04
MAXIMUM	PERMITTED					
NUMBER OF OPERATOR	REPORTED WW0057422	NUMBER		01	01	NA
CERTIFICATE	PERMITTED					
EXPIRATION OF OPERATOR	REPORTED Nov 15,2023	DATE		01	01	NA
CERTIFICATE	PERMITTED					
CLASS OF OPERATOR	REPORTED B	LETTER		01	01	NA
CERTIFICATE	PERMITTED					
	REPORTED					
	PERMITTED					
	REPORTED					
	PERMITTED					

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			MARSHALL JAMES		23 8 25
TELEPHONE NUMBER			PLANT OPERATOR	PLANT OPERATOR	YEAR MO. DAY
512	261	6222	EARL FOSTER		23 8 25
AREA CODE	NUMBER		EXECUTIVE OFFICER	EXECUTIVE OFFICER	YEAR MO. DAY

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

P.O. Box 13087, Austin, Texas 78711-3087

MONTHLY EFFLUENT REPORT

will be
youpon #1
0-6"

LAKEWAY MUD
1097 LOHMANS CROSSING RD
AUSTIN TX 78734-4459

40B
SYS

WQ0011495-001
PERMIT NUMBER

02
SET

23 8
Year MO.

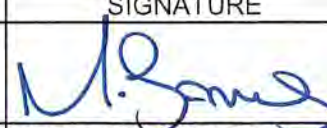
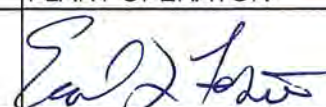
10729
EID

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PLEASE RETAIN A PHOTOCOPY FOR YOUR RECORDS.

SOIL MON 101 ANN 0-6

PARAMETER	EFFLUENT CONDITION			NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE	
		VALUE	UNITS				
004006080 PH	REPORTED	8.1	STD UNIT				
MAXIMUM	PERMITTED						
006001430 TOT NIT	REPORTED	1910	MG/KG				
IND GRAB	PERMITTED						
006651430 TOT. PHOS	REPORTED	22	MG/KG				
IND GRAB	PERMITTED						
009371430 P SSIMUM	REPORTED	242	MG/KG				
IND GRAB	PERMITTED						
009504280 CNDUCTVY	REPORTED	192	MICMHOS				
MAXIMUM	PERMITTED						
NUMBER OF OPERATOR	REPORTED	WW0057422	NUMBER				
CERTIFICATE	PERMITTED						
EXPIRATION OF OPERATOR	REPORTED	Nov 15,2023	DATE				
CERTIFICATE	PERMITTED						
CLASS OF OPERATOR	REPORTED	B	LETTER				
CERTIFICATE	PERMITTED						
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			MARSHALL JAMES		23 8 25
TELEPHONE NUMBER			PLANT OPERATOR	PLANT OPERATOR	YEAR MO. DAY
512	261	6222	EARL FOSTER		23 8 25
AREA CODE	NUMBER		EXECUTIVE OFFICER	EXECUTIVE OFFICER	YEAR MO. DAY

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

P.O. Box 13087, Austin, Texas 78711-3087

MONTHLY EFFLUENT REPORT

Low sample
Japan #1
6-B"

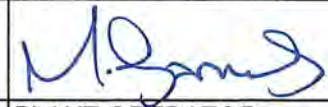
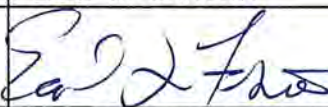
LAKEWAY MUD
1097 LOHMANS CROSSING RD
AUSTIN TX 78734-4459

40B	WQ0011495-001	02	23	8	10730
SYS	PERMIT NUMBER	SET	Year	MO.	EID

THIS REPORT TO BE USED FOR SOIL MON 201 ANN 6-18
SEE BACK FOR INSTRUCTIONS AND DEFINITIONS.
PLEASE RETAIN A PHOTOCOPY FOR YOUR RECORDS.

PARAMETER	EFFLUENT CONDITION			NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE	
		VALUE	UNITS				
004006080 PH	REPORTED	7.7					
MAXIMUM	PERMITTED		STD UNIT		22 1/YEAR	04	24 - HR COMP
006001430 TOT NIT	REPORTED	1660					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
006651430 TOT. PHOS	REPORTED	96					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
009371430 P SSIMUM	REPORTED	168					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
009504280 CNDUCTVY	REPORTED	161					
MAXIMUM	PERMITTED		MICMHOS		22 1/YEAR	04	24 - HR COMP
NUMBER OF OPERATOR	REPORTED	WW0057422					
CERTIFICATE	PERMITTED		NUMBER		01 01	NA	NA
EXPIRATION OF OPERATOR	REPORTED	Nov 15, 2023					
CERTIFICATE	PERMITTED		DATE		01 01	NA	NA
CLASS OF OPERATOR	REPORTED	B					
CERTIFICATE	PERMITTED		LETTER		01 01	NA	NA
	REPORTED						
	PERMITTED						
	REPORTED						
	PERMITTED						

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			MARSHALL JAMES PLANT OPERATOR		23 8 25 YEAR MO. DAY
512	261	6222	EARL FOSTER EXECUTIVE OFFICER		23 8 25 YEAR MO. DAY
AREA CODE	NUMBER		EXECUTIVE OFFICER	EXECUTIVE OFFICER	YEAR MO. DAY

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

P.O. Box 13087, Austin, Texas 78711-3087

MONTHLY EFFLUENT REPORT

USE ONLY
JANUARY #2
0-6"

LAKEWAY MUD
1097 LOHMANS CROSSING RD
AUSTIN TX 78734-4459

40B
SYS

WQ0011495-001
PERMIT NUMBER

02
SET

23 8
Year MO.

10729
EID

THIS REPORT TO BE USED FOR
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PLEASE RETAIN A PHOTOCOPY FOR YOUR RECORDS.

SOIL MON 101 ANN 0-6

PARAMETER	EFFLUENT CONDITION			NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE	
		VALUE	UNITS				
004006080 PH	REPORTED	8.3					
MAXIMUM	PERMITTED		STD UNIT		22 1/YEAR	04	24 - HR COMP
006001430 TOT NIT	REPORTED	1690					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
006651430 TOT. PHOS	REPORTED	35					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
009371430 P SIUM	REPORTED	276					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
009504280 CNDUCTVY	REPORTED	151					
MAXIMUM	PERMITTED		MICMHOS		22 1/YEAR	04	24 - HR COMP
NUMBER OF OPERATOR	REPORTED	WW0057422					
CERTIFICATE	PERMITTED		NUMBER		01 01	NA	NA
EXPIRATION OF OPERATOR	REPORTED	Nov 15,2023					
CERTIFICATE	PERMITTED		DATE		01 01	NA	NA
CLASS OF OPERATOR	REPORTED	B					
CERTIFICATE	PERMITTED		LETTER		01 01	NA	NA
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	PERMITTED						
	REPORTED						
	PERMITTED						

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COMPLETE AND ACCURATE

NAME

SIGNATURE

DATE

MARSHALL JAMES

M. James

23 | 8 | 25

TELEPHONE NUMBER

PLANT OPERATOR

PLANT OPERATOR

YEAR MO. DAY

512

261

6222

EARL FOSTER

Earl Foster

23 | 8 | 25

AREA CODE

NUMBER

EXECUTIVE OFFICER

EXECUTIVE OFFICER

YEAR MO. DAY

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

P.O. Box 13087, Austin, Texas 78711-3087

MONTHLY EFFLUENT REPORT

Core sample
Jawson #2
Le-15th

LAKEWAY MUD
1097 LOHMANS CROSSING RD
AUSTIN TX 78734-4459

40B
SYS

WQ0011495-001
PERMIT NUMBER

02
SET

23 8
Year MO.

10730
EID

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SOIL MON 201 ANN 6-18

PARAMETER	EFFLUENT CONDITION			NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE	
		VALUE	UNITS				
004006080 PH	REPORTED	8					
MAXIMUM	PERMITTED		STD UNIT		22 1/YEAR	04	24 - HR COMP
006001430 TOT NIT	REPORTED	1470					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
006651430 TOT. PHOS	REPORTED	39					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
009371430 P SSIMUM	REPORTED	195					
IND GRAB	PERMITTED		MG/KG		22 1/YEAR	04	24 - HR COMP
009504280 CNDUCTVY	REPORTED	150					
MAXIMUM	PERMITTED		MICMHOS		22 1/YEAR	04	24 - HR COMP
NUMBER OF OPERATOR	REPORTED	WW0057422					
CERTIFICATE	PERMITTED		NUMBER		01 01	NA	NA
EXPIRATION OF OPERATOR	REPORTED	Nov 15,2023					
CERTIFICATE	PERMITTED		DATE		01 01	NA	NA
CLASS OF OPERATOR	REPORTED	B					
CERTIFICATE	PERMITTED		LETTER		01 01	NA	NA
	REPORTED						
	PERMITTED						
	REPORTED						
	PERMITTED						

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C LETE AND ACCURATE


NAME
MARSHALL JAMES
PLANT OPERATOR

SIGNATURE

PLANT OPERATOR

DATE
23 | 8 | 25
YEAR MO. DAY

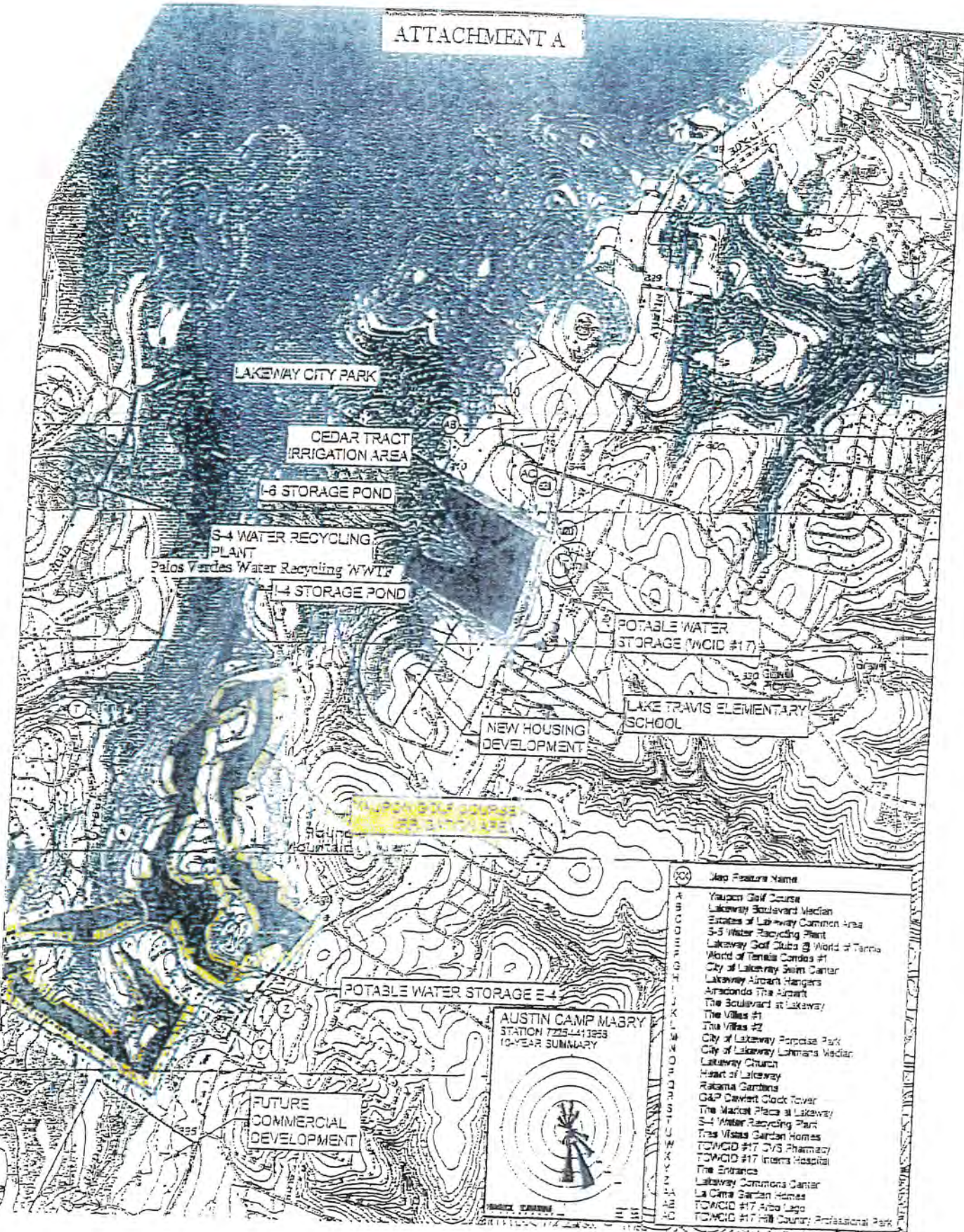
TELEPHONE NUMBER
512 261 6222
AREA CODE NUMBER

EARL FOSTER
EXECUTIVE OFFICER


EXECUTIVE OFFICER

23 | 8 | 25
YEAR MO. DAY

ATTACHMENT A



Map Feature Name
Yaucon Golf Course
Lakeway Boulevard Median
Estates of Lakeway Common Area
S-5 Water Recycling Plant
Lakeway Golf Club @ World of Tennis
World of Tennis Corridor #1
City of Lakeway Swim Center
Lakeway Airport Hangars
Airacundo The Airport
The Boulevard at Lakeway
The Villas #1
The Villas #2
City of Lakeway Paradise Park
City of Lakeway Lohmans Median
Lakeway Church
Heart of Lakeway
Rakama Gardens
GAP Dewart Clock Tower
The Market Place at Lakeway
S-4 Water Recycling Plant
Tree Vistas Garden Homes
TOWCID #17 CVS Pharmacy
TOWCID #17 Interm Hospital
The Entrance
Lakeway Commons Center
La Cima Garden Homes
TOWCID #17 Lego
TOWCID #17 Hill Country Professional Park



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LAKEWAY M.U.D.
PERMIT #11495-001
S-4 WATER RECYCLING PLANT
FACILITIES LOCATION MAP

DATE
SEPT 2014
(REVISED)
Attachment A
D2

ATTACHMENT S

Cedar Tract Technical Report for Irrigation Disposal/Water Balance

(Domestic Worksheet 3.1, Section 1A)

Following is a copy of the original permit submittal for the cedar tree irrigation area, given that the primary purpose of this permit amendment is to reflect the complete transfer of the existing wastewater permit WQ0014534001, previously maintained by Travis County Municipal Utility District No. 12 (TCMUD 12; RN 104372941) to the existing permit WQ0011495006, which will continue to be maintained by Lakeway Municipal Utility District (LMUD; RN 101714996).

The intent is to combine and maintain all previously approved and permitted Final permit conditions for the cedar tract and Live Oak Golf Course irrigation disposal sites (hence why the past approved Technical Report for Irrigation Disposal and water balance for the cedar tract follows). See Attachment B for further details.

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**SUPPLEMENTAL TECHNICAL REPORT
FOR IRRIGATION DISPOSAL**

TRAVIS COUNTY MUD NO. 12

Prepared by:

**James Miertschin & Associates, Inc.
Austin, Texas**

November 2013



TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 <u>INTRODUCTION</u>	1
1.1 LOCATION	1
1.2 PROPOSED CANOPY IRRIGATION DISPOSAL.....	1
2.0 <u>IRRIGATION SYSTEM SIZING</u>	2
2.1 CONVENTIONAL WATER BALANCE	3
2.2 CONVENTIONAL STORAGE BALANCE	7
2.3 INNOVATIVE WATER AND STORAGE BALANCE.....	9
2.4 NITROGEN BALANCE	13
3.0 <u>SUMMARY OF PROPOSED IRRIGATION SYSTEM</u>	16
APPENDIX A	
APPENDIX B	
APPENDIX C	

LIST OF TABLES

Table 1: Conventional Water Balance	6
Table 2: Conventional Storage Balance.....	8
Table 3: Innovative Application Schedule, Average Conditions.....	11
Table 4: Innovative Application Schedule, Wet Year Conditions.....	12
Table 5: Nitrogen Balance	14

1.0 INTRODUCTION

1.1 LOCATION

The Travis County MUD No. 12 will provide wastewater service to the Rough Hollow and Highlands subdivisions. Numerous residential units have already been constructed (with interim service provided by Lakeway MUD) and additional units are scheduled for construction. The proposed irrigation tract is located approximately 2 miles southwest of the City of Lakeway.

1.2 PROPOSED CANOPY IRRIGATION DISPOSAL

The MUD proposes to utilize irrigation for disposal of treated municipal effluent. An irrigation tract has been designated that has available a total of 346.55 acres. The cover crop for the irrigation tract is primarily juniper trees, with some mixed hardwood trees, grasses and shrubs on rangeland. In conjunction with the MUD's permit amendment application, a water balance and storage analysis was prepared for sizing of the irrigation disposal system.

The proposed irrigation system will be based upon spray application to the tree canopy. The irrigation application is authorized by the MUD's existing TLAP Permit No. 14534001.¹

There are significant differences in the proposed canopy irrigation system, compared to a conventional land-based application system. The groundwork for juniper canopy irrigation was laid by the nearby Lakeway MUD, which has two cedar canopy irrigation tracts included in TLAP Permit No. 11495001.² Pursuant to permit issuance in the early 1990's, Lakeway MUD conducted a detailed monitoring program of the operational canopy irrigation site which demonstrated the efficacy of the system.³ Key findings for the Lakeway MUD demonstration project are summarized in Appendix A. The proposed Travis County MUD No. 12 canopy irrigation system will be similar to the permitted Lakeway MUD canopy irrigation system.

The proposed irrigation tract has adequate area available for deployment of the canopy irrigation system. Most of the tract has thick cedar canopy available. Of course the cover is not homogeneous, but local deviations from the thick canopy will be accommodated in the design and construction of the final system. The lack of homogeneity is not expected to be a problem for successful system implementation.

¹ The Travis County MUD permit No. 14534001 authorizes irrigation on a 262 acre tract, at an application rate of 2.69 acre-feet per year per acre. The storage requirement for 0.63 MGD is 180 acre-feet, or 93 days of storage. Effluent limitations include 20 mg/L BOD₅ and 20 mg/L TSS. The permit authorizes an interim phase of 0.315 MGD with an irrigation area of 131 acres.

² The Lakeway MUD permit No. 11495001 authorizes cedar tree irrigation on tracts of 45 acre and 53 acres, at an application rate of 4.7 acre-feet per year per acre. The storage requirement for 0.81 MGD is 176.8 acre-feet, or 71 days of storage. Effluent limitations include 20 mg/L BOD₅ and 20 mg/L TSS, except that cedar tract irrigation has a more stringent requirement of 5 mg/L BOD₅ due to proximity to schools.

³ HDR, 2000. *Cedar Irrigation Demonstration Project Report*

The innovative concept of cedar canopy irrigation is substantially different from conventional land-based irrigation systems. A conventional system is based upon application of irrigation water to the ground surface with the majority of the applied water being consumed by the cover crop and ultimately removed via evapotranspiration through the plants. In the conventional system, some of the applied effluent is also leached into deeper horizons of the soil profile. Thus, the conventional system sizing is typically based upon a water balance and storage balance prescribed by TCEQ rules in Chapter 309, which takes into consideration both average and wet year rainfall and runoff conditions, since the plant water needs and the amount of rainfall that infiltrates into the ground are factors in operation of the land-based irrigation system.

The proposed cedar canopy irrigation system is based upon application of spray at a low rate to the top of the tree canopy. There, the applied effluent will largely remain on the leaf surfaces and be lost to evaporation to the atmosphere. It is estimated that approximately 80% of the sprayed effluent will be retained on the canopy and subsequently evaporate.⁴ The remaining sprayed effluent, estimated at 20% of the total applied, will migrate down the stems and trunk or fall through the canopy directly to the ground surface. The spray will be applied at a low rate, nominally 0.2 inches per hour (the volume may be spread out over a multi-hour window). Therefore, whatever volume does eventually reach the ground will infiltrate into the soil, since the low volume is insufficient to produce runoff. Since a portion of the applied water will reach the ground and infiltrate into the soil, the vegetation will uptake the water and some fraction of that will be lost via evapotranspiration. In essence then, the proposed canopy irrigation system includes conventional water loss via evapotranspiration, with enhanced evaporation loss directly from the leaf surfaces.

For the innovative canopy spray system, the conventional water and storage balance calculations as outlined in Chapter 309 are not technically representative of the system. The canopy system is dependent upon the amount of moisture held on the surface of the leaves, and it is largely irrelevant what rainfall/runoff may have recently occurred, what the plant watering needs may be, or what volume may infiltrate or leach into the soil. Of course, the canopy system will have other constraints, for example, spray will not take place during a precipitation event or immediately after if the leaves are wet. Spraying may also be curtailed if wind speeds are sufficiently high to cause excessive drift of spray.

2.0 IRRIGATION SYSTEM SIZING

TCEQ rules for irrigation systems generally require that effluent disposal be accomplished by evaporation and evapotranspiration from the vegetation. A water balance analysis for the study area is usually conducted to determine key irrigation system design parameters. In the conventional water balance, rainfall, runoff, infiltration, and evapotranspiration are analyzed in order to determine the amount of water that can be applied to a site for consumption by a particular cover crop. The results are then used to calculate an effluent application rate and land area requirements for irrigation of

⁴ Miertschin, J.D. and G.H. Ward, 2013. *Estimation of Total Evapotranspiration Loss From Canopy Irrigation Project in Wooded Terrain in the Austin, Texas Region*

wastewater.

A storage balance, similar in structure to the preceding water balance, is also typically prepared to determine the storage volume required for a system that will provide complete disposal of effluent via irrigation. The storage balance typically includes analysis of the effluent application rate and meteorological inputs under wet weather conditions.

The TCEQ's rules under 30 TAC Chapter 309.20 require that a water balance "generally follow" the example provided in that section. The example considers precipitation, runoff, leaching, crop consumptive use, evaporation, and irrigation efficiency, aggregated in a monthly distribution, in order to determine an application rate.

A water balance and storage balance for the Travis County MUD No. 12 facility has been prepared in the format of Chapter 309.20, as described in the subsequent Sections 2.1 and 2.2. This is followed in Section 2.3 with an innovative water and storage balance that is arguably more appropriate for the proposed canopy irrigation system. The proposed wastewater treatment facility will be developed in three increasing phases: 0.175 MGD, 0.315 MGD, and 0.63 MGD. The present water and storage balance focused upon the second phase of 0.315 MGD, since the MUD intends to construct the Phase 2 storage pond in Phase 1. Needs for other phases can be projected from the results obtained for the 0.315 MGD phase.

2.1 CONVENTIONAL WATER BALANCE

A water balance for the MUD facility was conducted that was based upon monthly calculation of key variables. The water balance is shown in Table 1. Information required in the water balance (and storage balance) is described below.

Precipitation

A water balance is usually developed using average rainfall data for a 25 year period of record. The use of average data tends to smooth out highly variable extremes in annual rainfall totals.

Data was obtained from National Climatic Data Center records for the Camp Mabry gauge at Austin, TX. The average annual precipitation for Camp Mabry was 33.79 inches for the period 1988-2012. This long-term average precipitation value was used as input in the water balance analysis.

For the storage balance analysis, a wet year condition is desired. The wettest year in the past 25 year period of record was selected for use. For Camp Mabry in Austin, the wettest year was 2004, with a total rainfall of 52.28 inches.

Runoff

For the water balance, a year is selected with an annual total rainfall similar to the 25-year average

value. Runoff at the irrigation site during actual storm events in the similar year was calculated with the Soil Conservation Service (SCS) curve number method. Hydrologic soil types were inventoried for the irrigation areas, and a CN of 80 was established for an antecedent moisture condition II (AMC II). The curve number method was applied to the actual storm events recorded during the average year, and runoff was calculated for each storm. The runoff for each storm was input into the water balance in the corresponding months when the events occurred.

Similarly, the specific year with the wettest condition was selected for analysis of runoff from individual storm events.

Evapotranspiration

One of the key variables in a water balance is evapotranspiration. For the present analysis, the cover crop in the irrigation area will be juniper trees, mixed hardwoods, and native grasses and shrubs. The evapotranspiration characteristics for cedar canopy irrigation were originally developed by Dr. Cornelius van Bavel, Professor Emeritus of Soil Physics and Environmental Agronomy at Texas A&M University.⁵ Dr. van Bavel's evapotranspiration numbers, which were used in development of the earlier Lakeway MUD permit application referenced previously that was reviewed and approved by the TCEQ (TLAP No. 11495001), demonstrated that the canopy system evapotranspiration loss would be 152.67 inches per year. This relatively large water consumption included typical evapotranspiration loss, supplemented by evaporation from the canopy leaf surfaces. Dr. van Bavel's paper is attached to this report in Appendix B.

For the present analysis, the evapotranspiration and evaporation rate for the canopy irrigation was estimated using an updated Penman-Monteith method calculation, similar to the approach developed by Dr. van Bavel. The updated procedure (Miertschin and Ward, 2013) is described in a memorandum provided in Appendix C to this report. With the updated procedure, a total evapotranspiration/evaporation loss for the cedar canopy was determined to be 104.6 inches per year for the climatic region of the irrigation site.

Leaching

A leaching requirement was incorporated into the water balance. Leaching is a mechanism that prevents the build-up of salts in the soil. The leaching requirement was estimated empirically as a function of the effluent conductivity and the soil conductivity, in accordance with the method in 30 TAC Chapter 309. The effluent conductivity was estimated at 1.0 mmhos/cm, and the allowable soil moisture conductivity was estimated at 8.5 mmhos/cm. The allowable soil conductivity was expected to be relatively high for the juniper vegetation but a direct reference was not available. Therefore, the allowable conductivity was estimated as a typical value for realization of 90% yield for Bermuda.⁶

⁵ C.H.M van Bavel, 1993. *Disposal of Effluent by Irrigation of Cedars (Juniperus ashei)*

⁶ Schwab, G.O., et al, 1981. *Soil and Water Conservation Engineering*; Table 18.2, Crop Salt Tolerance Levels for Crops

Evaporation

Loss of water from the storage pond via evaporation was estimated using data from the Texas Water Development Board, Quadrangle 710, for the period of record 1988-2012. The historical monthly average gross evaporation data were corrected for the historical monthly precipitation to obtain net evaporation. The 25-year average net evaporation was 26.71 inches, and the calculated average monthly evaporation values were input directly into the water balance. The 25-year low net evaporation, representing wet year conditions, was 13.6 inches, and the calculated annual total value was distributed into monthly values for use in the storage balance.

Effluent Application Rate

The conventional water balance calculates effluent that can be applied on a unit area basis. It is the effluent needed in the root zone divided by the irrigation efficiency, which is usually taken as 0.85. This states that only 85% of the water leaving the irrigation nozzle actually reaches the ground.

Consumption from the reservoir is shown in the final column of the water balance. This formula is taken from the TCEQ example, and it is the sum of the evaporation from the reservoir surface (which has been converted to a unit area basis for the irrigation field) plus the effluent to be applied. The water balance indicates an overall system consumptive use of 102.18 inches/year, which includes evaporation loss from the storage pond. This is the calculated allowable application rate for the irrigation system, which can be used to determine a minimum irrigation area requirement.

Minimum Irrigation Area

The effluent application rate from the water balance analysis can be used to determine the minimum irrigation area needed for a specific design flow. For this system, the minimum irrigation requirement is 41.4 acres, irrigated at a rate of 102.18 inches/yr (8.5 ft/yr). This calculation is based upon an annual wastewater flow of 0.315 MGD (352.8 acre-feet/yr), which is the Phase 2 flow for the facility.

However, as will be subsequently discussed, the MUD proposes to utilize acreage in excess of the calculated minimum allowable. If 92 acres of irrigation are utilized, the application rate would be reduced to 3.83 feet/year.⁷ Additional area available on the 346.55 acre irrigation tract may also be used for irrigation. This additional acreage will provide the MUD with more operational flexibility for effluent disposal.

⁷ The Phase 1 acreage would be 51.1 acres, Phase 2 would be 92 acres, and Final Phase would be 184 acres.

Table 1: Conventional Water Balance

Month	25 Yr. Average Precipitation (inches)	1995 Average Runoff (inches)	Average Infiltration (inches)	Evapotrans- piration (inches)	Required Leaching (inches)	Total Water Needs (inches)	Effluent Needed in Root Zone (inches)	25 yr Avg Net Evaporation Res. Surface (inches)	(New Column) Evaporation per Irrigation Area	Effluent Applied to Land (inches)	Consumpt. from Reservoir (inches)
(1)	(2)	(3)	(2)-(3) (4)	(5)	(6)	(5)+(6) (7)	(7)-(4) (8)	(9)	(9)*(PS/IA) (9A)	(8)/K (10)	(9A)+(10) (11)
Jan	2.63	0.00	2.63	5.39	0.37	5.76	3.13	0.640	0.0209	3.69	3.71
Feb	2.09	0.01	2.07	5.42	0.45	5.87	3.80	0.908	0.0296	4.47	4.50
Mar	2.88	0.14	2.74	7.20	0.59	7.79	5.06	1.160	0.0378	5.95	5.99
Apr	2.15	0.16	1.99	8.46	0.86	9.32	7.33	2.342	0.0764	8.62	8.70
May	4.17	2.67	1.50	9.32	1.04	10.36	8.86	1.507	0.0491	10.43	10.48
Jun	3.59	0.52	3.07	12.71	1.29	14.00	10.92	3.112	0.1015	12.85	12.95
Jul	1.96	0.00	1.96	14.55	1.68	16.23	14.27	5.246	0.1711	16.79	16.96
Aug	2.62	0.98	1.64	14.21	1.68	15.89	14.24	4.609	0.1503	16.76	16.91
Sep	2.95	0.09	2.85	8.99	0.82	9.81	6.95	2.991	0.0975	8.18	8.28
Oct	3.30	0.20	3.10	7.39	0.57	7.96	4.86	1.978	0.0645	5.72	5.78
Nov	2.95	0.44	2.51	5.69	0.42	6.11	3.61	1.239	0.0404	4.24	4.28
Dec	2.51	0.00	2.51	5.23	0.36	5.59	3.08	0.977	0.0319	3.62	3.65
TOTAL	33.79	5.22	28.58	104.56	10.13	114.69	86.12	26.71	0.87	101.31	102.18

Annual Consumption	102.18	ac. in/ac. or	8.52	ac. ft/ac.
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Data used:

Proposed Irrigation Area 92 acres
Pond Surface 3 acres
Res. surface/irr. area 0.033
Wastewater Flow Rate 0.315 MGD
Sprinkler Eff. (K) 0.85
Effluent Cond. (Ce) 1 mmhos/cm
Max Conductance (Cl) 8.5 mmhos/cm
Curve Number (CN) 80
Evaporation Data: Quadrangle 710, TWDB 1988-2012
Precipitation Data: Austin Camp Mabry 1988-2012

Minimum Area Needed:

$$\frac{352.79 \text{ ac ft/yr}}{8.52 \text{ ft/yr}} = 41.4 \text{ Acres}$$

2.2 CONVENTIONAL STORAGE BALANCE

A storage balance was conducted for sizing of the storage capacity necessary for successful irrigation scheduling in response to variable dry and wet conditions. For the purposes of this report, storage was analyzed to accommodate the Phase 2 flow of 0.315 MGD, since the Phase 2 pond would be constructed in the first phase of the treatment plant phasing. Using the method of Chapter 309, the storage balance is essentially a water balance that analyzes the effluent application rate, evapotranspiration, rainfall, runoff, infiltration, and evaporation in order to determine the storage volume required. The storage calculations were based on the wettest year on record during the past 25 years (1988 - 2012).

The information incorporated into the storage balance for precipitation, runoff, evapotranspiration, leaching, and evaporation were based upon the same data sources employed in the water balance, as described in the preceding section.

The storage analysis is dependent upon the irrigation area. A Phase 2 irrigation area of 92 acres was used for this analysis. This area will enable the effluent application rate to be restricted to 3.83 feet per year or less.

As shown in Table 2, the storage balance indicated a maximum storage requirement of 3.8 inches/acre. With this storage requirement, a storage pond volume of 29.2 acre-feet can be calculated for the Phase 2 wastewater flow of 0.315 MGD and the irrigation area of 92 acres. This volume of storage would provide 30.3 days of detention at 0.315 MGD. However, storage calculated with the conventional water and storage balance may not be adequate to successfully operate the innovative canopy spray system. In the next section is proposed a revision to the storage number obtained with the conventional water and storage balance.

Table 2: Conventional Storage Balance

Month	Effluent Received for Application or Storage (inches)	Wet Yr. 2004 Rainfall (inches)	Wet Yr. 2004 Runoff (inches)	Infiltrated Rainfall (inches)	Available Water (inches)	Dist. Low Net Evap. from Res. Surf. (inches)	(New Column) Evaporation per Irrigation Area	Storage (inches)	Accumulated Storage (inches)
	(13)	(14)	(15)	(14)-(15) (16)	(13)+(16) (17)	(18)	(18)*(PS/IA) (18A)	(19)	(20)
Jan	3.835	4.15	1.02	3.13	6.96	0.326	0.0106	0.73	2.17
Feb	3.835	3.73	0.08	3.65	7.49	0.462	0.0151	1.21	3.39
Mar	3.835	2.31	0.02	2.29	6.13	0.591	0.0193	-2.66	0.73
Apr	3.835	3.97	0.45	3.52	7.36	1.192	0.0389	-3.03	0.00
May	3.835	3.34	0.10	3.24	7.07	0.767	0.0250	-4.57	0.00
Jun	3.835	11.41	2.98	8.43	12.26	1.584	0.0517	-2.77	0.00
Jul	3.835	0.83	0.00	0.83	4.67	2.671	0.0871	-14.37	0.00
Aug	3.835	1.91	0.08	1.83	5.66	2.346	0.0765	-12.78	0.00
Sep	3.835	1.57	0.24	1.33	5.16	1.523	0.0497	-6.19	0.00
Oct	3.835	4.62	0.81	3.81	7.65	1.007	0.0328	-1.08	0.00
Nov	3.835	14.10	4.73	9.37	13.20	0.631	0.0206	3.81	3.81
Dec	3.835	0.33	0.00	0.33	4.17	0.497	0.0162	-2.37	1.44
TOTAL	46.02	52.28	10.52	41.75	87.77	13.60	0.443		

Storage Required

3.8 inch/acre
29.2 acre-ft
9.53 MG
30.3 Days

315,000 gallons per day

Flow

Irrigation Area

Pond Surface

Res. surface/irr. area

Effluent Applied

Curve Number (CN)

Sprinkler Eff. (K)

1 acre-foot = 325,900 gallons

Storage = ((13b)-(18A))-((7)-(16))/K

note: if (7)-(16) < 0, enter 0 for that term

2.3 INNOVATIVE WATER AND STORAGE BALANCE

The preceding sections 2.1 and 2.2 provided a conventional water and storage balance, patterned explicitly after the method described in Chapter 309.20. However, if one considers the unique characteristics of the innovative cedar canopy irrigation system, the conventional approach appears to have significant technical deficiencies. With the canopy spray system, most of the applied water will evaporate from leaf surfaces, therefore, neither the leaching loss nor the amount of plant evapotranspiration demand on a monthly basis are expected to be a controlling factor. Evaporation from leaf surfaces will occur irregardless of these factors. Instead, what is important to analysis of the operation of the canopy system is the actual number of days that are available for spraying the canopy and the amount of water that can be sprayed.

As a result of the unique characteristics of the canopy irrigation system, an innovative hypothetical effluent application schedule was developed as a substitute for a convention water balance. The effluent application schedule considered annual average precipitation conditions, similar to the conventional water balance, but only from the standpoint of the number of wet days per month. It was assumed that canopy spray would not take place on a day with measureable precipitation. The schedule also considered the presence of high-wind days, and prescribed a number of rest days per month. Next, a hypothetical number of spray applications was estimated on a daily and monthly basis. The number of acres subjected to spray was then applied in the spreadsheet, which enables calculation of the number of acre-feet of spray delivered per month. In this case, the spray acreage is a variable, and it can be optimized through iteration to achieve an annual spray volume that meets the needs for the volume of wastewater generated.

The innovative effluent application schedule is shown in Table 3 for average rainfall conditions. After the hypothetical spray schedule was developed, iteration on the area indicated that 85 acres would be required for disposal of the full volume of effluent generated. This is the area needed under average precipitation conditions, the same fundamental assumption as used in a conventional water balance developed under the guidance from Chapter 309.

But as with the conventional storage balance, it is necessary to consider system operation under wet weather conditions. So, a similar effluent application schedule was developed for wet weather conditions, as shown in Table 4. In this case, the wet year is defined as the year with the highest number of rainfall days, which was determined to be 2004 with 69 rain events. The number of wind days was determined for the wet year, and the allowable number of days available for spraying was calculated. Spray area is again a variable in this spreadsheet, and the results indicated that 85 acres would not be sufficient for disposal of the total volume of wastewater generated under wet year conditions. Instead, it was determined through iteration that an area of 92 acres would be required for disposal at the Phase 2 flow of 0.315 MGD.

The wet weather application schedule can also be used to determine the amount of effluent storage required. A column has been added to the spreadsheet to calculate the storage required on a monthly

basis, which enables determination of the maximum amount of storage needed. From this analysis, it was determined that 58 acre-feet of storage would be needed, which is equivalent to 60 days of storage at the Phase 2 flow of 0.315 MGD (0.9666 acre-feet/day).⁸

⁸ Phase 2 storage of 58 acre-feet would be constructed in Phase 1 and serve both Phase 1 and 2; an additional 58 acre-feet of storage would be required for the Final Phase of 0.63 MGD.

Table 3: Innovative Application Schedule, Average Conditions
HYPOTHETICAL CANOPY IRRIGATION SCHEDULE - AVERAGE CONDITIONS

Month	Total Days	Rain Days ¹	Average Wind >15 mph ²	Wind Days/mo	Rest Days ³ (2/wk)	Available Days Spray Days ⁴	No. of 0.2-in doses/day ⁵	Application per Month ⁶ Inches	Feet	Irrigation Acres ⁷	Sprayed ⁸ (ac-ft/mo)
Jan	31	3.72	0.06	1.86	8.86	16.56	1	3.31	0.28	85	23.46
Feb	28	3.72	0.08	2.24	8.00	14.04	1	2.81	0.23	85	19.89
Mar	31	4.80	0.08	2.48	8.86	14.86	1	2.97	0.25	85	21.06
Apr	30	3.56	0.06	1.8	8.57	16.07	1	3.21	0.27	85	22.76
May	31	4.64	0.05	1.55	8.86	15.95	1	3.19	0.27	85	22.60
Jun	30	4.52	0.03	0.9	8.57	16.01	2	6.40	0.53	85	45.36
Jul	31	3.24	0.01	0.31	8.86	18.59	2	7.44	0.62	85	52.68
Aug	31	3.20	0.01	0.31	8.86	18.63	2	7.45	0.62	85	52.79
Sep	30	3.80	0.02	0.6	8.57	17.03	1	3.41	0.28	85	24.12
Oct	31	4.00	0.04	1.24	8.86	16.90	1	3.38	0.28	85	23.95
Nov	30	3.48	0.05	1.5	8.57	16.45	1	3.29	0.27	85	23.30
Dec	31	3.84	0.06	1.86	8.86	16.44	1	3.29	0.27	85	23.29
Annual								50.16	4.18		355.27

NOTES:

- ¹ Number of rain days from NWS records, 1988 -2012, Austin Camp Mabry
- ² Wind speed from NWS records, averaged, cumulative frequency distribution for daily average; 15 mph assumed threshold not to be exceeded.
Data record 1999 - 2013, Austin Bergstrom
- ³ Rest days projected at 2 per week, could be more or less.
- ⁴ Available days for effluent application, excluding rain days, wind days (though may overlap with rain), and rest days.
- ⁵ Estimated number of 0.2-inch applications per day, nominally 1 or 2, and can vary.
- ⁶ Potential total effluent applied per unit area, inches and feet; actual values could be less due to limitations or effluent availability.
- ⁷ Area to be irrigated; use 60-100 ac as a nominal value for this variable.
- ⁸ Total effluent volume sprayed. Target for disposal is 352.8 ac-ft/yr (0.315 MGD).

Table 4: Innovative Application Schedule, Wet Year Conditions

HYPOTHETICAL CANOPY IRRIGATION SCHEDULE - 2004 WET YEAR CONDITIONS

Flow (MGD): 0.315

Irr. Area (ac): 92

Month	Total Days	Rain Days ¹	Average Wind >15 mph ²	Wind Days/mo ³	Rest Days ⁴ (2/wk)	Available Days Spray Days ⁵	No. of 0.2-in doses/day ⁶	Application per Month ⁷ Inches	Feet	Irrigation ⁸ Acres	Sprayed ⁹ (ac-ft/mo)	Eff. Rec'd ¹⁰ Inches	Storage ¹¹ Req.	Accum. Storage
Jan	31	3.00	0.00	2.00	8.86	17.14	1	3.43	0.29	92	26.29	3.83	0.41	2.77
Feb	28	10.00	0.00	3.00	8.00	7.00	1	1.40	0.12	92	10.73	3.83	2.43	5.20
Mar	31	6.00	0.00	1.00	8.86	15.14	1	3.03	0.25	92	23.22	3.83	0.81	6.01
Apr	30	6.00	0.00	0.00	8.57	15.43	1	3.09	0.26	92	23.66	3.83	0.75	6.76
May	31	7.00	0.00	0.00	8.86	15.14	1	3.03	0.25	92	23.22	3.83	0.81	7.56
Jun	30	9.00	0.00	0.00	8.57	12.43	2	4.97	0.41	92	38.11	3.83	-1.14	6.43
Jul	31	4.00	0.00	0.00	8.86	18.14	2	7.26	0.60	92	55.64	3.83	-3.42	3.01
Aug	31	4.00	0.00	0.00	8.86	18.14	2	7.26	0.60	92	55.64	3.83	-3.42	0.00
Sep	30	2.00	0.00	0.00	8.57	19.43	1	3.89	0.32	92	29.79	3.83	-0.05	0.00
Oct	31	6.00	0.00	0.00	8.86	16.14	1	3.23	0.27	92	24.75	3.83	0.61	0.61
Nov	30	10.00	0.00	0.00	8.57	11.43	1	2.29	0.19	92	17.52	3.83	1.55	2.16
Dec	31	2.00	0.00	2.00	8.86	18.14	1	3.63	0.30	92	27.82	3.83	0.21	2.36
Annual								46.49	3.87		356.39	46.02		

NOTES:

- ¹ Number of rain days from NWS records; year with highest number of storms 2004
- ² Wind speed from NWS records, cumulative frequency dist. For daily average (Not used for wet years)
- ³ Wind days per month, 2004
- ⁴ Rest days projected at 2 per week, could be more or less.
- ⁵ Available days for effluent application, excluding rain days, wind days (though may overlap with rain), and rest days.
- ⁶ Estimated number of 0.2-inch applications per day, nominally 1 or 2, and can vary.
- ⁷ Potential total effluent applied per unit area, inches and feet; actual values could be less due to limitations or effluent availability.
- ⁸ Area to be irrigated; use 60-100 ac as a nominal value for this variable.
- ⁹ Total effluent volume sprayed. Target for disposal is 352.8 ac-ft/yr (0.315 MGD).
- ¹⁰ Effluent received for application or for storage
- ¹¹ Storage required (Eff Rec'd⁹ - Eff Sprayed⁸)

Max Accum. Storage 7.56 inches
Ac-ft of Storage 57.99 ac-ft
Wastewater Volume 0.967 ac-ft/day
Days of Storage 60.00 days
= (ac-ft storage / ww. vol.)

2.4 NITROGEN BALANCE

A nitrogen balance was prepared for the irrigation site to examine system sizing with respect to conventional estimates of cover crop nutrient uptake, as shown in Table 5. Key input parameters are described below. The conventional nitrogen balance is only marginally applicable to the proposed canopy spray irrigation system, since it is projected that 80% of the applied wastewater will be lost to the atmosphere via evaporation, and only 20% of the applied wastewater will actually reach the ground surface.

Hydraulic Application Rate

The first column of data displays the effluent needed in the root zone obtained from the water balance analysis for the site. This root zone requirement for effluent represents the hydraulic application rate, or volume of wastewater, that can be applied for consumption by the crop. The effluent requirement varies monthly in accordance with the climatological and evapotranspiration characteristics at the site. The monthly distribution of crop effluent need is used throughout the nitrogen balance to represent the monthly variation of crop growth and nutritional need. This distribution is displayed in the second column of data in the table.

Nitrogen Loading

The nitrogen balance table calculates the applied nitrogen loading in pounds per acre to the irrigation area on a monthly basis. The third column of data in the table displays the effluent applied on a monthly basis, in terms of total volume in acre-feet, distributed in accordance with the crop effluent needs. For the innovative canopy irrigation system, only 20% of the sprayed effluent is expected to reach the ground surface. The nitrogen loading associated with the applied effluent is calculated in the fourth column of data. The nitrogen loading is determined from the effluent volume and the concentration of total nitrogen and converted to a unit area basis. The sum of the monthly nitrogen loading represents the total amount of nitrogen applied via effluent irrigation for the year.

Crop Uptake

The proposed MUD irrigation disposal site is composed of primarily juniper trees, mixed hardwood trees, and native grasses/shrubs. The nitrogen uptake rate for juniper is not well defined. The EPA Process Design Manual for Land Treatment of Municipal Wastewater suggests a nitrogen uptake range for western conifer forest of 134-223 lbs N/acre/year.¹ For the present analysis, the minimum value recommended by the EPA will be used, approximately 134 lbs N/acre/year. For use in the nitrogen balance, the uptake rate can be increased by 20% to account for volatilization loss of nitrogen. This value is the same uptake rate used in the earlier Lakeway MUD permit application that has been referenced previously, and was reviewed and approved by TCEQ.²

¹ EPA, 1981. *Process Design Manual for Land Treatment of Municipal Wastewater*. EPA 625/1-81-013

² Lakeway MUD, TLAP Permit No. 11495001

The total annual nitrogen uptake values enter into the nitrogen balance table in the fifth column of data (after including an allowance for volatilization), with the values distributed on a monthly basis in accordance with crop water needs. The sixth column of data presents the calculated hydraulic application rate (inches/month) of effluent that would be needed to satisfy the crop nitrogen needs, with effluent as the only source of nitrogen.

Discussion

Table 5 depicts the Phase 2 scenario with the proposed irrigation area of 92 acres, the projected flow of 352.8 acre-feet/year (0.315 MGD), and an estimated nitrogen concentration of 30 mg/l. An average of 20% of the sprayed effluent is assumed to reach the ground surface. Under these conditions, it is evident that nitrogen will be applied to the site at a rate lower than the calculated crop uptake rate for nitrogen. This is apparent in the sum of the column for applied nitrogen load, where it is estimated that the annual nitrogen loading will be 63 lb N/acre/year, which is less than the estimated juniper uptake of 134 lb N/acre/year. This is also apparent in the calculation of the effluent needed in the root zone for crop nitrogen uptake, which totals 23.82 inches/acre/year. By comparison, it is estimated that only 20% of the applied effluent, or 9.19 inches/acre/year ($3.83 \text{ ft/ac/yr} \times 0.2$) will reach the ground surface, which is less than the volume that could be applied on the basis of nitrogen uptake.

Table 5: Nitrogen Balance

Month	Effluent Needed in Root Zone for Crop Consumption (in)	Portion of Annual Nitrogen Needed	Effluent Applied (ac-ft)	Applied Nitrogen Load (lb/ac)	Nitrogen Application for Crop Uptake (lb/ac)	Effluent Needed in Root Zone for Crop Nitrogen Uptake (in)
JAN	3.13	0.036	3	2	5.85	0.9
FEB	3.80	0.044	3	3	7.09	1.1
MAR	5.06	0.059	4	4	9.44	1.4
APR	7.33	0.085	6	5	13.69	2.0
MAY	8.86	0.103	7	6	16.55	2.5
JUN	10.92	0.127	9	8	20.40	3.0
JUL	14.27	0.166	12	10	26.64	3.9
AUG	14.24	0.165	12	10	26.60	3.9
SEP	6.95	0.081	6	5	12.99	1.9
OCT	4.86	0.056	4	4	9.08	1.3
NOV	3.61	0.042	3	3	6.73	1.0
DEC	3.08	0.036	3	2	5.75	0.9
	86.12	1.000	71	63	160.80	23.82

Wastewater volume (projected) =

Consumption from reservoir =

Total effluent applied = 20% of spray reaches ground (0.2) (ww vol) =

Irrigation area =

Crop uptake =

Waste water total nitrogen concentration =

Annual nitrogen uptake (Crop uptake x 1.2) =

Effluent applied = (total effluent applied)(effluent needed/total)

Applied nitrogen load = (effluent applied)(0.3259 MG/ac-ft)(nitrogen conc)(8.34)(1/irrigation area)

Effluent needed for crop nitrogen uptake = (nitrogen loading rate for crop uptake)(12 in/ft)(1/2.7)(1/nitrogen conc)

352.8 ac-ft
102.18 in/yr
71 ac-ft
92 acres
134 lbs/ac
30 mg/L
160.8 lb/ac/yr

3.0 SUMMARY OF PROPOSED IRRIGATION SYSTEM

Sizing parameters for the proposed effluent irrigation system for the Travis County MUD No. 12 are summarized below. The proposed parameters take into account the three proposed phases for the wastewater treatment facility.

WWTP Flow Phase			Canopy Water Balance Total	Wet Year Storage		Storage
(MGD)	(acre-feet/day)	(acre-feet/year)	Area Required	Required		Provided
			(acres)	(acre-feet)	(days)	(acre-feet)
0.175	0.537	196	51.1	32.2	60	58
0.315	0.9666	352.8	92	58	60	58
0.63	1.933	705.6	184	116	60	116
Notes: Develop canopy acreage in accordance with wastewater flow pumped to that site.						

Buffers

A minimum 50 foot buffer will be maintained between the top of the storage pond berm and any adjacent property lines not under the control of MUD No. 12. The storage pond is not a wastewater treatment unit *per se* -- it only serves to store treated effluent.

The spray irrigation field will be surrounded by a designated 150 ft buffer zone.

Application System

The effluent will be used for irrigation of an increasing area of juniper rangeland, beginning with an area of 51.1 acres in Phase 1, 92 acres in Phase 2, and increasing to an area of 184 acres in the Final Phase, out of an available tract acreage of 346.55 acres. The effluent will be sprayed for canopy irrigation. Effluent from the storage pond will be pumped directly to the irrigation distribution system.

System Operation

The MUD will operate the wastewater treatment plant and the pumping station at the effluent storage pond. Effluent from the treatment plant will be pumped to the storage pond. Effluent will accumulate in the storage pond until it is applied via canopy spray to the tract. Irrigation will be controlled by personnel of the MUD or designated contract operators.

The application of wastewater effluent will be carefully controlled by the operators. There are no

physical tailwater controls proposed for the irrigation site. Runoff of effluent during irrigation will be prevented by careful control of the application rate. Irrigation will not occur during wet weather storm events as a further operational precaution to prevent runoff of effluent

APPENDIX A

**SUMMARY OF FINDINGS/CONCLUSIONS FROM LAKEWAY MUD CANOPY
IRRIGATION DEMONSTRATION PROJECT**

SUMMARY OF FINDINGS/CONCLUSIONS FROM LAKEWAY MUD CANOPY IRRIGATION DEMONSTRATION PROJECT

This report presents a summary of the key findings and conclusions of the canopy irrigation demonstration project conducted by Lakeway MUD and its consultants. The project report is referenced as follows: *HDR, 2000, Cedar Irrigation Demonstration Project Report*. For this summary, the format will mirror the sections of the original report, with bulletized highlights described for each section.

1.0 BACKGROUND

1.1 Introduction

- Effluent applied to 45-acre stand of cedar trees for evaporation and transpiration
- Project in response to Special Provisions 12 and 16 in TLAP permit 11495-001, issued December 30, 1994
- Three-year study

1.2 Description of Cedar Tract Irrigation

- Application rate limited by permit to 2.90 acre-feet annually, limited to the months of October through March¹
- Cedar trees capable of evaporating significantly more water than turf grass

1.3 Cedar Irrigation Monitoring Plan

- Permit required monitoring of the cedar irrigation operations and possible impacts to local groundwater quality
- Groundwater monitoring plan consisted of monitoring and control wells, sampling, laboratory analysis, and reporting
- Cedar irrigation operation involves irrigating cedar trees during the winter months at canopy levels
- Demonstration plan was to address health of the cedar vegetation, rates and durations of irrigation, environmental conditions, and quality of groundwater

2.0 LOCAL GROUNDWATER MONITORING

2.1 Monitoring Well Locations

- Site is underlain by the Glen Rose Formation, groundwater predominantly from the Trinity Group Aquifer
- Five groundwater monitoring wells were installed in the irrigation area, with two control wells away from the irrigation area
- Three monitoring wells and one control well were screened for shallow groundwater at 50-60 feet below ground surface; two monitoring wells and one control were screened for deeper

¹ Canopy application rate in current edition of Permit 11495-001 is 4.7 acre-feet/acre/year.

groundwater at 380 feet

2.2 Monitoring Well Installation

- Permit dictated monitoring of first water bearing zone
- Wells constructed with two-inch well casing and four-inch protective casing
- Borehole logs are available

2.3 Periodic Groundwater Monitoring

- Sample wells monthly during irrigation period, test for multiple parameters
- A three-month moving average was determined for each constituent

2.4 Groundwater Impact Evaluation Criteria

- Well monitoring results were evaluated for significant variations in water quality
- Compare moving average at each well to control well
- Results indicated only random variation rather than a trend in water quality
- Results do not indicate that effluent is causing water quality degradation in groundwater beneath the cedar tract
- It was not possible to effectively purge wells prior to sample collection due to low hydraulic conductivities

3.0 IRRIGATION DEMONSTRATION PLAN

3.1 Environmental Monitoring

- Climatological monitoring included wind speed, wind direction, solar radiation, temperature, and humidity; rainfall measured at nearby site (WWTP)
- Sensors were polled continuously by SCADA system
- SCADA system automatically operated the irrigation operation with the option for manual override
- Application rates were calculated daily
- Alarm triggers such as rainfall, excessive wind, freezing temperatures for shut down
- Retention capacity of the tree canopy was investigated with ten rain gauges in an open area, five gauges under an oak tree, five gauges under a cedar tree
- Irrigation system: each head delivers 60 gpm, 15 minute cycles, 100-foot radius; applies 0.0459 inches per 15-minute cycle, considering overlap application rate is 0.0735 inches per 15 minutes; four repeat cycles deliver 0.294 inches, applied in one hour during a period of eight hours; two hours between each zone's cycle
- Oak tree with irrigation from 0.10 to 0.21 inches, canopy retention averaged 48%
- Cedar tree with irrigation from 0.10 to 0.21 inches, canopy retention averaged 94%
- Canopy retention and evaporation prevents soil saturation, applied water runoff, and migration of constituents into groundwater

3.2 Irrigation Operations

- Twelve separate irrigation zones for the 45 acres
- Each zone isolated by a remote controlled regulating valve and manual shutoff valve
- Seven zones have 360 degree coverage sprinklers and five zones along perimeter have 180 and 90 degree coverage sprinklers
- Delivery rates at sprinkler pressure of 60 psi range from 540 to 680 gpm
- SCADA system computes potential irrigation volumes to replace the potential evapotranspiration deficit
- Irrigation pumping station has VFDs to provide a consistent system pressure, flow meter, pressure sensors

3.3 Vegetative Monitoring

- 45 acre irrigation area is primarily ash juniper trees, substantial number of Live Oak and Spanish Oak trees, number of grass species
- Tree health was monitored routinely by a horticulturist for general health and growth
- Horticulturist determined that irrigated trees are healthier than control trees; no tree deaths due to irrigation; grasses and ground cover abundant in irrigated area while sparse in control area
- Tree leaves were sampled and analyzed for trace metal constituents

3.4 Soil Monitoring

- Soil water tension sensors were installed to indicate if soil was wet during rain and irrigation, and drier afterwards; data was predictable and not useful
- Soil conditions were not suitable for Lysimeters
- Soil was sampled and analyzed annually for nutrients, salinity from each soil type on site
- For three years, sampled 0-6 inches, then 0-6 and 6-18 inches
- Data indicated that soil salinity and nutrient concentration were very low and not increasing as a result of irrigation

4.0 CONCLUSIONS

- Irrigation of the cedar tract is effective, and no evidence that it has degraded local groundwater conditions, the health of vegetative cover, or soil conditions

APPENDIX B

DISPOSAL OF EFFLUENT BY IRRIGATION OF CEDARS (*Juniperis ashei*)

Evapotranspiration (ET) of Golf Course Turf
in the Austin, TX Area

Cornelius van Bavel - May 6, 1993

The water use rate (identical to evapotranspiration or ET, also to consumptive use or CU) of golf course turf, as determined by weather conditions, is an important ingredient in the planning and operation of irrigation facilities on a golf course. During the winter months it is also a critical factor in determining the size of a storage reservoir for the effluent of a sewage treatment facility, if this effluent is used for irrigation of the course.

The application procedure for a permit to use the effluent for irrigating the turf requires that the size of the reservoir be calculated to prevent the discharge of the effluent. The difference between the monthly estimated ET and the 25-year maximum monthly infiltration of rainfall, divided by the irrigation efficiency factor, is the irrigation requirement. If the latter is less than the permitted monthly discharge of the sewage treatment facility, the excess effluent must be stored. Typically, storage may be required only during the winter months. When, with the progress of the season, the irrigation requirement begins to exceed the permitted discharge, the storage will be depleted and lake water will supplement the effluent.

Detailed procedures for this design calculation are spelled out in the guidelines promulgated by the Texas Water Commission, specifically in Subchapter C, Land Disposal of Sewage Effluent. The method whereby the consumptive use of water (evapotranspiration, or ET) will be determined is not mandated, but it is required that the method must be documented. The example of a water balance given in the guidelines is based on the use of Bulletin 6019, Texas Board of Water Engineers (TBWE, 1960).

In this report we review the suitability of the method documented in Bulletin 6019 for determining the monthly ET rates of turf, as managed on golfcourses in the Austin area. Next, we describe and document a newer method that is based on the scientific and engineering progress in the 32 years that have elapsed since Bulletin 6019 was prepared. We show the results of its application for the Austin climate, and compare these with available experimental evidence on the actual ET rates of well-watered turf grasses. Finally, we review what is known about the differences among turfgrass species and varieties in general, and about the type of turf that is in place at the Lakeway golf courses.

We will show that the updated method for determining ET from turf in the Austin area gives an annual total of 66.1 in., compared to 49.2 in., as found on the basis of the methods of Bulletin 6019, or 47.5 in., using adjusted values for the Climatic Index (CI),

(Mercier and Brown, 15). For the critical winter months (Nov. through Feb.), the corresponding numbers are 10.9 in. and 5.7 in. (or, 5.5 in., using the adjusted CI values). While the exact effect of this difference on the calculated storage capacity remains to be determined by others, we expect it to be significant. The substance of this report is designed to be the basis upon which an improved ET estimate will be acceptable to the Texas Water Commission when it considers a permit application.

TBWE Bulletin 6019 and its use in determining ET rates for turf

Prior to 1960, little had been done to provide estimates of water requirements for use in irrigated agriculture in Texas. At that time, four empirical methods had been developed based on latitude, time of year, and records of air temperature. By using "crop coefficients", derived from local measurements of crop water use obtained by soil moisture sampling, estimates were made for the seasonal and monthly requirements of specific crops. The validity of such methods is limited to the area of measurement, a fact that was recognized by the authors of Bulletin 6019.

A generally valid method, proposed by Penman in 1948 (1), is based on physical and meteorological principles and utilizes data on sunshine duration, air temperature, air humidity, and windspeed. It was developed to estimate the potential ET (ETP), defined as the ET from well-watered short grass. This method was tested by Penman in England using turf grown in lysimeters, and in 1956-1958 by Van Bavel and Harris (2) in North Carolina, also with lysimeters, using bermudagrass and corn. In the latter study the original method of Penman was improved by using a direct method to find the radiant energy balance, rather than estimating it from sunshine duration data. In both series of experiments the Penman method was accurate within about 10 % over periods as short as several days. However, by 1960 few other tests of the method had been reported, none in the irrigated western regions of the U.S.

It was the idea of L.L. Daniels of the TBWE to make use of a fundamental method, similar to that of Penman, but developed by the then U.S. Weather Bureau in 1955-1959. It was designed to estimate lake evaporation from standard weather data and was extensively tested by the U.S. Geological Survey in 1954-1958. The result was a set of evaporation maps for the U.S. The method used to compute lake evaporation was then used by Daniels to develop a climatic index (CI) (actually, the lake evaporation) for each successive two-week period during which a specific crop would be grown in Texas. Experimental data were then obtained for the ET during these periods to find the relation between the ET and the CI, expressed as a use coefficient (UC). Using these values of UC for each crop by periods, the average ET was estimated from the average CI values, the latter derived from the average value of

the needed weather parameters. The ET values for a number of crops, in each of the 24 climatic areas in which the state was divided, were calculated and made available as a set of tables. At the time, this method was a significant improvement for use in the development of water resources and irrigation engineering in Texas, if only because it was objective and reproducible.

The basis of the Bulletin 6019, published in 1960, are, as stated, estimated average lake evaporation amounts for 1946-1955, calculated using the methods of the US Weather Bureau (published in 1959). For the Austin area the annual total is 55 in., as shown for area 7C in Table 4 of Bulletin 6019. Since 1967, we also have available lake evaporation data based on actual measurements, as documented in TWDB report #64. Using the TWDB method and data for the Lake Travis area, and for 1940-1988 (shown in attachment 20 of the Lakeway Application), we find an average annual total for 1946-1955 of 68.0 in. This updated figure should be used rather than the earlier estimate of 55 in. In other words, in Bulletin 6019 the annual value of CI appears to be underestimated by 24 %. The revised value of CI for 1940-1978 (15) is, likewise, an underestimate of 19%, compared to the 1940-1978 measured lake evaporation, based on TWDB #64.

The foregoing facts would be one argument for upwardly revising any ET estimates from Bulletin 6019 for the Austin area. But, there are two additional reasons for questioning the applicability of Bulletin 6019 for ET rates of golf course turf. No experimental data were available in 1959 and in Texas on the actual ET of turf that is kept green and watered the entire year. Beard and associates (11) made outdoor measurements on 10 turfgrasses in College Station, but only during the summer months.

The data used in Bulletin 6019 for estimating the ET rates for a perennial pasture were those measured for alfalfa in 1940, in the San Fernando Valley. The numbers were obtained by periodically measuring soil water content and recording the local rainfall. Today, we know that the soil moisture depletion method is not adequate to accurately determine actual water use, particularly when it is not limited by water availability, generally understood as the potential evapotranspiration. The standard method is recognized to be the use of lysimeters as used by Beard (12), which are buried containers of which the water content changes are measured with absolute accuracy.

Also, crop coefficients developed in the Central Valley of California for alfalfa that is irrigated infrequently may not apply in central Texas for closely mowed turf that is watered every day if necessary. The methods suggested in Bulletin 6019, using the values given for alfalfa, suggest an annual ET of 49.2 in. for the Austin area. Such a crude estimate may be useful in irrigated crop production, but for well-watered short grass a more

fundamental and more precise method to find the potential ET from turf directly from local climatic data is available. This method, originally proposed by Penman, has been extensively improved and tested since 1948, and its modern form will now be described and applied to the golf course turf at Lakeway.

In the current version used here, the net radiation is found from measured values for solar radiation and calculated values for the sky long-wave radiation, based on measured air temperature and humidity, as proposed by Kimball et al. in 1982 (3). Another improvement, made by Van Bavel in 1967 (4), replaces the generalized wind function used by Penman by one that accounts for the aerodynamic nature of the crop canopy, generally known as its roughness parameter. The same report (4) shows that, based on data from a series of experiments in Phoenix, AZ, the method gave accurate hourly values for evaporation from open water, from wet, bare soil, and for the ET from well-watered alfalfa. It was shown also that daily values of ET could be accurately calculated from daily averages or totals for the air temperature and humidity, the windspeed and the solar radiation, the error being less than 5 %. The last finding is practically important since average daily values for those four climatic variables are readily available, and the ensuing calculation greatly reduced, in contrast to using hourly averages.

A final improvement was made possible by the availability of desk and handheld computers. In order to reduce his method to a single explicit formula, Penman had to use two mathematical approximations. The computation was then possible using a slide rule or calculator, as well as a set of physical tables. In 1976, Van Bavel and Hillel (5) introduced a numerical procedure that eliminates the need for these two approximations as well as the use of tables, thus making the calculation more accurate and faster.

With all the changes mentioned, the original Penman formula has given way to a brief set of algorithms, that require the following inputs: latitude, elevation, average barometric pressure reduced to sealevel, total of solar radiation, average air temperature, average humidity of the air as the average dewpoint, average windspeed and height of measurement, surface albedo, and surface roughness. The method is named the recursive combination method (RCM), since it combines the surface energy balance with the transport equations of heat and water vapor from the surface to or from the air layer where its temperature and humidity are measured, and finds the value of ET by a recursive (iterative) numerical method.

To simplify the procedure, the barometric pressure can be set at 1000 mb and the elevation can be ignored if it is less than 1000 feet, without loss in accuracy. All the input variables are

general, except for the albedo (reflectance) and the roughness parameter of the turf. For a turf that is kept at a height of 20 mm (3/4 in.), the respective values used are 0.2, and 0.5 mm, the latter value calculated with the empirical formulas given by Campbell (6) for finding the heat and vapor transfer roughness parameters from the height of the canopy.

The program is short, about 40 lines of code, and can be formulated in BASIC, in FORTRAN, or in Pascal on any desk or lap computer, or on a programmable calculator. A software package used in combination with an automatic weather station or a computerized weather data base is commercially available.

Inputs and results for monthly potential ET from turf for Austin

Since no long term weather data are available for the Lakeway location, we used average monthly data for the Austin airport. Table 1 shows the input data and the calculated values for the ET from turf in inches/month and in mm/day, the latter for comparison with the turfgrass literature, most of which is in metric units. The monthly means of the daily average air temperature, humidity, and wind speed were obtained from the local climatological summary for Austin (7). The data were obtained at the Austin municipal airport (elevation 587 ft, average barometric pressure 994.3 mb). The length of record is 28 years or longer.

The humidity is reported for 0, 6, 12, and 18 hours as relative humidity, and the daily average dewpoint was calculated from the average air temperature and the relative humidity at 12 hours, as the best possible approximation. The windspeed was measured at an elevation of 15 ft. The average daily solar radiation for each month was taken from a summary given for the state of Texas in a report by Hall (8) that cites the data for Austin. These data are given in langley's per day (cal per cm² per day) and were converted to MJ per m² per day (1 MJ per m² = 88.06 BTU per sq.ft). The calendar day number is that for the 15th of each month.

The calculated values for the monthly ETP from turf are plotted in Figure 1, as are the figures for the average monthly lake evaporation. The latter values were based on Table 4 in Bulletin 6019 for the Austin area (7C), and on the measured long term data for Lake Travis, from TWDB Publication 64, referred to above. The measured values for Lake Travis have been displaced by one month to bring them in phase with the others, that are unaffected by seasonal heat storage.

Table 1. Monthly weather parameters and ETP from golf course turf in Austin

month	day	taf F	rh	dpf F	wsp MPH	dgr MJ/m2.day	etp in./mo	etp mm/day
JAN	015	49.1	0.60	35.8	9.7	10.1	2.4	2.0
FEB	046	53.2	0.59	39.4	10.2	12.8	3.0	2.7
MAR	074	60.5	0.55	44.2	10.9	15.9	4.9	4.0
APR	105	68.7	0.57	52.9	10.5	18.2	5.9	5.0
MAY	135	74.9	0.60	60.1	9.6	21.0	7.1	5.8
JUN	166	81.6	0.57	64.9	9.1	23.9	8.3	7.0
JUL	196	84.7	0.51	64.6	8.3	24.7	9.0	7.4
AUG	227	84.5	0.50	63.9	7.9	23.8	8.6	7.0
SEP	258	79.2	0.56	62.1	8.0	19.5	6.5	5.5
OCT	288	69.8	0.55	52.9	8.1	16.1	4.9	4.0
NOV	319	58.7	0.58	43.9	9.0	11.6	3.1	2.6
DEC	349	52.1	0.59	38.1	9.2	10.1	2.4	2.0
YEAR		67.2		51.9	9.2	17.3	66.1	1679

taf=air temp in F; rh=rel. hum.; dpf=dewpoint in F; wsp=windspeed; dgr=solar radiation; etp=potential evapotranspiration from golf course turf.

Table 1 shows the monthly average weather parameters as reported by the Weather Service, that is, degrees F for temperature, fraction (or percent/100) for the relative humidity, and windspeed in miles per hour. The value of the dewpoint is calculated from the temperature and the relative humidity, using standard tables, and also given in degrees F. Solar radiation is reported as ly/day (calories per cm2 per day), but these values have been converted to the unit now commonly used in meteorology, MJ per m2 per day (the US equivalent would be BTU per sq.ft. per day). 1 ly = 0.04186 MJ/m2 = 3.686 BTU/sq.ft.

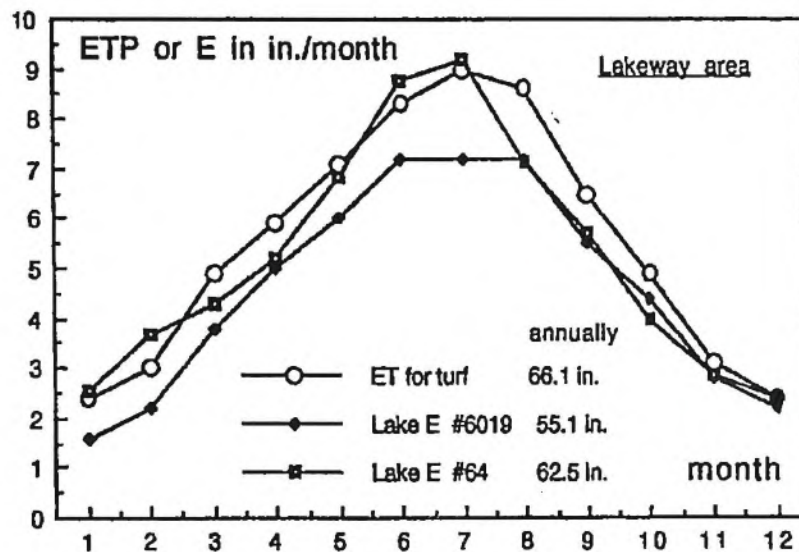
ETP is given in in. per month, this being the unit used in water balance calculations. However, we also give ETP as mm per day as most reports on measured water use by turf are now using that unit. Likewise, the annual average total is given both in inches and in mm. The RCM computations are done exclusively in metric units and converted to US units for reporting purposes.

The monthly value of ETP is based on the long-time averages for each month for solar radiation, air temperature and humidity, and windspeed, as given by the Weather Service records. However, in adjusting the value for the long-wave incoming sky radiation for the average degree of cloudiness, the monthly average value of solar radiation (dgr) is compared to its maximum possible value (mgr). The latter is not a weather parameter, but calculated from

the latitude and the sun's declination, the latter depending on the calendar day number (cdn). This calculation was made for the 15th of each month, as a close approximation of the average value for the month.

The difference, if any, has only a minor effect on the calculated effect of ETP, inasmuch as the adjustment factor varies from 1.0 for a totally clear day to 1.2 for a totally and heavily overcast day. We have calculated the value of the adjustment factor for the month of June by both methods and find that the value for the 15th is 1.026, whereas the average value for the month is 1.025. The difference could be larger for some months, but it is never significant. The cdn numbers are included in the table because they are the inputs for the calculation of mgr, but serve no other purpose.

Figure 1. Calculated ETP from turf; also, calculated and measured lake evaporation.



The difference between the estimated and the measured lake evaporation has been discussed already, as a shortcoming of the Bulletin 6019. What may be surprising is the finding that the potential evaporation from a well-watered golfcourse turf is calculated to be somewhat greater than that from a large lake such as Lake Travis. The physical explanation is that, in an arid environment, a wet surface such as open water or frequently

irrigated turf, obtains on a daily basis energy from the surrounding dry land, augmenting the solar energy driving the evaporation process. Further, this process, known as advection, increases with wind speed and with surface exposure, the latter characterized by the surface roughness parameter for heat and vapor transfer. As we indicated before, the value of this parameter for golfcourse turf is calculated as 0.5 mm. For an open water surface the corresponding value under average conditions is 0.06 mm, based on Table 5.1 in Brutsaert (9), being nearly an order of magnitude smaller and giving a decreased ET.

In contrast, in a humid climate where rainfall generally exceeds the evaporative demand, the surface loses, on a daily basis, heat to the air above it, the result being that a well-watered turf would have a smaller ET rate than open water. This was shown by Penman (1) in England, and also by Van Bavel and Harris (2) in North Carolina, the reduction being typically around 20 %. On the other hand, Van Bavel (4) found that, in Arizona, the ET rates from irrigated alfalfa were greater than those from an open water surface

In conclusion, the numbers given in Table 1 for the monthly ETP from a well-watered golfcourse turf at Lakeway are in line with those measured for nearby open water, and represent the results of a state-of-the-art method of obtaining such numbers from standard weather data, without empiricism or transfer of data from faraway regions. For the 4 winter months, the calculated total ETP is 10.9 in., which can be compared with the 5.7 in. figure from Bulletin 6019, Table 5, for alfalfa, and the corresponding evaporation from Lake Travis of 11.7 in.. Note that, during the generally wetter weather of the winter, lake evaporation is more than turf ET, as explained above.

Comparison with measured values for turf ET

The method used here to calculate ETP by the RCM approach is theoretically sound, has been experimentally verified, often using a well-watered turf in the experiments, and is widely used. Nevertheless, one should verify it with data obtained in turf grass practice and in the area of application. No systematic measurements of water use by turf have been made in the Austin area: we may, however, look at data from other places.

Water use studies by turfgrass scientists in the last two decades have generally been done with lysimeters. These can be of three types, percolation lysimeters, constant water table lysimeters, and weighable lysimeters. The first two are adequate to obtain the ET values over periods of several days or longer, whereas accurate daily ET values can only be had by daily or more frequent weighing. In all cases the methods are absolute and accurate,

provided they are made in a representative and uniform environment.

The only reported study of a turf surface, that was kept growing year around by overseeding in the winter and by constant watering, is due to Kneebone and Pepper (10). It is based on measurements made in Tucson, AZ in 1977-1979, using 1 m² constant water table lysimeters. They used three types of bermudagrass and one type of zoysiagrass, overseeded with perennial ryegrass and managed in a manner similar to that used on golfcourse fairways. They also made parallel measurements without overseeding in the winter period (November through February) from which the use of water by the overseeded turf during the winter period could be estimated. From this report, which is not greatly detailed, we can make the comparison in Table 2. The calculations were made using average monthly values for the weather parameters at the Tucson airport.

location	Tucson	Tucson
	measured	calculated
ETP	65.1 in.	67.1 in.
cool season ET	13.5 in.	13.9 in.
warm season ET	51.6 in.	53.9 in.

Table 2. Measured water use (ET) by turf, averaged over four types of turf, in Tucson and calculated values for Tucson.

The agreement between the measured and calculated values is reasonably close. The weather parameters that prevailed at the site during the study were not reported.

A major source of data on turf water use are the studies at the Turfgrass Research Field Station at College Station, all of which pertain only to the warm season and mostly to warm-season grasses. Moreover, the climate is different from that of Austin, being less warm and more humid. On the basis of the average July weather data for College Station, turf ET should be 0.83 times less there than in Austin during the summer period. All measurements of ET quoted from College Station were made with weighable lysimeters.

Kim and Beard (11) reported water use by a number of grasses in 1982 and 1984, for the months of May, August and September. The average value for three bermudagrass types, totaled for the three months of measurement and adjusted by a factor of 1.20 (1/0.83), gave an ET value of 21.5 in., which corresponds to a figure of 22.2 in. in Table 1 of this report. In a summary of water use studies by turfgrasses, Beard (12, Table 5) gives figures for the

average summer ET rates found in College Station for two varieties of St. Augustinegrass and three varieties of bermudagrass. The average ET value for the five types of turf for the months of June through August was found, after adjustment, as 31.2 in., to be compared with a calculated value of 33.0 in. for Austin.

One should have more definitive and directly measured ET values that can be used for verifying the calculated values for the Austin area. The few data that have been reported support the results given in Table 1, and the conclusion that the values obtained by the method of Bulletin 6019 are too small.

Differences in water use among turf grass species and varieties

On the Lakeway golfcourses the principal species are bermudagrass on the fairways, overseeded with perennial rye in the winter, and bentgrass or dwarf bermuda on the greens. For practical purposes we need consider only the former two types of turf that will occupy 95 % of the irrigated area.

The RCM method that is used to obtain the ETP values in Table 1 does not differentiate between grass types, other than assigning a value for the reflectance of the turf surface for solar radiation and for the roughness parameter as a function of mowing height. The literature reports a number of field experiments in which the ET rates from different turf types have been measured side by side, showing significant differences. An extensive review and summary of this work can be found in reports by Beard (12, 13, 14), from which two main relevant conclusions can be drawn, as follows.

First, there is a significant and consistent difference in ET, all other things being equal, between cool-season grasses, such as rye grass and warm-season grasses, such as the bermuda species, the former showing ET values at least 40 % more than the latter. Table 2 in reference (13) makes this fact evident. Second, there is a great deal of variation within species among the many cultivars that have been developed and tested. In fact, Beard (12) states that there appears to be as much variation within any species as there has been found between them. Data given in reference 14 (Table 1), show that a range of as much as 50% around the mean value was measured among 24 bermudagrass cultivars studied in College Station. However, Beard also points out that the available evidence is confounded with the effects of location, weather, and management, and that more and better research, preferably under controlled conditions, is needed to draw firm conclusions.

Summarizing, the ETP values calculated by the RCM procedure for Austin conditions are supported by the few available field data for bermudagrass turf. Data on overseeded perennial ryegrass are

limited to the Tucson experiments. Recent literature suggests that the ET from an overseeded turf in Austin could be greater than what we calculate, but the explanation for this fact has not been discovered, nor has a means to account for it in the calculation of ET from weather data. Measurements of water use in Central Texas by an overseeded turf are not available, but are critically needed. For now, it seems preferable to use the values as shown in Table 1, considering them as conservative estimates.

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Appendix

Potential Evapotranspiration

The potential evapotranspiration (ETP) is the maximum rate of evaporation from a vegetated surface in a given set of weather conditions. Thus, it is a different value for different types of surface, though the weather parameters are the most important in determining the value of ETP. Penman defined ETP for practical purposes as the rate of evaporation from short and well-watered grass. However, in deriving his theoretical model for calculating ETP from weather parameters, he specified that, at the entire evaporating surface, the water vapor pressure would have the saturation value, and, therefore, be determined by the temperature of that surface. The physical definition of ETP is then the rate of evaporation from a given surface that is covered with a thin layer of water. Obviously, this rate cannot be exceeded. The difference between the two definitions is not measurable in the case of well-watered turf.

The principal weather factors that determine the rate of ETP are, in order of significance, the radiant energy received at the surface from sun and sky, the air temperature, the air humidity, and the wind speed. The principal properties of the surface are its reflectance for solar radiation and its aerodynamic roughness, the latter determining the intensity of the turbulent exchange of heat and water vapor between the surface and the air above it.

The actual rate of evapotranspiration (ET) is always less than ETP, but for a well-watered vegetal cover the difference may not be measurable, or be smaller than the errors made in estimating the surface parameters and in measuring the weather parameters. In the case of a typical golf course turf, which is generally frequently watered so as to maintain a quality surface, and that is also mowed quite close, ET and ETP are essentially the same. Only if there was a soil moisture deficit, would ET decline below the ETP value. Also,

if turf becomes dormant, or is not fully established in the case of overseeding, for example, ET would be less than ETP.

In verifying the numerous variations of the Penman method, agricultural climatologists and micrometeorologists have typically used a turf field that was well watered. Such tests have been made over the past 40 years in different continents and in various climates: humid, arid, continental, maritime, and tropical. They demonstrate that the physical model estimates the ETP value with an accuracy that is adequate for engineering purposes, such as 5-10%, over periods as short as one hour, but also as long as one month, or one week. In making predictions, one can base the ETP estimate on average weekly or monthly values of weather parameters for a given locality.

Disposal of Effluent by Irrigation of Cedars (*Juniperus ashei*)

Cornelius van Bavel - May 6, 1993

1. Availability and utilization of a stand of cedar trees on the 85-acre tract at Lakeway.

Based on a personal examination of the 85-acre tract at Lakeway on March 25, 1993 and from available aerial photographs, it appears that at least 50 acres are in a contiguous and complete tree cover, mostly cedars. The remaining acreage is either incompletely covered, but shows many small cedar trees, or it has a slope exceeding 10 %. An up-to-date aerial photo and a topographical map are available. This remaining area could still be used if needed, but at a lower application rate, based on a lower value for the ET rate. Using the numbers on ETP for cedar and for the readily available acreage, a water balance can be calculated by the mandated procedures, using a part of the 85-acre tract to supplement the presently used 118 acres of fairways on the Yaupon golf course.

The cedars in question are Ashe junipers (*Juniperus ashei*), according to the documentation by Simpson (1). This species is similar to the Eastern red cedar (*Juniperus virginiana*), which occurs in all the Eastern states, the approximate dividing line being the Balcones fault. However, in the Hill Country the two species appear to have hybridized to a large extent.

Occurring mostly on eroded and relatively infertile soils, in a semi-arid climate, the cedar grows slowly, but has a competitive advantage over other tree species, being a true evergreen and tolerant of drought and cold. It has little economic value, but forms a significant wildlife habitat, according to Simpson (1) and other authors. Cedars respond readily to watering and fertilization, but because of their status as an undesirable tree in the view of farmers and ranchers, very little is known about their water relations and nutrient requirements.

By irrigating cedars frequently in small doses with effluent, one can approximate the condition that defines potential evaporation, in the same manner as this is done on a golf course where the maintenance of a rapidly growing turf is essential. As shown in the following section, the value of ETP on a month by month basis can be calculated by the exact same RCM method that is used for golf course turf grass.

Disposal of sewage treatment plant effluent by forested areas is by no means unusual. In the book on land application of municipal wastewater edited by D'Itri (2), three pages (15-17) are dedicated in the introductory chapter to forested systems on which research has been carried out in the US since 1960 and in 5 central, eastern, and southern states, using a variety of tree species and sites. Slow-rate irrigation, using sprinklers is the prevailing technique of choice, the control of nitrogen as nitrate being the foremost design constraint. For small facilities (less than 0.5 MGD) minimal management of the forested area is preferable. The

winter dormancy of trees limits the practicality of forest disposal in many areas, but this does not apply in Central Texas when cedar trees are used.

In the same book (2), chapter 9 deals entirely with effluent disposal on tree stands, citing tests in Michigan with Scotch pine, white spruce, and balsam fir, at irrigation rates of 0.4 in./day. In Table I, Chapter 11 results are shown on nutrient retention by a forested system in which the annual hydraulic load was about three times the annual ET. As one might expect, only 20% of the applied N was retained, in contrast to 95% of the P load. It was concluded that forested systems are particularly effective if removal of phosphorus is the prime objective, even if the percolation discharge is relatively high.

A summary report of research at Penn State by Sopper (3) comes to the following conclusion: "Twelve years of research have indicated that the living filter system for renovation and conservation of municipal waste water is feasible and that the combinations of agronomic and forested areas provide the greatest flexibility in operation. Such a system is more adaptable to small cities and suburbs because of the availability of open land close to the wastewater treatment plant ..." (Italics added).

Cole et al. (4) gave a review of disposal of wastewater and of sludge on forests and present the results of a 6-year study of the use of an established Douglas fir stand in Washington state. This forest was irrigated during the entire year with 2 in. per week of waste water from the city of Seattle. The forest received 200 lbs of N per year, of which 90% was retained. Phosphorus was entirely removed through its chemical immobilization by the soil. In their conclusions they point out that "... (for) the lack of adequate information and understanding... some municipalities have been reluctant to select forests for this use." (Italics added).

In the 1981 EPA manual for land treatment of municipal wastewater (5), 7 operational forest disposal systems in the US are cited (Table 4-9), varying from 19.5 MGD to 0.01 MGD. These sites include the use of loblolly pine, slash pine, red pine, balsam fir, hemlock, and spruce. In Table 4-10, red cedar is listed as a species that responds well to irrigation with wastewater. In the same manual a relative comparison is given of crop categories and species. All forest crops are classified as high water users and good nitrogen users, the latter in comparison with turf, which was rated as an excellent user of nitrogen.

In summary, disposal of municipal wastewater by a forest can be effective and practical when the design of the system is adapted to the site and its climate, while it also complies with the regulations on hydraulic loading and nutrient removal.

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2. Potential ET from a stand of cedar trees in the Austin area.

As an introduction, reference is made to the Appendix of the report "Evapotranspiration (ET) of Golf Course Turf in the Austin, TX area". The evapotranspiration by a cedar stand differs from that by a fairway turf, under the same weather conditions, for the following reasons. One, the reflectivity of such a stand for incoming solar radiation is less, hence the absorbed radiant energy is greater. Second, the aerodynamic roughness coefficient of such a stand is much larger, hence the dissipation of the evaporated water is more rapid, as is the rate of extraction of heat by the evaporating and cooler foliage from the warmer air that flows over the stand and that originates from surrounding areas that are not being irrigated. This is known as the "oasis" or the "clothesline" effect. It can be accurately calculated as shown by Van Bavel in 1966 (1), and it was demonstrated dramatically by Van Bavel et al. in 1963 (2). The latter reported an evaporation rate of 0.58 in./day from an isolated stand of Sudangrass about 3 feet high, whereas the rate from a similar 2 acre field was found as 0.38 in./day.

With regard to the reflectivity from the cedar stand on the 85 acre tract at Lakeway, the following. In our calculations of the ET rate from fairway turf, a value of 20% was used for the reflectivity. No data for a cedar stand have been found. Campbell (3) in his textbook cites a value of 16% for coniferous woodland. In the monograph on evaporation by Brutsaert (4) a range is given of 10-15% for coniferous forests. Aerial photographs of the area in question clearly show the darker shade of the cedar brakes as compared with the irrigated and green golfcourse fairways. We have adopted a conservative value of 15 % in calculating the ET rate from a cedar brake.

In respect to the aerodynamic roughness, we have to rely again on values measured or assigned to forest stands similar to the cedar brakes at Lakeway. Fichtl and McVehil (5) made measurements at Cape Canaveral, Florida of vegetation 3 to 6 feet high, and found a value for the roughness coefficient (ZOT in our equations and measured in meters) of 0.20 m. For tree stands 30 to 45 feet

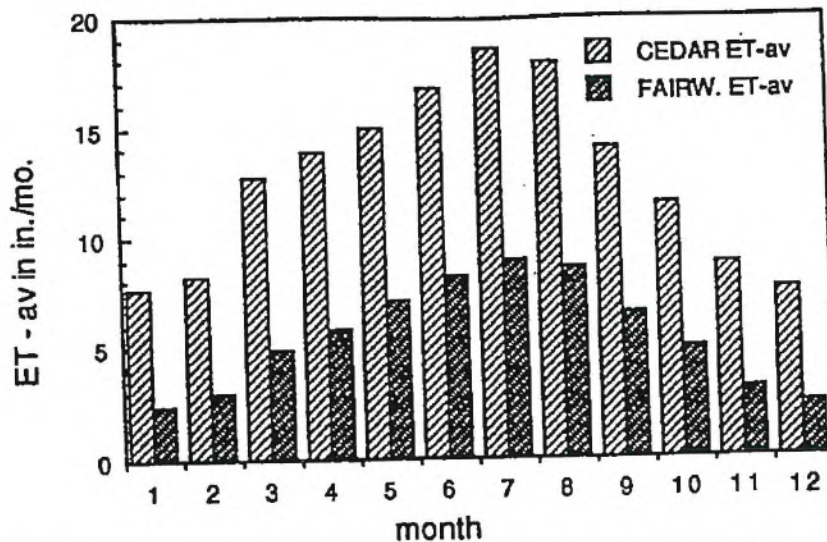
high, they measured values from 0.40 to 0.70 m. Campbell (3) gives an empirical formula for the roughness coefficient as $ZOT = 0.026 \cdot H$, in which H is the average height of the vegetation in m. For a fairway turf mowed at 3/4 in., $ZOT = 0.0005$ m which is the value we used to compute ET from well-watered turf. For the cedar brakes on the Lakeway tract we use a conservative value of 0.12 m ($0.026 \cdot 15 \cdot 0.305$), based on an average estimated tree height of 15 feet. To be further on the conservative side, we added the height of the tree stand to the elevation above the terrain at which the windspeed was recorded by the Weather Service, resulting in a value of 11.29 m for the parameter ZOM in our equations.

Using these physical characteristics for an area covered principally with cedars and that is continually kept well-watered by either rain or overhead irrigation, we find the values shown in the table below. These are calculated from the average monthly weather parameters as recorded for Austin, TX. In the table we show also the values calculated previously for fairway turf.

Table 1. Calculated monthly average ETP for a well-watered cedar brake and for a fairway turf at Lakeway, Texas, using the RCM method.

MONTH	cedar brake in./month	fairway turf in./month
JAN	7.66	2.40
FEB	8.26	3.00
MAR	12.74	4.90
APR	13.95	5.90
MAY	14.94	7.10
JUN	16.83	8.30
JUL	18.66	9.00
AUG	17.95	8.60
SEP	13.98	6.50
OCT	11.46	4.90
NOV	8.76	3.10
DEC	7.56	2.40
YEAR	152.75 in.	66.10 in.

Obviously, there is a great difference between the ETP values for the fairway turf and that of the cedar brakes, as can be seen from the following figure.



Monthly ETP in in. from a well-watered fairway turf and from a well-watered stand of cedars, both in the Austin, TX area. The data are based on average monthly weather parameters.

One might well ask why a cedar forest can evaporate so much more water than short grass. To a large extent this reflects the definition of potential evaporation, which is the maximum rate at which water can evaporate from a vegetated surface and which assumes that the entire canopy is wet at all times. This condition will be closely approximated if the tree stand is being irrigated frequently and in small dosages on dry days, which would require application of the water from above. Much of this water will be intercepted by the vegetation, thus fully exposing it to the drying action of the atmosphere above and within the canopy.

Numerous studies have shown that the fraction of intercepted rain (or overhead irrigation) by a forest is quite large. For example, in Chapter 5C by Benecke in the book "Water and Plant Life" (6), the interception by two types of coniferous tree stands of a 0.25 in. rain is given as ranging between 30 and 50 %. During the winter months in Austin, a daily dose of from 0.20 to 0.25 in. on rainless days would supply the evaporative demand as shown in Table 1 above. The water applied would be partially retained by the canopy, the remainder reaching the soil surface, to be absorbed first by the soil and next by the cedar roots, to be ultimately transpired by the leaves. In his book "Vegetation and Hydrology", Penman (7) gives in Table 7 a figure of 55% interception from a 0.2 in. rainfall on a spruce forest. He comments that "Most of the intercepted water is re-evaporated, and becomes part of the evaporation term in the hydrological balance sheet."

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3. Nutrient Uptake and Requirements of Cedar Trees.

Since no specific data on the uptake and requirements for N, P, and K by cedar trees are available, an estimate will be made based on what is known about other evergreen coniferous trees. Even this type of data are not abundant for the US, because economic interest in fertilization of forests is minimal. Further, such data as have been published reflect the fact that, typically, forest exist on the less fertile sites and are not fertilized nor irrigated. Such conditions result in low apparent nutrient requirements.

Wells and Jorgenson (1) measured the nutrient requirements of loblolly pine in a 16-year old stand in North Carolina. Their findings show the following, with the ratio of P and K to N in parentheses:

N	104 lbs./ac./yr.	(1.00)
P	18 lbs./ac./yr.	(0.17)
K	58 lbs./ac./yr.	(0.26)

They also measured the leaching losses from this stand, which were 1 lbs./ac./yr. or less, hence insignificant. These data are gross underestimates of the requirements that would exist if the stand were irrigated with wastewater. However, they realistically suggest the ratios between the three major nutrient elements.

In a review of the nutrient cycling of 36 forest sites around the world, Cole and Rapp (2) show the nutrient cycling average for 17 coniferous forests in the temperate zone (Table 6.8). These data, again, are of direct value only as an estimate of the relative requirements, as follows:

N	41 lbs./ac./yr.	(1.00)
P	5 lbs./ac./yr.	(0.12)
K	25 lbs./ac./yr.	(0.61)

Another possible indication of the nutrient requirements of conifers are the fertilizer recommendations for new plantings in the US. For loblolly pines in the Southeast, Allen (3) states that the common after-planting rates are 150-200 lbs. of N/ac., and 40-50 lbs. of K/ac. These numbers provide limited information about sustained requirements.

In its Process Design Manual, EPA (4) shows in Table 4-12 for the annual nitrogen uptake of fully stocked and vigorously growing forests of conifers in the South a range of 196-285 lbs./ac./yr. For the West, the range is given as 134-223 lbs./ac./yr. We believe these numbers to more nearly represent the conditions of a cedar forest that is irrigated with municipal wastewater than the data derived from natural stands. The average of the two ranges is assumed to be applicable to a cedar stand in Central Texas and comes to 209 lbs./ac./yr. of N. Since the manual gives no data on P and K, we have used the average ratios for P/N and K/N found at natural sites to give the following values for the annual nutrient requirement of a cedar stand irrigated with wastewater:

N	209 lbs./ac./yr.
P	30 lbs./ac./yr.
K	122 lbs./ac./yr.

In the application of these numbers in the nutrient balance calculation it must be remembered that any apparent overload of phosphorus will not show up in the groundwater, as it will be adsorbed almost entirely by the soil in the root zone. In fact, the trees must compete with this process which tends to reduce the P content of the soil solution to below 1 mg/l. In contrast, an overload of N and K could affect the ground water, but only if there were a significant hydraulic overload, which the design of the entire system will prevent.

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Appendix

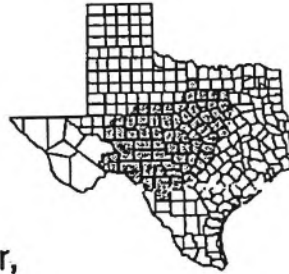
Description of the Ashe Juniper, from Simpson, A Field Guide to Texas Trees.

Texas Trees

Juniperus ashei

Ashe Juniper

(Mountain Cedar,
Rock Cedar, Post Cedar,
Mexican Juniper, Break Cedar,
Texas Cedar, Sabino)



Ashe Juniper occurs on limestone soils that were part of an ancient reef more than 60 million years old. The juniper ranges from the southern Ozarks in Arkansas and Missouri, down through the Arbuckle Mountains in Oklahoma, and into Texas, where it approximately marks the eastern edge of the Balcones Escarpment fault line. It then crosses the Pecos River into Terrell County and northern Mexico. Here it forms great thickets and drifts. When the Edwards Plateau was first settled, Ashe Juniper occupied only the stoniest, steepest hillsides and the heads of canyons, places where they were not destroyed by fires. After the settlers stopped the fires, Ashe Juniper began to colonize the lands.

Ashe Juniper is a small, many-stemmed tree growing to 38 feet in height. The bark comes off in long, narrow strips that are used for nest material by the golden-cheeked warbler. The leaves are minutely saw-toothed and smell like cedar. Male and female flowers are borne on separate trees, and the large blue berrylike cones are eagerly eaten by wildlife. The heartwood of this species makes excellent fence posts. Ashe Juniper is closely related to *Juniperus monosperma* in west Texas, but they do not overlap in distribution. Some authors believe that Ashe Juniper hybridizes with *J. virginiana*, but generally *J. virginiana* flowers later.

APPENDIX C

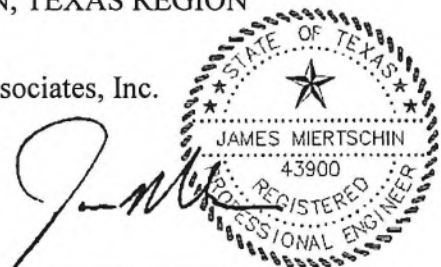
ESTIMATION OF TOTAL EVAPOTRANSPIRATION LOSS FROM CANOPY IRRIGATION PROJECT IN WOODED TERRAIN IN THE AUSTIN, TEXAS REGION

TECHNICAL MEMORANDUM

**ESTIMATION OF TOTAL EVAPOTRANSPIRATION LOSS FROM CANOPY IRRIGATION
PROJECT IN WOODED TERRAIN IN THE AUSTIN, TEXAS REGION**

FROM: James Miertschin, Ph.D., P.E., James Miertschin & Associates, Inc.
George Ward, Ph.D., University of Texas

DATE: 16 October 2013



10/16/2013

Background

Cornelius H.M. van Bavel (1993) prepared an analysis of evapotranspiration loss from canopy irrigation of cedar trees that was originally employed in a permit amendment application for Lakeway Municipal Utility District (TLAP Permit No. 11495-001). The van Bavel monthly ET estimates are shown in Table 1. Texas Commission on Environmental Quality (TCEQ) staff accepted the van Bavel ET estimates in that proceeding, and the same canopy estimates may have been referenced in subsequent permit applications. The van Bavel ET estimates for cedar canopy irrigation are significantly higher in magnitude than typical ET estimates for turf irrigation. Dr. van Bavel attributed the enhanced ET to the canopy interception of applied irrigation water and its subsequent evaporation.

Table 1
Cedar Canopy Evapotranspiration Estimates
(Cornelius van Bavel, 1993)

	<i>Cedar Canopy Evapotranspiration (inches)</i>
Jan	7.38
Feb	8.23
Mar	12.77
Apr	13.95
May	14.91
Jun	16.83
Jul	18.66
Aug	17.92
Sep	13.95
Oct	11.81
Nov	8.73
Dec	7.53
Annual	152.67

The Las Ventanas Land Partners, Ltd holds a TCEQ permit (TLAP No. 14534-001) in the same general area as the Lakeway facility, and that entity plans to move forward with an amendment application to finalize the parameters for a proposed cedar canopy irrigation system.

Discussions with TCEQ staff have indicated a desire to “update” the van Bavel ET estimates, primarily to determine if more recent studies have been completed or methodologies developed that would serve to confirm or modify the earlier ET estimates. That was therefore the objective of the present analysis. Ideally, the analysis would enable re-creation of the van Bavel methodology and perhaps a breakdown of the overall ET into compartments of typical cover crop evapotranspiration loss and enhanced evaporative loss from canopy interception.

Proposed Application Data Needs

The total monthly evapotranspiration loss is to be estimated for a canopy irrigation project over a cedar (Ashe juniper) brake in the Austin area. We assume average meteorology as defined by the 1981-2010 normals for Camp Mabry (Austin). Typical parameters are also needed to describe the proposed canopy application system. For the purposes of this analysis, it is assumed that an irrigation application rate of 0.2 inches per hour will be targeted. A hypothetical canopy irrigation schedule was developed to estimate the available days for irrigation application, taking into consideration the typical number of rain days and high wind days. This schedule is subjective, in that actual days of application may vary to accommodate local conditions, however, it does provide an indication of the prospects for successful application. The hypothetical irrigation schedule is shown in Appendix A.

Methodology

There are two components to the total evapotranspiration rate that need to be quantified:

- (1) the evapotranspiration from soil moisture, which is lost to the atmosphere through physical evaporation from the soil surface, and plant transpiration, in which soil moisture is taken up by plant roots, conveyed up the stem system and transferred to the atmosphere from the leaf surfaces (this component would be typical of conventional turf or cover crop irrigation systems).
- (2) water from the irrigation system intercepted by the canopy and evaporated into the atmosphere.

Evapotranspiration component (1) above, can be estimated by the standardized equation for short reference crop evapotranspiration (ET) as presented by the Task Committee of Hydrology (1996) and the Task Committee on Standardization of Reference Evapotranspiration (2005) of the

American Society of Civil Engineers, which is based on the Penman-Monteith equation for potential evapotranspiration. The resulting reference ET is multiplied by a crop coefficient appropriate for a general conifer forest to obtain the estimated ET for cedar trees. This methodology is in fact similar to that employed by van Bavel in his earlier work. Dr. van Bavel arrived at his overall estimates of ET by including the effect of the canopy on the vertical wind profile (aerodynamic roughness), with higher absorption of solar radiation (lower albedo), in lieu of a crop coefficient.

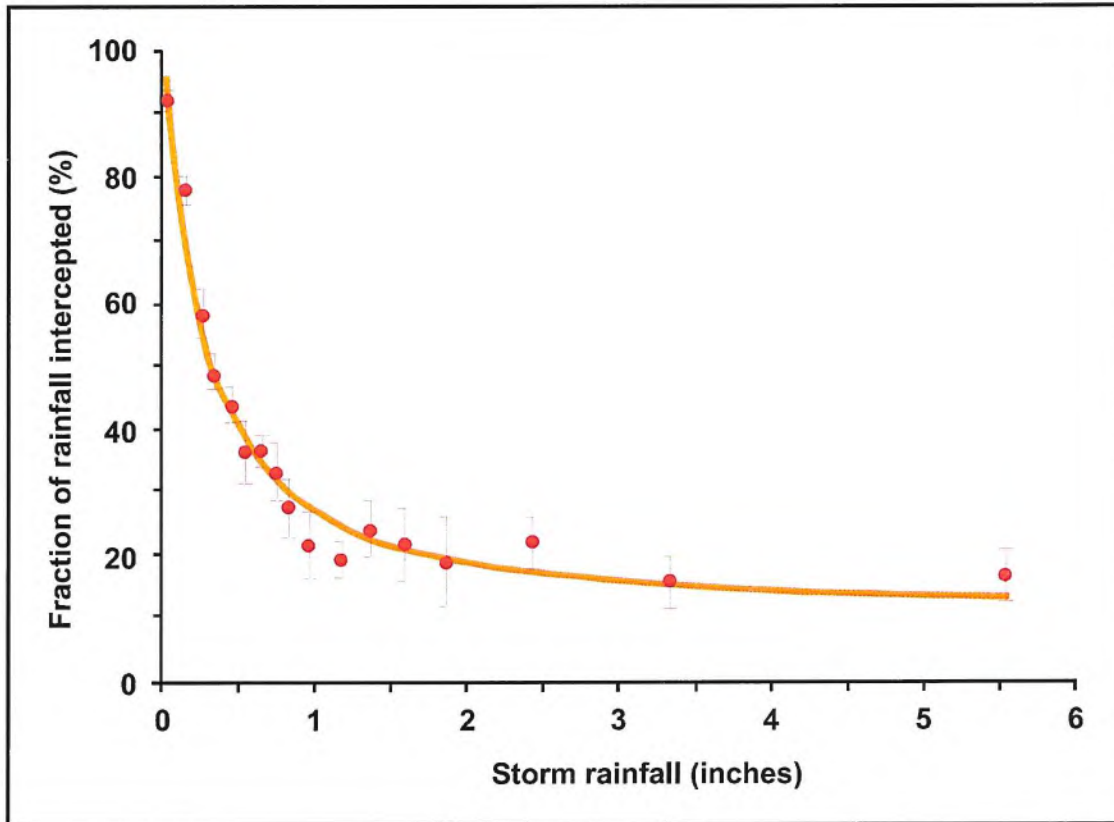


Figure 1 - Interception in ashe juniper canopy as a function of total storm rainfall,
re-drawn from Owens and Lyons (2004)

Canopy-interception evaporation, component (2) of the total evapotranspiration, can be estimated from the field studies of Ashe juniper rainfall dynamics conducted by Owens and Lyons (2004) in Texas, in which instrumented trees along the Balcones Fault zone were monitored for three years, and water budgets closed for about 2700 storms. This appears to be the best available information for actual interception losses of rainfall falling on a stand of cedar. For small storm rainfall rates, less than or equal to 0.2 inches, they found more than 80% of the rainfall to be intercepted by the canopy and evaporated back to the atmosphere, see Figure 1. This is an important factor in the present evaluation, since the proposed irrigation of cedar canopy would be accomplished by frequent dosing at low application rate.

Details of the methodology for application of the Penman-Monteith formula are given in a separate memorandum (Ward, 2013).

Results

Estimated soil-water ET values for each calendar month were calculated using the ASCE standardized reference equation (Penman-Monteith formula) and are summarized in the first two columns of Table 2. This is component (1) of the overall evapotranspiration calculation, and is entirely climatologically controlled. The calculations are based upon *daily* values of 30-year normal meteorological parameters, for which the elements of the surface heat budget were computed, including ET, then averaged monthly. This is determined from the ASCE reference ET multiplied by a crop coefficient of 1.0 for a conifer forest (Ward, 2013). Two values are given for the standardized reference ET estimate each month in Table 2: the first includes the standard corrections for cloud cover, and the second assumes clear-sky conditions. The first is a good estimate for an average ET, while the second may be of more utility in estimating a “reasonable” maximum value.

Table 2
Evapotranspiration Estimates for Cedar Canopy Irrigation
(Average Historical Austin Meteorological Conditions)

	Standardized Reference Evapotranspiration (inches)		Hypothetical Canopy Application ¹	Canopy Interception ²	Canopy-interception Evaporation ³	Total Evapotranspiration ⁴ (inches)	
	w/cloud	clear-sky	(inches)		(inches)	w/cloud	clear-sky
Jan	2.7	2.8	3.36	0.8	2.69	5.39	5.49
Feb	3.2	3.4	2.78	0.8	2.22	5.42	5.62
Mar	4.8	5.2	3.00	0.8	2.40	7.20	7.60
Apr	5.9	6.6	3.20	0.8	2.56	8.46	9.16
May	6.8	7.8	3.15	0.8	2.52	9.32	10.32
Jun	7.7	8.4	6.27	0.8	5.01	12.71	13.41
Jul	8.6	9	7.43	0.8	5.95	14.55	14.95
Aug	8.2	8.5	7.52	0.8	6.01	14.21	14.51
Sep	6.3	6.7	3.37	0.8	2.69	8.99	9.39
Oct	4.7	5	3.37	0.8	2.69	7.39	7.69
Nov	3.1	3.3	3.24	0.8	2.59	5.69	5.89
Dec	2.6	2.7	3.29	0.8	2.63	5.23	5.33
Annual	64.6	69.4	49.98		40.0	104.6	109.4

NOTES:

¹ Applications on available spray days at 0.2-inch each; historical average conditions, this number can vary according to actual needs and conditions

² Interception by tree canopy assuming applications of 0.2-inch

³ Intercepted water loss by evaporation

⁴ Total is the sum of standard ET plus enhanced canopy evaporative loss

For canopy interception evaporation rate, component (2) of the total evapotranspiration value, the seasonal irrigation application pattern in inches per month is multiplied by 0.8, a representative value from Fig. 1 for the low application rate specified. (For even lower rates, this

interception factor would be higher, and for higher rates applied less frequently, a lower value would be used, see Fig. 1.)

The total ET for the cedar canopy irrigation system is the sum of component (1) and component (2). The total ET values are shown in the final two columns of Table 2, and values are presented for cloud correction and clear sky conditions.

It is the conclusion of this analysis that the total evapotranspiration monthly values for historical cloudy conditions would be appropriate for use in evaluation of a proposed cedar canopy irrigation system. It is observed from Table 2 that the total evapotranspiration estimate is 104.6 inches on an annual basis. This estimated evapotranspiration rate can vary, depending upon the actual irrigation schedule which will be dictated by local conditions and needs, and the number of acres under irrigation. The estimated value of 104.6 inches is well below the earlier van Bavel ET estimate for canopy irrigation, which totaled 152 inches (see Table 1). There are several uncertainties encountered in an attempt to replicate the original van Bavel results. First, it is unclear what period of meteorological data was utilized by van Bavel. In addition, it is unclear precisely what aerodynamic roughness and albedo were utilized by van Bavel to account for the enhanced canopy loss, and the frequency of irrigation application that he assumed is unknown. These factors contribute to the difference in ET from the present analysis compared to the original van Bavel analysis. The present analysis also had the benefit of cedar interception data that could be applied.

References

- Owens, M. K., and R. K. Lyons, 2004: *Evaporation and interception water loss from juniper communities on the Edwards Aquifer recharge area*. Final Report to Upper Guadalupe River Authority, Texas Agricultural Experiment Station and Texas Cooperative Extension, Texas A&M University, College Station.
- Task Committee on Hydrology, 1996: *Hydrology Handbook*. Manual 28, Manuals and Reports on Engineering Practice, American Society of Civil Engineers. New York: ASCE.
- Task Committee on Standardization of Reference Evapotranspiration, 2005: *The ASCE standardized reference evapotranspiration equation*. Environmental and Water Resources Institute, American Society of Civil Engineers.
- Van Bavel, C.H.M., 1993: *Disposal of effluent by irrigation of cedars (Juniperus ashei)*. Professor Emeritus, Texas A&M University, College Station, TX.

Ward, G. H., 2013: *Terrestrial water budget for estimating irrigation water demand for wooded terrain in the Austin, Texas region*. Technical Memorandum (unpublished).

APPENDIX A

Table A-1 provided on the next page illustrates a hypothetical irrigation application schedule for the proposed canopy irrigation system. This analysis looks at the total number of days in a typical year and considers that a certain number of days may not be suitable for canopy irrigation due to rainfall or high wind (even this exclusion is subjective, since rainfall may be of short-term duration and wind speed will vary throughout the day). With these assumptions, the number of days available for canopy irrigation can be estimated. Next, the analysis assumes a specific number of 0.2-inch applications per day; for most months, it is assumed that this dose will be delivered once per day, but for summer months, it is assumed that this dose can be applied twice per day. This number of doses can then be extrapolated to a total number of inches applied per month. An irrigation area is postulated in the table, which enables calculation of the volume of effluent applied monthly in acre-feet. This acreage is a variable in the analysis, and it is a parameter that is suitable for phasing during actual implementation of the system. The irrigation application schedule confirms that it is feasible to apply the needed volume of effluent, given the assumptions on number of days available, number of doses, and number of acres. Each of those variables could be modified during actual operation of a system.

Table A-1: Hypothetical Irrigation Application Schedule

HYPOTHETICAL CANOPY IRRIGATION SCHEDULE - AVERAGE CONDITIONS

Month	Total Days	Rain Days ¹	Average Wind >15 mph ²	Wind Days/mo	Rest Days ³ (2/wk)	Available Days ⁴ Spray Days	No. of 0.2-in doses/day ⁵	Application per Month ⁶ Inches	Feet	Irrigation Acres ⁷	Sprayed ⁸ (ac-ft/mo)
Jan	31	3.5	0.06	1.86	8.86	16.78	1	3.36	0.28	85	23.78
Feb	28	3.86	0.08	2.24	8.00	13.90	1	2.78	0.23	85	19.69
Mar	31	4.64	0.08	2.48	8.86	15.02	1	3.00	0.25	85	21.28
Apr	30	3.61	0.06	1.8	8.57	16.02	1	3.20	0.27	85	22.69
May	31	4.82	0.05	1.55	8.86	15.77	1	3.15	0.26	85	22.34
Jun	30	4.86	0.03	0.9	8.57	15.67	2	6.27	0.52	85	44.39
Jul	31	3.25	0.01	0.31	8.86	18.58	2	7.43	0.62	85	52.65
Aug	31	3.04	0.01	0.31	8.86	18.79	2	7.52	0.63	85	53.25
Sep	30	4	0.02	0.6	8.57	16.83	1	3.37	0.28	85	23.84
Oct	31	4.07	0.04	1.24	8.86	16.83	1	3.37	0.28	85	23.85
Nov	30	3.75	0.05	1.5	8.57	16.18	1	3.24	0.27	85	22.92
Dec	31	3.82	0.06	1.86	8.86	16.46	1	3.29	0.27	85	23.32
Annual								49.98	4.16		354.01

NOTES:

- ¹ Number of rain days from NWS records, 1985 -2012, Austin Camp Mabry
- ² Wind speed from NWS records, averaged, cumulative frequency distribution for daily average; 15 mph assumed threshold not to be exceeded.
Data record 1999 - 2013, Austin Bergstrom
- ³ Rest days projected at 2 per week, could be more or less.
- ⁴ Available days for effluent application, excluding rain days, wind days (though may overlap with rain), and rest days.
- ⁵ Estimated number of 0.2-inch applications per day, nominally 1 or 2, and can vary.
- ⁶ Potential total effluent applied per unit area, inches and feet; actual values could be less due to limitations or effluent availability.
- ⁷ Area to be irrigated; use 60-100 ac as a nominal value for this variable.
- ⁸ Total effluent volume sprayed. Target for disposal is 352.8 ac-ft/yr (0.315 MGD).

ATTACHMENT T

Turf Grass Technical Report for Irrigation Disposal/Water Balance

(Domestic Worksheet 3.1, Section 1A)

Following is a revised Technical Report for the Live Oak Golf Course Irrigation Disposal/Water Balance. While the intent of this permit application is to combine and maintain all previously approved and permitted Final permit conditions, as detailed in Attachment B, Lakeway MUD's last submittal of the water balance was in 1999 and hydrologic conditions have since changed. **This submittal updates hydrology and provides a daily balance that more accurately reflects storage requirements.**

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Technical Memorandum

Date: March 15, 2024
To: Earl Foster, LMUD General Manager
Prepared By: Christianne Castleberry, P.E.
Project: LMUD S-5 WRP TLAP Permit Amendment
Subject: S-5 WRP Live Oak Golf Course Irrigation Disposal



Lakeway MUD (LMUD) provides wastewater treatment service to district residents and businesses and to some out-of-district customers through agreements. LMUD operates two water recycling plants (WRP), the S-4 WRP and the S-5 WRP. Both the S-4 and S-5 WRPs are permitted as no discharge systems via a Texas Land Application Permit (TLAP) with effluent requirements compliant with TCEQ standards for Type 1 reclaimed water (RCW), and all effluent from the plants is used for irrigation.

The S-5 WRP provides service to both in district customers on the west side of the district and to some out-of-district customers, in addition to wholesale service to Travis County Municipal Utility District No. 12 (TCMUD 12; RN 104372941). The S-5 WRP system and, specifically, the Live Oak Golf Course which comprises 117 acres of existing turf grass land disposal area currently permitted for RCW irrigation required by the S-5 WRP TLAP is the focus of this memorandum.

S-5 WRP TLAP

The purpose of the proposed current 2024 permit amendment is to reflect the complete transfer of the existing TCMUD 12 wastewater permit WQ0014534001 (planned treatment capacity and cedar tract irrigation that has not yet been implemented) to the existing LMUD S-5 WRP permit WQ0011495006. TCMUD 12 area current and future wastewater flows are provided by LMUD wholesale service. To reflect the permit transfer, this amendment proposes to combine and maintain all previously approved and permitted Final permit conditions, including treatment facility capacity, reclaimed water storage volume, irrigation application rate, and irrigation disposal sites. This merging of permits results in a total combined Final Phase treatment capacity of 1.03 MGD, treated effluent storage capacity of 233 acre-feet (76 MG) and surface irrigation of 301 acres at the unchanged maximum application rate of 3.83 acre-feet per year per acre irrigated. See Attachment B, Basis of Permit Amendment, for more detail.

Given that the 117 acres of Live Oak Golf Course turf grasses have already been permitted under LMUD's existing permit (0.4 MGD, Existing/Interim I Phase) for over 20 years and no additional turf grass irrigation is proposed for future phases, this memorandum only serves to reissue the water balance with updates to hydrologic conditions and a daily balance that more accurately reflects storage requirements.

Turf Grass Irrigation Disposal Balance

A daily water balance was performed for the 0.4 MGD permit portion of turf grass irrigation in this amendment to determine the allowable application rates under climatological conditions, and to determine the required storage volumes under design conditions. The balance was performed according to the general methods prescribed in 30 TAC §309.20(b), but on a daily basis using the previously permitted reclaimed water application rate of 3.83 ft/ac/yr for turf grasses. A summary of Water & Storage Balance Calculations is attached for reference.

Irrigation Area - Live Oak Golf Course

The turf grass irrigation areas are identified in permit Attachments E and F. This turf grass irrigation area, comprising 117 acres of the Live Oak Golf Course, is currently permitted for the S-5 WRP Existing/Interim I Phase facility flow of 0.4 MGD. The remaining irrigation disposal needed for future permit phases is also currently permitted (via TCMUD12 WQ0014534001 permit transfer) and the technical report for that cedar tract irrigation disposal is addressed separately in Attachment S.

Rainfall

The National Weather Service gage in Austin, Texas at Camp Mabry provides a long history of rainfall in the area. Historical data from the National Climactic Data Center at this site is readily available from 1938 to 2022. This average data was also compared to monthly precipitation for 1940 to 2022 as determined by the Texas Water Development Board (TWDB) for quadrangles 709 and 710 in which Lakeway is located. Lakeway MUD also has two rain gages located at their facilities, one each on the west and east sides of Lakeway, that have recorded daily data from 2001 to current. The Lakeway precipitation records since 2001 more closely compare to the TWDB records and are regularly lower than values recorded at the Camp Mabry gage.

For purposes of a daily evaluation and conservatism, Lakeway MUD daily records from the single wettest year (occurring in 2004) are used for evaluation. This data is specific and more accurate to the Lakeway area. To ensure representation of at least the 25-year return period, these records

were compared to Camp Mabry's return period rainfall which was determined by ranking annual total rainfall and assigning a frequency using the Weibull plotting position. For Camp Mabry, 2004 data is much more conservative than the 25-year return period and is representative as a 42.5-year return period annually. A listing of the ranked rainfall data, adjustment ratios, and a frequency plot are attached. The total annual rainfall for 2004 in Lakeway was 44.8 inches.

Precipitation for an average year on a daily basis was developed using long-term monthly records, ensuring that the relative pattern applicable to the 2004 wettest year is maintained such that it would be appropriate for the water and storage balance evaluations. This was done by distributing actual monthly average records according to the same daily pattern throughout the year, with adjustment for the actual average rain days per month. Resulting average daily precipitation, alongside the 2004 daily precipitation data, is attached. The total annual average rainfall is 31.6 inches.

Net Evaporation

Monthly evaporation data for 1954 to 2022 determined by the Texas Water Development Board for quadrangles 709 and 710 was used in the balance computations. Gross evaporation values for 2004, distributed among days without rain, were used with actual 2004 daily precipitation to develop 2004 daily net low evaporation values. The lowest net evaporation for 2004 was 18.2 inches.

Evaporation for an average year on a daily basis was developed similar to average precipitation records, ensuring that a relative pattern to the 2004 daily net evaporation data is maintained and applicable for the water and storage balance calculations. This was done by distributing the monthly average net evaporation, calculated from average gross evaporation and precipitation records, according to the same daily 2004 pattern throughout the year with adjustment for the actual average rain days per month. Resulting average net evaporation, alongside the 2004 daily low net evaporation data, is attached.

Evapotranspiration

Monthly average values for potential evapotranspiration (ET) of turf grasses in the Austin area were calculated by Dr. Cornelius van Bavel, past Professor Emeritus of Soil Physics and Environmental Agronomy at Texas A&M University. These calculations were based on the recursive combination method (RCM) which is an implementation of the widely accepted Penman equation. Documentation on this method was prepared by Dr. van Bavel and is included with this attachment.

The water balance considers ET values for turf grasses developed by Dr. van Bavel. The total annual ET of the turf grasses is 66.10 inches. Daily values were derived from distributing monthly

sums according to the predicted rate of change and only on days without rain, for conservatism. Resulting evapotranspiration for turf grasses, alongside the 2004 daily rainfall pattern, is attached for reference.

Runoff

Runoff is computed using the SCS method set forth in Hydrology Engineering Handbook - Volume 4, Hydrology:

where:

Q = runoff in inches

P = Rainfall in inches

CN = Curve Number; Varies based on Antecedent Moisture Condition

The SCS curve number was chosen based on soil types, ground cover, and soil moisture conditions. Soils in the turf areas primarily consist of clays, clay loams and sandy clay. These soils are classified as Group C soils. For Group C soils with good grass cover, curve 74 is representative of runoff potential under Type II antecedent moisture conditions for the turf areas. For cumulative rains greater than a day, a curve number of 88 is used to reflect Type III antecedent moisture conditions.

Leaching

Required leaching (L) is based on the equation:

$$L = Ce / (C1 - Ce) * (ET - Ri)$$

where

Ce= Electrical conductivity of effluent= 0.78 millimhos/cm

C1= Maximum allowable electrical conductivity of soil solution

= 8 millimhos/cm (for Bermudagrass)

ET = Evapotranspiration in inches

Ri =Infiltrated Rainfall =S₋₁ Net Soil Storage, if >0

Irrigation Efficiency

Sprinkler irrigation is used to distribute reclaimed water over the land surface for all irrigation areas. An efficiency of 85%, according to the 30 TAC §309.20(b) Table 1, was assumed for this application method.

Maximum Allowable Application Rate

Based on the daily water balance analyses and average conditions, the maximum allowable annual irrigation rate for the turf areas is approximately 59.8 inches (See attached Water Balance, page 4 of 8, Average Conditions Maximum Allowable Loading Analysis (Turf)). However, the proposed average annual application rate of 45.96 inches is below this value.

Accumulated Storage Requirements

Currently the District has a reclaimed water storage of 38 MG available in the I-5 Pond. See Attachment O for a description of reclaimed water storage for the system.

The calculated storage required is 29.0 MG which equates to 72.5 days of storage based on the 0.40 MGD average annual design flow of the S-5 Water Recycling Plant (See attached Storage Volume Requirements, page 5 of 8). The existing available 38 MG pond volume of the system provides 95 days storage for the S-5 WRP Existing/Interim I Phase 0.4 MGD capacity. The excess volume of 9.0 MG gives the system further flexibility for future capacity expansion and/or to reduce irrigation application during the winter months, thereby maximizing irrigation application during the summer months.

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S-5 SYSTEM - TURF APPLICATION - Daily Methodology Revised Water Balance Calcs for Rainfall Accumulation w/Available Water Capacity (AWC) Max

TURF IRRIGATION INPUT		
S-5 Turf Irrigation Area =	117	ACRES
I-5 Pond Surface =	6.5	ACRES
Sprinkler Efficiency (k) =	0.85	(permit)
Effluent Conductance (Ce) =	0.78	MMHOS/CM
Max. Conductance (CI) =	8.0	MMHOS/CM
Curve Number (CN; AMCI) =	74	First Day
Curve Number (CN; AMCII) =	88	Next Days S>0.5"
Max Avail. Water Capacity (AWC) =	1.26	NRCS BID

System Design Flow			
Flow Rate (Q) =	0.40 MGD 45.92 in/ac		
Application Rate			
Turf	(ft/ac)	(in/ac)	(mgd)
	3.83	45.96	0.400

AVERAGE CONDITIONS MAXIMUM ALLOWABLE LOADING ANALYSIS (Turf)

(Units are inches/acre of irrigated land unless otherwise noted)

Month	Average Precipitation	Average Runoff	Average Infiltrated Rainfall	Evapotrans- piration	Net Soil Storage $S_{actual} \leq AWC$	Total Water Deficit	Required Leaching	Total Water Needs	Effluent Needed in Root Zone	Ave Net Evaporation Pond Surface	Evaporation per Irrigation Area	Max Effluent to be Applied to Land	Consumption from Reservoir
	(inches)	(inches)	(inches)	(inches)	(inches)		(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
(1)	(2)	(3)	(4)	(5)	$S_{(i)} - (4)-(5); AWC_{max}$ (5a)	$(5)-(5a)_{-1}; if > 0$ (5b)	$C_e / (C_e + Ce) * (5b)$ (6)	$(5)+(6)$ (7)	$(5b)+(6)$ (8)	(9)	$(9)*(PS/A)$ (9a)	$(8)/K$ (10)	$(9)+(10)$ (11)
1/1/2004	0.00	0.000	0.000	0.08	0.00	0.08	0.01	0.09	0.09	0.03	0.002	0.11	0.11
1/2/2004	0.00	0.000	0.000	0.08	0.00	0.08	0.01	0.09	0.09	0.03	0.002	0.11	0.11
1/3/2004	0.00	0.000	0.000	0.08	0.00	0.08	0.01	0.09	0.09	0.03	0.002	0.11	0.11
1/4/2004	0.00	0.000	0.000	0.09	0.00	0.09	0.01	0.09	0.09	0.03	0.002	0.11	0.11
1/5/2004	0.00	0.000	0.000	0.09	0.00	0.09	0.01	0.10	0.10	0.03	0.002	0.11	0.11
1/6/2004	0.00	0.000	0.000	0.09	0.00	0.09	0.01	0.10	0.10	0.03	0.002	0.11	0.12
1/7/2004	0.00	0.000	0.000	0.09	0.00	0.09	0.01	0.10	0.10	0.03	0.002	0.12	0.12
1/8/2004	0.00	0.000	0.000	0.09	0.00	0.09	0.01	0.10	0.10	0.03	0.002	0.12	0.12
1/9/2004	0.00	0.000	0.000	0.09	0.00	0.09	0.01	0.10	0.10	0.03	0.002	0.12	0.12
1/10/2004	0.00	0.000	0.000	0.09	0.00	0.09	0.01	0.10	0.10	0.03	0.002	0.12	0.12
1/11/2004	0.00	0.000	0.000	0.09	0.00	0.09	0.01	0.10	0.10	0.03	0.002	0.12	0.12
1/12/2004	0.00	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.002	0.00	0.00
1/13/2004	0.00	0.000	0.000	0.09	0.00	0.09	0.01	0.11	0.11	0.03	0.002	0.12	0.13
1/14/2004	0.00	0.000	0.000	0.10	0.00	0.10	0.01	0.11	0.11	0.03	0.002	0.13	0.13
1/15/2004	0.43	0.000	0.432	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
1/16/2004	0.59	0.060	0.531	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
1/17/2004	1.40	0.508	0.889	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
1/18/2004	0.00	0.000	0.000	0.10	1.16	0.00	0.00	0.10	0.00	0.03	0.002	0.00	0.00
1/19/2004	0.00	0.000	0.000	0.10	1.06	0.00	0.00	0.10	0.00	0.03	0.002	0.00	0.00
1/20/2004	0.00	0.000	0.000	0.10	0.96	0.00	0.00	0.10	0.00	0.03	0.002	0.00	0.00
1/21/2004	0.00	0.000	0.000	0.10	0.86	0.00	0.00	0.10	0.00	0.03	0.002	0.00	0.00
1/22/2004	0.00	0.000	0.000	0.10	0.76	0.00	0.00	0.10	0.00	0.03	0.002	0.00	0.00
1/23/2004	0.00	0.000	0.000	0.10	0.66	0.00	0.00	0.10	0.00	0.03	0.002	0.00	0.00
1/24/2004	0.00	0.000	0.000	0.00	0.66	0.00	0.00	0.00	0.00	0.03	0.002	0.00	0.00
1/25/2004	0.00	0.000	0.000	0.10	0.56	0.00	0.00	0.10	0.00	0.03	0.002	0.00	0.00
1/26/2004	0.00	0.000	0.000	0.11	0.45	0.00	0.00	0.11	0.00	0.03	0.002	0.00	0.00
1/27/2004	0.00	0.000	0.000	0.11	0.34	0.00	0.00	0.11	0.00	0.03	0.002	0.00	0.00
1/28/2004	0.00	0.000	0.000	0.11	0.24	0.00	0.00	0.11	0.00	0.03	0.002	0.00	0.00
1/29/2004	0.00	0.000	0.000	0.11	0.13	0.00	0.00	0.11	0.00	0.03	0.002	0.00	0.00
1/30/2004	0.10	0.000	0.096	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
1/31/2004	0.00	0.000	0.000	0.11	0.11	0.00	0.00	0.11	0.00	0.03	0.002	0.00	0.00
Subtotal	2.52	0.57	1.95	2.40			0.12	2.52	1.28	0.77	0.04	1.51	1.55
2/1/2004	0.00	0.000	0.000	0.12	0.00	0.01	0.00	0.12	0.01	0.04	0.002	0.01	0.01
2/2/2004	0.00	0.000	0.000	0.12	0.00	0.12	0.01	0.14	0.14	0.04	0.002	0.16	0.16
2/3/2004	0.00	0.000	0.000	0.13	0.00	0.13	0.01	0.14	0.14	0.04	0.002	0.17	0.17
2/4/2004	0.09	0.000	0.086	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
2/5/2004	0.44	0.019	0.424	0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
2/6/2004	0.00	0.000	0.000	0.13	0.38	0.00	0.00	0.13	0.00	0.04	0.002	0.00	0.00
2/7/2004	0.00	0.000	0.000	0.14	0.24	0.00	0.00	0.14	0.00	0.04	0.002	0.00	0.00
2/8/2004	0.00	0.000	0.000	0.14	0.10	0.00	0.00	0.14	0.00	0.04	0.002	0.00	0.00
2/9/2004	0.05	0.000	0.047	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
2/10/2004	0.27	0.000	0.273	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
2/11/2004	0.74	0.121	0.623	0.00	1.04	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
2/12/2004	0.00	0.000	0.000	0.15	0.90	0.00	0.00	0.15	0.00	0.04	0.002	0.00	0.00
2/13/2004	0.00	0.000	0.000	0.15	0.75	0.00	0.00	0.15	0.00	0.04	0.002	0.00	0.00
2/14/2004	0.11	0.000	0.107	0.00	0.86	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
2/15/2004	0.00	0.000	0.000	0.15	0.70	0.00	0.00	0.15	0.00	0.04	0.002	0.00	0.00
2/16/2004	0.00	0.000	0.000	0.16	0.54	0.00	0.00	0.16	0.00	0.04	0.002	0.00	0.00
2/17/2004	0.00	0.000	0.000	0.16	0.38	0.00	0.00	0.16	0.00	0.04	0.002	0.00	0.00
2/18/2004	0.00	0.000	0.000	0.17	0.22	0.00	0.00	0.17	0.00	0.04	0.002	0.00	0.00
2/19/2004	0.00	0.000	0.000	0.17	0.05	0.00	0.00	0.17	0.00	0.04	0.002	0.00	0.00
2/20/2004	0.00	0.000	0.000	0.17	0.00	0.13	0.01	0.19	0.14	0.04	0.002	0.17	0.17
2/21/2004	0.00	0.000	0.000	0.18	0.00	0.18	0.02	0.20	0.20	0.04	0.002	0.23	0.24
2/22/2004	0.00	0.000	0.000	0.18	0.00	0.18	0.02	0.20	0.20	0.04	0.002	0.24	0.24
2/23/2004	0.00	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.002	0.00	0.00
2/24/2004	0.79	0.002	0.784	0.00	0.78	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
2/25/2004	0.04	0.000	0.037	0.00	0.82	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
2/26/2004	0.00	0.000	0.000	0.19	0.63	0.00	0.00	0.19	0.00	0.04	0.002	0.00	0.00
2/27/2004	0.00	0.000	0.000	0.19	0.44	0.00	0.00	0.19	0.00	0.04	0.002	0.00	0.00
2/28/2004	0.00	0.000	0.000	0.20	0.25	0.00	0.00	0.20	0.00	0.04	0.002	0.00	0.00
2/29/2004	0.35	0.000	0.355	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
Subtotal	2.88	0.14	2.74	3.00			0.08	3.08	0.83	0.72	0.04	0.98	1.02
3/1/2004	0.00	0.000	0.000	0.23	0.37	0.00	0.00	0.23	0.00	0.06	0.003	0.00	0.00
3/2/2004	0.00	0.000	0.000	0.23	0.14	0.00	0.00	0.23	0.00	0.06	0.003	0.00	0.00
3/3/2004	0.07	0.000	0.075	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
3/4/2004	0.07	0.000	0.071	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
3/5/2004	0.32	0.002	0.317	0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
3/6/2004	0.00	0.000	0.000	0.23	0.37	0.00	0.00	0.23	0.00	0.06	0.003	0.00	0.00
3/7/2004	0.00	0.000	0.000	0.24	0.14	0.00	0.00	0.24	0.00	0.06	0.003	0.00	0.00
3/8/2004	0.00	0.000	0.000	0.24	0.00	0.10	0.01	0.25	0.12	0.06	0.003	0.14	0.14
3/9/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.27	0.27	0.06	0.003	0.32	0.32
3/10/2004	0.00	0.000	0.000	0.25	0.00	0.25	0.03	0.27	0.27	0.06	0.003	0.32	0.33
3/11/2004	0.00	0.000	0.000	0.25	0.00	0.25	0.03	0.28	0.28	0.06	0.003	0.33	0.33
3/12/2004	0.00	0.000	0.000	0.25	0.00	0.25	0.03	0.28	0.28	0.06	0.003		

AVERAGE CONDITIONS MAXIMUM ALLOWABLE LOADING ANALYSIS (Turf)

(Units are inches/acre of irrigated land unless otherwise noted)

Month	Average Precipitation	Average Runoff	Average Infiltrated Rainfall	Evapotrans- piration	Net Soil Storage $S_{actual} \leq AWC$	Total Water Deficit	Required Leaching	Total Water Needs	Effluent Needed in Root Zone	Ave Net Evaporation Pond Surface	Evaporation per Irrigation Area	Max Effluent to be Applied to Land	Consumption from Reservoir
(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
(1)	(2)	(3)	(4)	(5)	$S_{(10)} + (4) - (5); AWC_{max}$ (5a)	$(5) - (5a); i, if > 0$ (5b)	$C_e / (C_e - 1) * (5b)$ (6)	(5)+(6) (7)	(5b)+(6) (8)	(9)	$(9) * (PS/A)$ (9a)	$(8)/K$ (10)	$(9)/(10)$ (11)
3/23/2004	0.00	0.000	0.000	0.27	0.00	0.18	0.02	0.29	0.20	0.06	0.003	0.23	0.24
3/24/2004	0.02	0.000	0.018	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
3/25/2004	0.12	0.000	0.124	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
3/26/2004	0.00	0.000	0.000	0.27	0.00	0.13	0.01	0.29	0.14	0.06	0.003	0.17	0.17
3/27/2004	0.00	0.000	0.000	0.28	0.00	0.28	0.03	0.31	0.31	0.06	0.003	0.36	0.36
3/28/2004	0.00	0.000	0.000	0.28	0.00	0.28	0.03	0.31	0.31	0.06	0.003	0.36	0.37
3/29/2004	0.00	0.000	0.000	0.28	0.00	0.28	0.03	0.31	0.31	0.06	0.003	0.37	0.37
3/30/2004	0.00	0.000	0.000	0.29	0.00	0.29	0.03	0.32	0.32	0.06	0.003	0.37	0.38
3/31/2004	0.00	0.000	0.000	0.29	0.00	0.29	0.03	0.32	0.32	0.06	0.003	0.38	0.38
Subtotal	1.46	0.01	1.45	4.90			0.31	5.21	3.16	1.17	0.06	3.72	3.78
4/1/2004	0.00	0.000	0.000	0.27	0.00	0.27	0.03	0.30	0.30	0.07	0.004	0.35	0.35
4/2/2004	0.00	0.000	0.000	0.27	0.00	0.27	0.03	0.30	0.30	0.07	0.004	0.35	0.36
4/3/2004	0.08	0.000	0.081	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
4/4/2004	0.00	0.000	0.000	0.27	0.00	0.19	0.02	0.29	0.21	0.07	0.004	0.25	0.25
4/5/2004	0.25	0.000	0.254	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
4/6/2004	1.49	0.575	0.916	0.00	1.17	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
4/7/2004	0.00	0.000	0.000	0.27	0.90	0.00	0.00	0.27	0.00	0.07	0.004	0.00	0.00
4/8/2004	0.00	0.000	0.000	0.27	0.62	0.00	0.00	0.27	0.00	0.07	0.004	0.00	0.00
4/9/2004	0.00	0.000	0.000	0.27	0.35	0.00	0.00	0.27	0.00	0.07	0.004	0.00	0.00
4/10/2004	0.00	0.000	0.000	0.28	0.07	0.00	0.00	0.28	0.00	0.07	0.004	0.00	0.00
4/11/2004	0.36	0.000	0.360	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
4/12/2004	0.00	0.000	0.000	0.28	0.16	0.00	0.00	0.28	0.00	0.07	0.004	0.00	0.00
4/13/2004	0.00	0.000	0.000	0.28	0.00	0.12	0.01	0.29	0.13	0.07	0.004	0.16	0.16
4/14/2004	0.00	0.000	0.000	0.28	0.00	0.28	0.03	0.31	0.31	0.07	0.004	0.36	0.37
4/15/2004	0.00	0.000	0.000	0.28	0.00	0.28	0.03	0.31	0.31	0.07	0.004	0.37	0.37
4/16/2004	0.00	0.000	0.000	0.28	0.00	0.28	0.03	0.31	0.31	0.07	0.004	0.37	0.37
4/17/2004	0.00	0.000	0.000	0.28	0.00	0.28	0.03	0.31	0.31	0.07	0.004	0.37	0.37
4/18/2004	0.00	0.000	0.000	0.28	0.00	0.28	0.03	0.32	0.32	0.07	0.004	0.37	0.37
4/19/2004	0.00	0.000	0.000	0.29	0.00	0.29	0.03	0.32	0.32	0.07	0.004	0.37	0.38
4/20/2004	0.00	0.000	0.000	0.29	0.00	0.29	0.03	0.32	0.32	0.07	0.004	0.37	0.38
4/21/2004	0.00	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.004	0.00	0.00
4/22/2004	0.00	0.000	0.000	0.29	0.00	0.29	0.03	0.32	0.32	0.07	0.004	0.38	0.38
4/23/2004	0.00	0.000	0.000	0.29	0.00	0.29	0.03	0.32	0.32	0.07	0.004	0.38	0.38
4/24/2004	0.32	0.000	0.325	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
4/25/2004	0.00	0.000	0.000	0.00	0.32	0.00	0.00	0.00	0.00	0.07	0.004	0.00	0.00
4/26/2004	0.05	0.000	0.045	0.00	0.37	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
4/27/2004	0.00	0.000	0.000	0.29	0.08	0.00	0.00	0.29	0.00	0.07	0.004	0.00	0.00
4/28/2004	0.00	0.000	0.000	0.29	0.00	0.21	0.02	0.32	0.24	0.07	0.004	0.28	0.28
4/29/2004	0.44	0.000	0.438	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
4/30/2004	0.00	0.000	0.000	0.29	0.14	0.00	0.00	0.29	0.00	0.07	0.004	0.00	0.00
Subtotal	2.99	0.58	2.42	5.90			0.39	6.29	4.02	1.53	0.08	4.73	4.81
5/1/2004	0.14	0.000	0.143	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
5/2/2004	0.00	0.000	0.000	0.00	0.29	0.00	0.00	0.00	0.00	0.07	0.004	0.00	0.00
5/3/2004	0.00	0.000	0.000	0.27	0.02	0.00	0.00	0.27	0.00	0.07	0.004	0.00	0.00
5/4/2004	0.00	0.000	0.000	0.27	0.00	0.25	0.03	0.30	0.28	0.07	0.004	0.33	0.33
5/5/2004	0.00	0.000	0.000	0.27	0.00	0.27	0.03	0.30	0.30	0.07	0.004	0.36	0.36
5/6/2004	0.00	0.000	0.000	0.28	0.00	0.28	0.03	0.31	0.31	0.07	0.004	0.36	0.37
5/7/2004	0.00	0.000	0.000	0.28	0.00	0.28	0.03	0.31	0.31	0.07	0.004	0.37	0.37
5/8/2004	0.09	0.000	0.086	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
5/9/2004	0.00	0.000	0.000	0.29	0.00	0.20	0.02	0.31	0.22	0.07	0.004	0.26	0.26
5/10/2004	0.26	0.000	0.263	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
5/11/2004	0.00	0.000	0.000	0.29	0.00	0.03	0.00	0.29	0.03	0.07	0.004	0.03	0.04
5/12/2004	0.00	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.004	0.00	0.00
5/13/2004	0.06	0.000	0.061	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
5/14/2004	0.77	0.132	0.636	0.00	0.70	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
5/15/2004	0.00	0.000	0.000	0.29	0.40	0.00	0.00	0.29	0.00	0.07	0.004	0.00	0.00
5/16/2004	0.00	0.000	0.000	0.30	0.11	0.00	0.00	0.30	0.00	0.07	0.004	0.00	0.00
5/17/2004	0.00	0.000	0.000	0.30	0.00	0.19	0.02	0.32	0.21	0.07	0.004	0.25	0.26
5/18/2004	0.00	0.000	0.000	0.30	0.00	0.30	0.03	0.34	0.34	0.07	0.004	0.40	0.40
5/19/2004	0.00	0.000	0.000	0.31	0.00	0.31	0.03	0.34	0.34	0.07	0.004	0.40	0.41
5/20/2004	0.00	0.000	0.000	0.31	0.00	0.31	0.03	0.35	0.35	0.07	0.004	0.41	0.41
5/21/2004	0.00	0.000	0.000	0.32	0.00	0.32	0.03	0.35	0.35	0.07	0.004	0.41	0.42
5/22/2004	0.00	0.000	0.000	0.32	0.00	0.32	0.03	0.35	0.35	0.07	0.004	0.42	0.42
5/23/2004	0.00	0.000	0.000	0.32	0.00	0.32	0.04	0.36	0.36	0.07	0.004	0.42	0.43
5/24/2004	0.00	0.000	0.000	0.33	0.00	0.33	0.04	0.36	0.36	0.07	0.004	0.43	0.43
5/25/2004	0.11	0.000	0.107	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
5/26/2004	0.00	0.000	0.000	0.33	0.00	0.22	0.02	0.36	0.25	0.07	0.004	0.29	0.30
5/27/2004	0.00	0.000	0.000	0.34	0.00	0.34	0.04	0.37	0.37	0.07	0.004	0.44	0.44
5/28/2004	0.00	0.000	0.000	0.34	0.00	0.34	0.04	0.38	0.38	0.07	0.004	0.44	0.45
5/29/2004	0.00	0.000	0.000	0.34	0.00	0.34	0.04	0.38	0.38	0.07	0.004	0.45	0.45
5/30/2004	0.00	0.000	0.000	0.35	0.00	0.35	0.04	0.38	0.38	0.07	0.004	0.45	0.46
5/31/2004	0.00	0.000	0.000	0.35	0.00	0.35	0.04	0.39	0.39	0.07	0.004	0.46	0.46
Subtotal	1.43	0.13	1.30	7.10			0.61	7.71	6.27	1.78	0.10	7.38	7.48
6/1/2004	0.00	0.000	0.000	0.45	0.00	0.45	0.05	0.50	0.50	0.11	0.006	0.59	0.59
6/2/2004	0.00	0.000	0.000	0.45	0.00	0.45	0.05	0.50	0.50	0.11	0.006	0.59	0.60
6/3/2004	0.05	0.000	0.047	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
6/4/2004	0.00	0.000	0.000	0.45	0.00	0.41	0.04	0.50	0.45	0.11	0.006	0.53	0.54
6/5/2004	0.00	0.000	0.000	0.45	0.00	0.45	0.05	0.50	0.50	0.11	0.006	0.59	0.60
6/6/2004	0.00	0.000	0.000	0.46	0.00	0.46	0.05	0.51	0.51	0.11	0.006	0.59	0.60
6/7/2004	0.00	0.000	0.000	0.46	0.00	0.46	0.05	0.51	0.51	0.11	0.006	0.60	0.60
6/8/2004	0.80	0.002	0.794	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
6/9/2004	0.92	0.207	0.710	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
6/10/2004	1.11	0.321	0.793	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
6/11/2004	0.00	0.000	0.000	0.46	0.80	0.00	0.00	0.46	0.00	0.11	0.006	0.00	0.01
6/12/200													

AVERAGE CONDITIONS MAXIMUM ALLOWABLE LOADING ANALYSIS (Turf)

(Units are inches/acre of irrigated land unless otherwise noted)

Month	Average Precipitation	Average Runoff	Average Infiltrated Rainfall	Evapotrans- piration	Net Soil Storage $S_{actual} \leq AWC$	Total Water Deficit	Required Leaching	Total Water Needs	Effluent Needed in Root Zone	Ave Net Evaporation Pond Surface	Evaporation per Irrigation Area	Max Effluent to be Applied to Land	Consumption from Reservoir
(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
(1)	(2)	(3)	(4)	(5)	$S_{(10)} + (4) - (5); AWC_{max}$ (5a)	$(5) - (5a); \text{if } > 0$ (5b)	$C_e / (C_e - C_r) * (5b)$ (6)	(5)+(6) (7)	(5b)+(6) (8)	(9)	$(9) * (PS/A)$ (9a)	(8)/K (10)	(9)/(10) (11)
6/28/2004	0.52	0.038	0.483	0.00	1.08	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
6/29/2004	0.04	0.000	0.036	0.00	1.12	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
6/30/2004	1.04	0.279	0.765	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
Subtotal	5.32	0.85	4.47	8.30			0.73	9.03	7.48	2.09	0.12	8.80	8.91
7/1/2004	0.30	0.001	0.300	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
7/2/2004	0.00	0.000	0.000	0.40	0.86	0.00	0.00	0.40	0.00	0.09	0.005	0.00	0.00
7/3/2004	0.00	0.000	0.000	0.39	0.47	0.00	0.00	0.39	0.00	0.09	0.005	0.00	0.00
7/4/2004	0.00	0.000	0.000	0.39	0.08	0.00	0.00	0.39	0.00	0.09	0.005	0.00	0.00
7/5/2004	0.00	0.000	0.000	0.39	0.00	0.31	0.03	0.42	0.34	0.09	0.005	0.40	0.41
7/6/2004	0.00	0.000	0.000	0.38	0.00	0.38	0.04	0.43	0.43	0.09	0.005	0.50	0.51
7/7/2004	0.00	0.000	0.000	0.38	0.00	0.38	0.04	0.42	0.42	0.09	0.005	0.50	0.50
7/8/2004	0.00	0.000	0.000	0.38	0.00	0.38	0.04	0.42	0.42	0.09	0.005	0.49	0.50
7/9/2004	0.00	0.000	0.000	0.38	0.00	0.38	0.04	0.42	0.42	0.09	0.005	0.49	0.49
7/10/2004	0.00	0.000	0.000	0.37	0.00	0.37	0.04	0.41	0.41	0.09	0.005	0.49	0.49
7/11/2004	0.00	0.000	0.000	0.37	0.00	0.37	0.04	0.41	0.41	0.09	0.005	0.48	0.49
7/12/2004	0.00	0.000	0.000	0.37	0.00	0.37	0.04	0.41	0.41	0.09	0.005	0.48	0.48
7/13/2004	0.00	0.000	0.000	0.36	0.00	0.36	0.04	0.40	0.40	0.09	0.005	0.47	0.48
7/14/2004	0.00	0.000	0.000	0.36	0.00	0.36	0.04	0.40	0.40	0.09	0.005	0.47	0.47
7/15/2004	0.00	0.000	0.000	0.36	0.00	0.36	0.04	0.40	0.40	0.09	0.005	0.47	0.47
7/16/2004	0.00	0.000	0.000	0.35	0.00	0.35	0.04	0.39	0.39	0.09	0.005	0.46	0.47
7/17/2004	0.00	0.000	0.000	0.35	0.00	0.35	0.04	0.39	0.39	0.09	0.005	0.46	0.46
7/18/2004	0.00	0.000	0.000	0.35	0.00	0.35	0.04	0.39	0.39	0.09	0.005	0.45	0.46
7/19/2004	0.00	0.000	0.000	0.34	0.00	0.34	0.04	0.38	0.38	0.09	0.005	0.45	0.45
7/20/2004	0.00	0.000	0.000	0.34	0.00	0.34	0.04	0.38	0.38	0.09	0.005	0.45	0.45
7/21/2004	0.00	0.000	0.000	0.34	0.00	0.34	0.04	0.38	0.38	0.09	0.005	0.44	0.45
7/22/2004	0.00	0.000	0.000	0.34	0.00	0.34	0.04	0.37	0.37	0.09	0.005	0.44	0.44
7/23/2004	0.00	0.000	0.000	0.33	0.00	0.33	0.04	0.37	0.37	0.09	0.005	0.43	0.44
7/24/2004	0.14	0.000	0.141	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
7/25/2004	0.00	0.000	0.000	0.00	0.14	0.00	0.00	0.00	0.00	0.09	0.005	0.00	0.01
7/26/2004	0.74	0.000	0.742	0.00	0.88	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
7/27/2004	0.00	0.000	0.000	0.33	0.55	0.00	0.00	0.33	0.00	0.09	0.005	0.00	0.00
7/28/2004	0.00	0.000	0.000	0.33	0.23	0.00	0.00	0.33	0.00	0.09	0.005	0.00	0.00
7/29/2004	0.00	0.000	0.000	0.00	0.23	0.00	0.00	0.00	0.00	0.09	0.005	0.00	0.01
7/30/2004	0.11	0.000	0.106	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
7/31/2004	0.00	0.000	0.000	0.32	0.01	0.00	0.00	0.32	0.00	0.09	0.005	0.00	0.00
Subtotal	1.29	0.00	1.29	9.00			0.73	9.73	7.49	2.43	0.13	8.81	8.95
8/1/2004	0.00	0.000	0.000	0.34	0.00	0.33	0.04	0.38	0.37	0.09	0.005	0.43	0.43
8/2/2004	0.00	0.000	0.000	0.34	0.00	0.34	0.04	0.37	0.37	0.09	0.005	0.44	0.45
8/3/2004	0.00	0.000	0.000	0.34	0.00	0.34	0.04	0.37	0.37	0.09	0.005	0.44	0.44
8/4/2004	0.00	0.000	0.000	0.33	0.00	0.33	0.04	0.37	0.37	0.09	0.005	0.43	0.44
8/5/2004	0.00	0.000	0.000	0.33	0.00	0.33	0.04	0.37	0.37	0.09	0.005	0.43	0.44
8/6/2004	0.00	0.000	0.000	0.33	0.00	0.33	0.04	0.36	0.36	0.09	0.005	0.43	0.43
8/7/2004	0.00	0.000	0.000	0.33	0.00	0.33	0.04	0.36	0.36	0.09	0.005	0.42	0.43
8/8/2004	0.00	0.000	0.000	0.32	0.00	0.32	0.03	0.36	0.36	0.09	0.005	0.42	0.43
8/9/2004	0.00	0.000	0.000	0.32	0.00	0.32	0.03	0.36	0.36	0.09	0.005	0.42	0.42
8/10/2004	0.00	0.000	0.000	0.32	0.00	0.32	0.03	0.35	0.35	0.09	0.005	0.41	0.42
8/11/2004	0.00	0.000	0.000	0.32	0.00	0.32	0.03	0.35	0.35	0.09	0.005	0.41	0.42
8/12/2004	0.00	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.005	0.00	0.00
8/13/2004	0.00	0.000	0.000	0.31	0.00	0.31	0.03	0.35	0.35	0.09	0.005	0.41	0.41
8/14/2004	0.00	0.000	0.000	0.31	0.00	0.31	0.03	0.34	0.34	0.09	0.005	0.41	0.41
8/15/2004	0.00	0.000	0.000	0.31	0.00	0.31	0.03	0.34	0.34	0.09	0.005	0.40	0.41
8/16/2004	0.00	0.000	0.000	0.31	0.00	0.31	0.03	0.34	0.34	0.09	0.005	0.40	0.40
8/17/2004	0.00	0.000	0.000	0.30	0.00	0.30	0.03	0.34	0.34	0.09	0.005	0.40	0.40
8/18/2004	0.00	0.000	0.000	0.30	0.00	0.30	0.03	0.33	0.33	0.09	0.005	0.39	0.40
8/19/2004	0.00	0.000	0.000	0.30	0.00	0.30	0.03	0.33	0.33	0.09	0.005	0.39	0.39
8/20/2004	0.00	0.000	0.000	0.30	0.00	0.30	0.03	0.33	0.33	0.09	0.005	0.39	0.39
8/21/2004	1.02	0.027	0.995	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
8/22/2004	0.00	0.000	0.000	0.29	0.70	0.00	0.00	0.29	0.00	0.09	0.005	0.00	0.00
8/23/2004	0.00	0.000	0.000	0.00	0.70	0.00	0.00	0.00	0.00	0.09	0.005	0.00	0.00
8/24/2004	0.00	0.000	0.000	0.29	0.41	0.00	0.00	0.29	0.00	0.09	0.005	0.00	0.00
8/25/2004	0.00	0.000	0.000	0.29	0.12	0.00	0.00	0.29	0.00	0.09	0.005	0.00	0.00
8/26/2004	0.00	0.000	0.000	0.29	0.00	0.16	0.02	0.30	0.18	0.09	0.005	0.21	0.22
8/27/2004	0.00	0.000	0.000	0.28	0.00	0.28	0.03	0.31	0.31	0.09	0.005	0.37	0.37
8/28/2004	0.00	0.000	0.000	0.28	0.00	0.28	0.03	0.31	0.31	0.09	0.005	0.37	0.37
8/29/2004	0.00	0.000	0.000	0.28	0.00	0.28	0.03	0.31	0.31	0.09	0.005	0.36	0.37
8/30/2004	0.00	0.000	0.000	0.28	0.00	0.28	0.03	0.31	0.31	0.09	0.005	0.36	0.37
8/31/2004	0.00	0.000	0.000	0.27	0.00	0.27	0.03	0.30	0.30	0.09	0.005	0.36	0.36
Subtotal	1.02	0.03	1.00	8.60			0.82	5.42	8.41	2.63	0.15	9.90	10.05
9/1/2004	0.00	0.000	0.000	0.25	0.00	0.25	0.03	0.27	0.27	0.07	0.004	0.32	0.32
9/2/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.27	0.27	0.07	0.004	0.32	0.32
9/3/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.27	0.27	0.07	0.004	0.32	0.32
9/4/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.27	0.27	0.07	0.004	0.32	0.32
9/5/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.27	0.27	0.07	0.004	0.31	0.32
9/6/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.27	0.27	0.07	0.004	0.31	0.32
9/7/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.27	0.27	0.07	0.004	0.31	0.32
9/8/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.26	0.26	0.07	0.004	0.31	0.31
9/9/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.26	0.26	0.07	0.004	0.31	0.31
9/10/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.26	0.26	0.07	0.004	0.31	0.31
9/11/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.26	0.26	0.07	0.004	0.31	0.31
9/12/2004	0.00	0.000	0.000	0.23	0.00	0.23	0.03	0.26	0.26	0.07	0.004	0.31	0.31
9/13/2004	0.00	0.000	0.000	0.23	0.00	0.23	0.03	0.26	0.26	0.07	0.004	0.30	0.31
9/14/2004	0.20	0.000	0.200	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
9/15/2004	0.11	0.000	0.111	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
9/16/2004	0.00	0.000	0.000	0.23	0.08	0.00	0.00	0.23	0.00	0.07	0.004	0.00	0.00
9/17/200													

AVERAGE CONDITIONS MAXIMUM ALLOWABLE LOADING ANALYSIS (Turf)

(Units are inches/acre of irrigated land unless otherwise noted)

Month	Average Precipitation	Average Runoff	Average Infiltrated Rainfall	Evapotrans- piration	Net Soil Storage $S_{actual} \leq AWC$	Total Water Deficit	Required Leaching	Total Water Needs	Effluent Needed in Root Zone	Ave Net Evaporation Pond Surface	Evaporation per Irrigation Area	Max Effluent to be Applied to Land	Consumption from Reservoir
(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
(1)	(2)	(3)	(4)	(5)	$S_{(10)} + (4) - (5); AWC_{max}$ (5a)	$(5) - (5a); \text{if } > 0$ (5b)	$C_r / (C_r + C_e) * (5b)$ (6)	$(5) + (6)$ (7)	$(5b) + (6)$ (8)	(9)	$(9) * (PS/A)$ (9a)	$(8)/K$ (10)	$(9) + (10)$ (11)
10/2/2004	0.88	0.009	0.876	0.00	0.88	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
10/3/2004	0.14	0.000	0.142	0.00	1.02	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
10/4/2004	0.00	0.000	0.000	0.00	1.02	0.00	0.00	0.00	0.00	0.07	0.004	0.00	0.00
10/5/2004	0.57	0.000	0.566	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
10/6/2004	0.00	0.000	0.000	0.26	1.00	0.00	0.00	0.26	0.00	0.07	0.004	0.00	0.00
10/7/2004	0.01	0.000	0.015	0.00	1.01	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
10/8/2004	0.00	0.000	0.000	0.26	0.75	0.00	0.00	0.26	0.00	0.07	0.004	0.00	0.00
10/9/2004	0.00	0.000	0.000	0.26	0.49	0.00	0.00	0.26	0.00	0.07	0.004	0.00	0.00
10/10/2004	0.00	0.000	0.000	0.26	0.23	0.00	0.00	0.26	0.00	0.07	0.004	0.00	0.00
10/11/2004	0.00	0.000	0.000	0.25	0.00	0.02	0.00	0.26	0.02	0.07	0.004	0.03	0.03
10/12/2004	0.00	0.000	0.000	0.25	0.00	0.25	0.03	0.28	0.28	0.07	0.004	0.33	0.33
10/13/2004	0.00	0.000	0.000	0.25	0.00	0.25	0.03	0.28	0.28	0.07	0.004	0.33	0.33
10/14/2004	0.20	0.000	0.202	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
10/15/2004	0.00	0.000	0.000	0.25	0.00	0.05	0.00	0.25	0.05	0.07	0.004	0.06	0.06
10/16/2004	0.00	0.000	0.000	0.25	0.00	0.25	0.03	0.27	0.27	0.07	0.004	0.32	0.32
10/17/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.27	0.27	0.07	0.004	0.32	0.32
10/18/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.27	0.27	0.07	0.004	0.32	0.32
10/19/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.27	0.27	0.07	0.004	0.31	0.32
10/20/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.26	0.26	0.07	0.004	0.31	0.31
10/21/2004	0.00	0.000	0.000	0.24	0.00	0.24	0.03	0.26	0.26	0.07	0.004	0.31	0.31
10/22/2004	0.00	0.000	0.000	0.23	0.00	0.23	0.03	0.26	0.26	0.07	0.004	0.30	0.31
10/23/2004	0.71	0.000	0.708	0.00	0.71	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
10/24/2004	0.00	0.000	0.000	0.23	0.48	0.00	0.00	0.23	0.00	0.07	0.004	0.00	0.00
10/25/2004	0.07	0.000	0.071	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
10/26/2004	0.00	0.000	0.000	0.23	0.32	0.00	0.00	0.23	0.00	0.07	0.004	0.00	0.00
10/27/2004	1.37	0.105	1.260	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
10/28/2004	0.22	0.000	0.220	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
10/29/2004	0.00	0.000	0.004	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
10/30/2004	0.00	0.000	0.000	0.23	1.03	0.00	0.00	0.23	0.00	0.07	0.004	0.00	0.00
10/31/2004	0.00	0.000	0.000	0.22	0.81	0.00	0.00	0.22	0.00	0.07	0.004	0.00	0.00
Subtotal	4.18	0.11	4.07	4.90			0.27	5.17	2.79	1.52	0.08	3.28	3.36
11/1/2004	1.07	0.035	1.036	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
11/2/2004	0.00	0.000	0.000	0.20	1.06	0.00	0.00	0.20	0.00	0.05	0.003	0.00	0.00
11/3/2004	0.00	0.000	0.000	0.20	0.86	0.00	0.00	0.20	0.00	0.05	0.003	0.00	0.00
11/4/2004	0.00	0.000	0.000	0.19	0.67	0.00	0.00	0.19	0.00	0.05	0.003	0.00	0.00
11/5/2004	0.00	0.000	0.000	0.19	0.48	0.00	0.00	0.19	0.00	0.05	0.003	0.00	0.00
11/6/2004	0.00	0.000	0.000	0.18	0.30	0.00	0.00	0.18	0.00	0.05	0.003	0.00	0.00
11/7/2004	0.00	0.000	0.000	0.18	0.12	0.00	0.00	0.18	0.00	0.05	0.003	0.00	0.00
11/8/2004	0.00	0.000	0.000	0.18	0.00	0.05	0.01	0.18	0.06	0.05	0.003	0.07	0.07
11/9/2004	0.00	0.000	0.000	0.17	0.00	0.17	0.02	0.19	0.19	0.05	0.003	0.22	0.23
11/10/2004	0.00	0.000	0.000	0.17	0.00	0.17	0.02	0.19	0.19	0.05	0.003	0.22	0.22
11/11/2004	0.00	0.000	0.000	0.16	0.00	0.16	0.02	0.18	0.18	0.05	0.003	0.21	0.22
11/12/2004	0.00	0.000	0.000	0.16	0.00	0.16	0.02	0.18	0.18	0.05	0.003	0.21	0.21
11/13/2004	0.00	0.000	0.000	0.15	0.00	0.15	0.02	0.17	0.17	0.05	0.003	0.20	0.20
11/14/2004	1.14	0.049	1.093	0.00	1.09	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
11/15/2004	0.61	0.067	0.544	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
11/16/2004	0.26	0.000	0.258	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
11/17/2004	3.42	2.198	1.224	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
11/18/2004	0.24	0.000	0.240	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
11/19/2004	0.00	0.000	0.000	0.15	1.11	0.00	0.00	0.15	0.00	0.05	0.003	0.00	0.00
11/20/2004	0.00	0.000	0.000	0.15	0.96	0.00	0.00	0.15	0.00	0.05	0.003	0.00	0.00
11/21/2004	0.13	0.000	0.134	0.00	1.10	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
11/22/2004	0.54	0.044	0.497	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
11/23/2004	0.17	0.000	0.170	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
11/24/2004	0.00	0.000	0.000	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.003	0.00	0.00
11/25/2004	0.00	0.000	0.000	0.14	1.12	0.00	0.00	0.14	0.00	0.05	0.003	0.00	0.00
11/26/2004	0.00	0.000	0.000	0.14	0.98	0.00	0.00	0.14	0.00	0.05	0.003	0.00	0.00
11/27/2004	0.00	0.000	0.000	0.13	0.84	0.00	0.00	0.13	0.00	0.05	0.003	0.00	0.00
11/28/2004	0.00	0.000	0.000	0.13	0.71	0.00	0.00	0.13	0.00	0.05	0.003	0.00	0.00
11/29/2004	0.00	0.000	0.000	0.13	0.59	0.00	0.00	0.13	0.00	0.05	0.003	0.00	0.00
11/30/2004	0.22	0.000	0.223	0.00	0.81	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
Subtotal	7.81	2.39	5.42	3.10			0.09	3.19	0.96	1.03	0.06	1.13	1.19
12/1/2004	0.00	0.000	0.000	0.08	0.73	0.00	0.00	0.08	0.00	0.03	0.002	0.00	0.00
12/2/2004	0.00	0.000	0.000	0.08	0.64	0.00	0.00	0.08	0.00	0.03	0.002	0.00	0.00
12/3/2004	0.00	0.000	0.000	0.08	0.56	0.00	0.00	0.08	0.00	0.03	0.002	0.00	0.00
12/4/2004	0.00	0.000	0.000	0.09	0.47	0.00	0.00	0.09	0.00	0.03	0.002	0.00	0.00
12/5/2004	0.15	0.000	0.149	0.00	0.62	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
12/6/2004	0.08	0.000	0.079	0.00	0.70	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
12/7/2004	0.05	0.000	0.047	0.00	0.75	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
12/8/2004	0.00	0.000	0.000	0.09	0.66	0.00	0.00	0.09	0.00	0.03	0.002	0.00	0.00
12/9/2004	0.00	0.000	0.000	0.09	0.57	0.00	0.00	0.09	0.00	0.03	0.002	0.00	0.00
12/10/2004	0.00	0.000	0.000	0.09	0.48	0.00	0.00	0.09	0.00	0.03	0.002	0.00	0.00
12/11/2004	0.00	0.000	0.000	0.09	0.39	0.00	0.00	0.09	0.00	0.03	0.002	0.00	0.00
12/12/2004	0.00	0.000	0.000	0.09	0.30	0.00	0.00	0.09	0.00	0.03	0.002	0.00	0.00
12/13/2004	0.00	0.000	0.000	0.09	0.21	0.00	0.00	0.09	0.00	0.03	0.002	0.00	0.00
12/14/2004	0.00	0.000	0.000	0.09	0.12	0.00	0.00	0.09	0.00	0.03	0.002	0.00	0.00
12/15/2004	0.00	0.000	0.000	0.09	0.02	0.00	0.00	0.09	0.00	0.03	0.002	0.00	0.00
12/16/2004	0.00	0.000	0.000	0.10	0.00	0.08	0.01	0.10	0.08	0.03	0.002	0.10	0.10
12/17/2004	0.00	0.000	0.000	0.10	0.00	0.10	0.01	0.11	0.11	0.03	0.002	0.13	0.13
12/18/2004	0.00	0.000	0.000	0.10	0.00	0.10	0.01	0.11	0.11	0.03	0.002	0.13	0.13
12/19/2004	0.00	0.000	0.000	0.10	0.00	0.10	0.01	0.11	0.11	0.03	0.002	0.13	0.13
12/20/2004	0.00	0.000	0.000	0.10	0.00	0.10	0.01	0.11	0.11	0.03	0.002	0.13	0.13
12/21/2004	0.00	0.000	0.000	0.10	0.00	0.10	0.01	0.11	0.11	0.03	0.002	0.13	0.13
12/22/2004	0.18	0.000	0.185	0.00	0.18	0.00	0.00						

Storage Required	
9.12 inch/ac	=max (X)
89.0 acre-ft	= X in/ac * #Acres *(1120.22 acft/yr-mgd * 325851gal/acft * 1ft/12in * 1yr/365d * 1MG/1E6 gal)
This is volume required	29.0 MG = #acre-ft * (365d/yr) * (1 MGD/1120.22 acft/yr)
Existing Pond Capacity	38.0 MG = 11.95 in/ac Turf = 95.0 days storage for 0.4 MGD
Based on 0.400 MGD Ave Annual Design Flow	72.5 days = #MG/Qdesign
-9.0 MG OK-Adequate Pond Capacity	

STORAGE VOLUME REQUIREMENTS (Units are inches/acre of irrigated land unless otherwise noted)

	Total Water Needs	Effluent Received for Application from S-5	25 Year Precipitation	25 Year Runoff	Infiltrated Rainfall	Available Water	Net LOW Evap. from Pond	Net Low Pond Evap. per IA	Max Effluent Application to Turf Allowed per ET Values	Design Effluent Application to Maintain Permit Turf Application	Application Direct to Turf From Plant Discharge	Excess Effl. for Storage (per Turf A)	Storage Demand by Turf	Total Storage Demand (-) /Excess (+)	Accumul. Storage*
Month	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
	(5)+(6) (7)	(13)	(14)	(15)	(14) - (15) (16)	(13) + (16) (17)	(18)	(18)*(PS/IA) (18a)	[(7) - (16)]/k (19a)	(19a) x rate ratio (19b)	min of (13) & (19b) (19c)	(13)-(19b) (19d)	(13)-(19b) (19e)	(9d)-(19e)+(19f)-(18a) (19f)	(20)
1/1/2004	0.09	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.11	0.06	0.06	0.07	0.00	0.07	4.45
1/2/2004	0.09	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.11	0.06	0.06	0.07	0.00	0.06	4.51
1/3/2004	0.09	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.11	0.06	0.06	0.07	0.00	0.06	4.57
1/4/2004	0.09	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.11	0.06	0.06	0.06	0.00	0.06	4.64
1/5/2004	0.10	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.11	0.06	0.06	0.06	0.00	0.06	4.70
1/6/2004	0.10	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.11	0.06	0.06	0.06	0.00	0.06	4.76
1/7/2004	0.10	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.12	0.06	0.06	0.06	0.00	0.06	4.82
1/8/2004	0.10	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.12	0.06	0.06	0.06	0.00	0.06	4.88
1/9/2004	0.10	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.12	0.07	0.07	0.06	0.00	0.06	4.94
1/10/2004	0.10	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.12	0.07	0.07	0.06	0.00	0.06	4.99
1/11/2004	0.10	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.12	0.07	0.07	0.06	0.00	0.06	5.05
1/12/2004	0.00	0.125	0.01	0.000	0.01	0.13	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	5.18
1/13/2004	0.11	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.12	0.07	0.07	0.06	0.00	0.06	5.23
1/14/2004	0.11	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.13	0.07	0.07	0.06	0.00	0.05	5.29
1/15/2004	0.00	0.125	0.59	0.004	0.58	0.71	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	5.41
1/16/2004	0.00	0.125	0.81	0.152	0.66	0.78	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	5.54
1/17/2004	0.00	0.125	1.95	0.925	1.02	1.15	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	5.66
1/18/2004	0.10	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.11	0.06	0.06	0.06	0.00	0.06	5.72
1/19/2004	0.10	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.12	0.06	0.06	0.06	0.00	0.06	5.78
1/20/2004	0.10	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.12	0.06	0.06	0.06	0.00	0.06	5.84
1/21/2004	0.10	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.12	0.07	0.07	0.06	0.00	0.06	5.90
1/22/2004	0.10	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.12	0.07	0.07	0.06	0.00	0.06	5.96
1/23/2004	0.10	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.12	0.07	0.07	0.06	0.00	0.06	6.02
1/24/2004	0.00	0.125	0.10	0.000	0.10	0.23	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	6.14
1/25/2004	0.10	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.12	0.07	0.07	0.06	0.00	0.06	6.20
1/26/2004	0.11	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.12	0.07	0.07	0.06	0.00	0.06	6.25
1/27/2004	0.11	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.13	0.07	0.07	0.06	0.00	0.05	6.31
1/28/2004	0.11	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.13	0.07	0.07	0.06	0.00	0.05	6.36
1/29/2004	0.11	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.13	0.07	0.07	0.06	0.00	0.05	6.42
1/30/2004	0.00	0.125	0.11	0.000	0.11	0.24	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	6.54
1/31/2004	0.11	0.125	0.00	0.000	0.00	0.13	0.030	0.002	0.13	0.07	0.07	0.05	0.00	0.05	6.59
Subtotal	2.52	3.89	3.56	1.08	2.48	6.37	0.76	0.04	2.97	1.63	1.63	2.26	0.00		
2/1/2004	0.12	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.14	0.08	0.08	0.05	0.00	0.05	6.64
2/2/2004	0.14	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.16	0.09	0.09	0.04	0.00	0.03	6.67
2/3/2004	0.14	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.17	0.09	0.09	0.03	0.00	0.03	6.71
2/4/2004	0.00	0.125	0.12	0.116	0.00	0.13	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	6.83
2/5/2004	0.00	0.125	0.63	0.072	0.55	0.68	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	6.96
2/6/2004	0.13	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.16	0.09	0.09	0.04	0.00	0.04	6.99
2/7/2004	0.14	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.16	0.09	0.09	0.04	0.00	0.03	7.03
2/8/2004	0.14	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.17	0.09	0.09	0.03	0.00	0.03	7.06
2/9/2004	0.00	0.125	0.07	0.000	0.07	0.19	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	7.19
2/10/2004	0.00	0.125	0.39	0.032	0.35	0.48	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	7.31
2/11/2004	0.00	0.125	1.05	0.282	0.77	0.89	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	7.44
2/12/2004	0.15	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.17	0.09	0.09	0.03	0.00	0.03	7.47
2/13/2004	0.15	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.18	0.10	0.10	0.03	0.00	0.03	7.49
2/14/2004	0.00	0.125	0.15	0.103	0.05	0.17	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	7.62
2/15/2004	0.15	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.18	0.10	0.10	0.03	0.00	0.02	7.64
2/16/2004	0.16	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.19	0.10	0.10	0.02	0.00	0.02	7.67
2/17/2004	0.16	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.19	0.10	0.10	0.02	0.00	0.02	7.68
2/18/2004	0.17	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.20	0.11	0.11	0.02	0.00	0.02	7.70
2/19/2004	0.17	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.20	0.11	0.11	0.02	0.00	0.01	7.71
2/20/2004	0.19	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.22	0.12	0.12	0.00	0.00	0.00	7.71
2/21/2004	0.20	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.23	0.13	0.13	0.00	0.00	-0.01	7.71
2/22/2004	0.20	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.24	0.13	0.13	0.00	-0.01	-0.01	7.70
2/23/2004	0.00	0.125	0.02	0.000	0.02	0.14	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	7.83
2/24/2004	0.00	0.125	1.11	0.042	1.07	1.19	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	7.95
2/25/2004	0.00	0.125	0.05	0.000	0.05	0.18	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.08
2/26/2004	0.19	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.22	0.12	0.12	0.00	0.00	0.00	8.08
2/27/2004	0.19	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.23	0.12	0.12	0.00	0.00	0.00	8.08
2/28/2004	0.20	0.125	0.00	0.000	0.00	0.13	0.038	0.002	0.23	0.13	0.13	0.00	0.00	0.00	8.07
2/29/2004	0.00	0.125	0.50	0.012	0.49	0.61	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.20
Subtotal	3.08	3.64	4.07	0.66	3.41	7.05	0.71	0.04	3.62	1.99	1.98	1.66	-0.01		
3/1/2004	0.23	0.125	0.00	0.000	0.00										

STORAGE VOLUME REQUIREMENTS (Units are inches/acre of irrigated land unless otherwise noted)

Month	Total Water Needs	Effluent Received for Application from S-5 (inches)	25 Year Precipitation (inches)	25 Year Runoff (inches)	Infiltrated Rainfall (inches)	Available Water (inches)	Net LOW Evap. from Pond (inches)	Net Low Evap. per IA (inches)	Max Effluent Application to Turf Allowed per ET Values (inches)	Design Effluent Application to Turf Application (inches)	Application Direct to Turf From Plant Discharge (inches)	Excess Effl. for Storage (per Turf A) (inches)	Storage Demand by Turf (inches)	Total Storage Demand (-) /Excess (+) (inches)	Accumul. Storage* (inches)
	(5)+(6) (7)	(13)	(14)	(15)	(14) - (15) (16)	(13) + (16) (17)	(18)	(18)*(PS/IA) (18a)	[(7) - (16)]/k (19a)	(19a) x rate ratio (19b)	min of (13) & (19b) (19c)	(13)-(19b) (19d)	(13)-(19b) (19e)	add=(19a)+(19b)-(18a) (19g)	(20)
3/23/2004	0.29	0.125	0.00	0.000	0.00	0.13	0.061	0.003	0.34	0.19	0.13	0.00	-0.06	-0.06	8.87
3/24/2004	0.00	0.125	0.03	0.000	0.03	0.15	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	9.00
3/25/2004	0.00	0.125	0.18	0.093	0.08	0.21	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	9.12
3/26/2004	0.29	0.125	0.00	0.000	0.00	0.13	0.061	0.003	0.34	0.18	0.13	0.00	-0.06	-0.06	9.06
3/27/2004	0.31	0.125	0.00	0.000	0.00	0.13	0.061	0.003	0.36	0.20	0.13	0.00	-0.07	-0.08	8.98
3/28/2004	0.31	0.125	0.00	0.000	0.00	0.13	0.061	0.003	0.36	0.20	0.13	0.00	-0.07	-0.08	8.90
3/29/2004	0.31	0.125	0.00	0.000	0.00	0.13	0.061	0.003	0.37	0.20	0.13	0.00	-0.08	-0.08	8.82
3/30/2004	0.32	0.125	0.00	0.000	0.00	0.13	0.061	0.003	0.37	0.20	0.13	0.00	-0.08	-0.08	8.74
3/31/2004	0.32	0.125	0.00	0.000	0.00	0.13	0.061	0.003	0.38	0.21	0.13	0.00	-0.08	-0.09	8.66
Subtotal	5.21	3.89	2.07	0.15	1.92	5.81	1.15	0.06	6.13	3.37	2.38	1.51	-0.99		
4/1/2004	0.30	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.35	0.19	0.13	0.00	-0.07	-0.07	8.59
4/2/2004	0.30	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.35	0.19	0.13	0.00	-0.07	-0.07	8.51
4/3/2004	0.00	0.125	0.11	0.000	0.11	0.23	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.64
4/4/2004	0.29	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.34	0.19	0.13	0.00	-0.06	-0.07	8.57
4/5/2004	0.00	0.125	0.35	0.039	0.31	0.44	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.70
4/6/2004	0.00	0.125	2.10	1.046	1.05	1.18	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.82
4/7/2004	0.27	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.32	0.18	0.13	0.00	-0.05	-0.05	8.77
4/8/2004	0.27	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.32	0.18	0.13	0.00	-0.05	-0.06	8.71
4/9/2004	0.27	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.32	0.18	0.13	0.00	-0.05	-0.06	8.66
4/10/2004	0.28	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.32	0.18	0.13	0.00	-0.05	-0.06	8.60
4/11/2004	0.00	0.125	0.50	0.012	0.49	0.61	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.73
4/12/2004	0.28	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.33	0.18	0.13	0.00	-0.05	-0.06	8.67
4/13/2004	0.29	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.34	0.19	0.13	0.00	-0.06	-0.07	8.60
4/14/2004	0.31	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.36	0.20	0.13	0.00	-0.08	-0.08	8.52
4/15/2004	0.31	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.37	0.20	0.13	0.00	-0.08	-0.08	8.44
4/16/2004	0.31	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.37	0.20	0.13	0.00	-0.08	-0.08	8.36
4/17/2004	0.31	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.37	0.20	0.13	0.00	-0.08	-0.08	8.28
4/18/2004	0.32	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.37	0.20	0.13	0.00	-0.08	-0.08	8.20
4/19/2004	0.32	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.37	0.21	0.13	0.00	-0.08	-0.08	8.12
4/20/2004	0.32	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.37	0.21	0.13	0.00	-0.08	-0.08	8.03
4/21/2004	0.00	0.125	0.02	0.000	0.02	0.14	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.16
4/22/2004	0.32	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.38	0.21	0.13	0.00	-0.08	-0.09	8.07
4/23/2004	0.32	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.38	0.21	0.13	0.00	-0.08	-0.09	7.99
4/24/2004	0.00	0.125	0.45	0.020	0.43	0.56	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.11
4/25/2004	0.00	0.125	0.05	0.000	0.05	0.18	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.24
4/26/2004	0.00	0.125	0.06	0.000	0.06	0.18	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.36
4/27/2004	0.29	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.34	0.19	0.13	0.00	-0.06	-0.07	8.30
4/28/2004	0.32	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.37	0.20	0.13	0.00	-0.08	-0.08	8.21
4/29/2004	0.00	0.125	0.61	0.003	0.61	0.73	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.34
4/30/2004	0.29	0.125	0.00	0.000	0.00	0.13	0.069	0.004	0.35	0.19	0.13	0.00	-0.06	-0.07	8.27
Subtotal	6.29	3.76	4.24	1.12	3.11	6.88	1.45	0.08	7.40	4.07	2.63	1.13	-1.44		
5/1/2004	0.00	0.125	0.18	0.091	0.09	0.21	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.40
5/2/2004	0.00	0.125	0.07	0.000	0.07	0.19	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.52
5/3/2004	0.27	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.31	0.17	0.13	0.00	-0.05	-0.05	8.47
5/4/2004	0.30	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.35	0.19	0.13	0.00	-0.07	-0.07	8.40
5/5/2004	0.30	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.36	0.20	0.13	0.00	-0.07	-0.08	8.32
5/6/2004	0.31	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.36	0.20	0.13	0.00	-0.07	-0.08	8.25
5/7/2004	0.31	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.37	0.20	0.13	0.00	-0.08	-0.08	8.17
5/8/2004	0.00	0.125	0.10	0.000	0.10	0.23	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.29
5/9/2004	0.31	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.36	0.20	0.13	0.00	-0.07	-0.08	8.21
5/10/2004	0.00	0.125	0.35	0.039	0.31	0.44	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.34
5/11/2004	0.29	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.34	0.19	0.13	0.00	-0.06	-0.07	8.27
5/12/2004	0.00	0.125	0.07	0.000	0.07	0.19	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.40
5/13/2004	0.00	0.125	0.07	0.000	0.07	0.19	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.52
5/14/2004	0.00	0.125	1.07	0.291	0.77	0.90	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	8.65
5/15/2004	0.29	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.35	0.19	0.13	0.00	-0.06	-0.07	8.58
5/16/2004	0.30	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.35	0.19	0.13	0.00	-0.07	-0.07	8.51
5/17/2004	0.32	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.38	0.21	0.13	0.00	-0.08	-0.09	8.42
5/18/2004	0.34	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.40	0.22	0.13	0.00	-0.09	-0.10	8.32
5/19/2004	0.34	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.40	0.22	0.13	0.00	-0.10	-0.10	8.22
5/20/2004	0.35	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.41	0.22	0.13	0.00	-0.10	-0.10	8.12
5/21/2004	0.35	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.41	0.23	0.13	0.00	-0.10	-0.11	8.01
5/22/2004	0.35	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.42	0.23	0.13	0.00	-0.10	-0.11	7.91
5/23/2004	0.36	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.42	0.23	0.13	0.00	-0.11	-0.11	7.80
5/24/2004	0.36	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.43	0.24	0.13	0.00	-0.11	-0.11	7.68
5/25/2004	0.00	0.125	0.13	0.112	0.02	0.14	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	7.81
5/26/2004	0.36	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.42	0.23	0.13	0.00	-0.10	-0.11	7.70
5/27/2004	0.37	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.44	0.24	0.13	0.00	-0.12	-0.12	7.58
5/28/2004	0.38	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.44	0.24	0.13	0.00	-0.12	-0.12	7.46
5/29/2004	0.38	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.45	0.25	0.13	0.00	-0.12	-0.12	7.33
5/30/2004	0.38	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.45	0.25	0.13	0.00	-0.12	-0.13	7.20
5/31/2004	0.39	0.125	0.00	0.000	0.00	0.13	0.076	0.004	0.46	0.25	0.13	0.00	-0.13	-0.13	7.07
Subtotal	7.71	3.89	2.02	0.53	1.49	5.38	1.76	0.10	9.07	4.99	2.89	1.00	-2.10		
6/1/2004	0.50	0.125													

STORAGE VOLUME REQUIREMENTS (Units are inches/acre of irrigated land unless otherwise noted)

Month	Total Water Needs	Effluent Received for Application from S-5	25 Year Precipitation	25 Year Runoff	Infiltrated Rainfall	Available Water	Net LOW Pond Evap. from Pond (inches)	Net Low Pond Evap. per IA (inches)	Max Effluent Application to Turf Allowed per ET Values (inches)	Design Effluent Application to Maintain Permit Turf Application (inches)	Application Direct to Turf From Plant Discharge (inches)	Excess Effl. for Storage (per Turf A) (inches)	Storage Demand by Turf (inches)	Total Storage Demand (-) /Excess (+) (inches)	Accumul. Storage*
	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
	(5)+(6) (7)	(13)	(14)	(15)	(14) - (15) (16)	(13) + (16) (17)	(18)	(18)*(PS/IA) (18a)	[(7) - (16)]/k (19a)	(19a) x rate ratio (19b)	min of (13) & (19b) (19c)	(13)-(19b) (19d)	(13)-(19b) (19e)	8d+(19b)+(19f)-(18a) (19g)	(20)
6/28/2004	0.00	0.125	0.74	0.117	0.62	0.74	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	4.63
6/29/2004	0.00	0.125	0.05	0.000	0.05	0.18	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	4.76
6/30/2004	0.00	0.125	1.48	0.563	0.91	1.04	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	4.88
Subtotal	9.03	3.76	7.53	1.92	5.61	9.37	2.06	0.11	10.62	5.84	2.26	1.51	-3.58		
7/1/2004	0.00	0.125	0.38	0.034	0.34	0.47	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	5.01
7/2/2004	0.40	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.47	0.26	0.13	0.00	-0.13	-0.14	4.87
7/3/2004	0.39	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.46	0.25	0.13	0.00	-0.13	-0.13	4.74
7/4/2004	0.39	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.46	0.25	0.13	0.00	-0.13	-0.13	4.60
7/5/2004	0.42	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.50	0.27	0.13	0.00	-0.15	-0.15	4.45
7/6/2004	0.43	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.50	0.28	0.13	0.00	-0.15	-0.16	4.30
7/7/2004	0.42	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.50	0.27	0.13	0.00	-0.15	-0.15	4.14
7/8/2004	0.42	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.49	0.27	0.13	0.00	-0.15	-0.15	3.99
7/9/2004	0.42	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.49	0.27	0.13	0.00	-0.14	-0.15	3.84
7/10/2004	0.41	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.49	0.27	0.13	0.00	-0.14	-0.15	3.70
7/11/2004	0.41	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.48	0.26	0.13	0.00	-0.14	-0.14	3.55
7/12/2004	0.41	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.48	0.26	0.13	0.00	-0.14	-0.14	3.41
7/13/2004	0.40	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.47	0.26	0.13	0.00	-0.13	-0.14	3.27
7/14/2004	0.40	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.47	0.26	0.13	0.00	-0.13	-0.14	3.13
7/15/2004	0.40	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.47	0.26	0.13	0.00	-0.13	-0.14	3.00
7/16/2004	0.39	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.46	0.25	0.13	0.00	-0.13	-0.13	2.86
7/17/2004	0.39	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.46	0.25	0.13	0.00	-0.13	-0.13	2.73
7/18/2004	0.39	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.45	0.25	0.13	0.00	-0.12	-0.13	2.60
7/19/2004	0.38	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.45	0.25	0.13	0.00	-0.12	-0.13	2.48
7/20/2004	0.38	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.45	0.24	0.13	0.00	-0.12	-0.12	2.35
7/21/2004	0.38	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.44	0.24	0.13	0.00	-0.12	-0.12	2.23
7/22/2004	0.37	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.44	0.24	0.13	0.00	-0.12	-0.12	2.11
7/23/2004	0.37	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.43	0.24	0.13	0.00	-0.11	-0.12	1.99
7/24/2004	0.00	0.125	0.15	0.103	0.05	0.17	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	2.12
7/25/2004	0.00	0.125	0.10	0.000	0.10	0.23	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	2.24
7/26/2004	0.00	0.125	1.00	0.253	0.75	0.87	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	2.37
7/27/2004	0.33	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.39	0.21	0.13	0.00	-0.09	-0.09	2.27
7/28/2004	0.33	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.38	0.21	0.13	0.00	-0.09	-0.09	2.18
7/29/2004	0.00	0.125	0.10	0.000	0.10	0.23	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	2.31
7/30/2004	0.00	0.125	0.10	0.000	0.10	0.23	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	2.43
7/31/2004	0.32	0.125	0.00	0.000	0.00	0.13	0.096	0.005	0.38	0.21	0.13	0.00	-0.08	-0.09	2.34
Subtotal	9.73	3.89	1.83	0.39	1.44	5.32	2.40	0.13	11.45	6.29	3.14	0.75	-3.16		
8/1/2004	0.38	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.44	0.24	0.13	0.00	-0.12	-0.12	2.22
8/2/2004	0.37	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.44	0.24	0.13	0.00	-0.12	-0.12	2.10
8/3/2004	0.37	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.44	0.24	0.13	0.00	-0.11	-0.12	1.98
8/4/2004	0.37	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.43	0.24	0.13	0.00	-0.11	-0.12	1.86
8/5/2004	0.37	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.43	0.24	0.13	0.00	-0.11	-0.12	1.74
8/6/2004	0.36	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.43	0.24	0.13	0.00	-0.11	-0.11	1.63
8/7/2004	0.36	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.42	0.23	0.13	0.00	-0.11	-0.11	1.52
8/8/2004	0.36	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.42	0.23	0.13	0.00	-0.11	-0.11	1.41
8/9/2004	0.36	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.42	0.23	0.13	0.00	-0.10	-0.11	1.30
8/10/2004	0.35	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.41	0.23	0.13	0.00	-0.10	-0.11	1.19
8/11/2004	0.35	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.41	0.23	0.13	0.00	-0.10	-0.11	1.08
8/12/2004	0.00	0.125	0.09	0.000	0.09	0.21	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	1.21
8/13/2004	0.35	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.41	0.22	0.13	0.00	-0.10	-0.10	1.10
8/14/2004	0.34	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.41	0.22	0.13	0.00	-0.10	-0.10	1.00
8/15/2004	0.34	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.40	0.22	0.13	0.00	-0.10	-0.10	0.90
8/16/2004	0.34	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.40	0.22	0.13	0.00	-0.09	-0.10	0.80
8/17/2004	0.34	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.40	0.22	0.13	0.00	-0.09	-0.10	0.70
8/18/2004	0.33	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.39	0.22	0.13	0.00	-0.09	-0.10	0.61
8/19/2004	0.33	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.39	0.21	0.13	0.00	-0.09	-0.09	0.52
8/20/2004	0.33	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.39	0.21	0.13	0.00	-0.09	-0.09	0.42
8/21/2004	0.00	0.125	1.18	0.057	1.12	1.25	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.55
8/22/2004	0.29	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.35	0.19	0.13	0.00	-0.06	-0.07	0.48
8/23/2004	0.00	0.125	0.18	0.091	0.09	0.21	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.60
8/24/2004	0.29	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.34	0.19	0.13	0.00	-0.06	-0.07	0.54
8/25/2004	0.29	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.34	0.19	0.13	0.00	-0.06	-0.07	0.47
8/26/2004	0.30	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.36	0.20	0.13	0.00	-0.07	-0.08	0.39
8/27/2004	0.31	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.37	0.20	0.13	0.00	-0.08	-0.08	0.31
8/28/2004	0.31	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.37	0.20	0.13	0.00	-0.08	-0.08	0.23
8/29/2004	0.31	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.36	0.20	0.13	0.00	-0.07	-0.08	0.15
8/30/2004	0.31	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.36	0.20	0.13	0.00	-0.07	-0.08	0.07
8/31/2004	0.30	0.125	0.00	0.000	0.00	0.13	0.093	0.005	0.36	0.20	0.13	0.00	-0.07	-0.08	0.00
Subtotal	9.42	3.89	1.45	0.15	1.30	5.19	2.60	0.14	11.08	6.09	3.51	0.38	-2.58		
9/1/2004	0.27	0.125	0.00	0.000	0.00	0.13	0.069	0.000	0.32	0.18	0.13	0.00	-0.05	-0.05	0.00
9/2/2004	0.27	0.125	0.00	0.000	0.00	0.13	0.069	0.000	0.32	0.17	0.13	0.00	-0.05	-0.05	0.00
9/3/2004	0.27	0.125	0.00	0.000	0.00	0.13	0.069	0.000	0.32	0.17	0.13	0.00	-0.05	-0.05	0.00
9/4/2004	0.27	0.125	0.00	0.000	0.00	0.13	0.069	0.000	0.32	0.17	0.13	0.00	-0.05	-0.05	0.00
9/5/2004	0.27	0.125	0.00	0.000	0.00	0.13	0.069	0.000	0.31	0.17	0.13	0.00	-0.05	-0.05	0.00

STORAGE VOLUME REQUIREMENTS (Units are inches/acre of irrigated land unless otherwise noted)

Month	Total Water Needs	Effluent Received for Application from S-5	25 Year Precipitation	25 Year Runoff	Infiltrated Rainfall	Available Water	Net LOW Pond from Pond (inches)	Net Low Pond Evap. per IA (inches)	Max Effluent Application to Turf Allowed per ET Values (inches)	Design Effluent Application to Maintain Permit Turf Application (inches)	Application Direct to Turf From Plant Discharge (inches)	Excess Effl. for Storage (per Turf A) (inches)	Storage Demand by Turf (inches)	Total Storage Demand (-) /Excess (+) (inches)	Accumul. Storage*
	(5)+(6) (7)	(13)	(14)	(15)	(14) - (15) (16)	(13) + (16) (17)	(18)	(18)*(PS/IA) (18a)	[(7) - (16)]/k (19a)	(19a) x rate ratio (19b)	min of (13) & (19b) (19c)	(13)-(19b) (19d)	(13)-(19b) (19e)	add=(19e)+(19f)-(18a) (19g)	(20)
10/2/2004	0.00	0.125	1.25	0.074	1.18	1.30	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.13
10/3/2004	0.00	0.125	0.20	0.084	0.12	0.24	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.25
10/4/2004	0.00	0.125	0.01	0.000	0.01	0.14	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.38
10/5/2004	0.00	0.125	0.80	0.003	0.80	0.92	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.50
10/6/2004	0.26	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.31	0.17	0.13	0.00	-0.05	-0.05	0.45
10/7/2004	0.00	0.125	0.02	0.000	0.02	0.15	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.58
10/8/2004	0.26	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.31	0.17	0.13	0.00	-0.04	-0.05	0.53
10/9/2004	0.26	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.31	0.17	0.13	0.00	-0.04	-0.05	0.48
10/10/2004	0.26	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.30	0.17	0.13	0.00	-0.04	-0.05	0.44
10/11/2004	0.26	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.30	0.17	0.13	0.00	-0.04	-0.05	0.39
10/12/2004	0.28	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.33	0.18	0.13	0.00	-0.06	-0.06	0.33
10/13/2004	0.28	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.33	0.18	0.13	0.00	-0.05	-0.06	0.28
10/14/2004	0.00	0.125	0.29	0.056	0.23	0.35	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.40
10/15/2004	0.25	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.30	0.16	0.13	0.00	-0.04	-0.04	0.36
10/16/2004	0.27	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.32	0.18	0.13	0.00	-0.05	-0.06	0.30
10/17/2004	0.27	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.32	0.17	0.13	0.00	-0.05	-0.05	0.25
10/18/2004	0.27	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.32	0.17	0.13	0.00	-0.05	-0.05	0.20
10/19/2004	0.27	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.31	0.17	0.13	0.00	-0.05	-0.05	0.15
10/20/2004	0.26	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.31	0.17	0.13	0.00	-0.04	-0.05	0.10
10/21/2004	0.26	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.31	0.17	0.13	0.00	-0.04	-0.05	0.05
10/22/2004	0.26	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.30	0.17	0.13	0.00	-0.04	-0.05	0.01
10/23/2004	0.00	0.125	1.00	0.023	0.98	1.10	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.13
10/24/2004	0.23	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.27	0.15	0.13	0.00	-0.02	-0.03	0.10
10/25/2004	0.00	0.125	0.10	0.000	0.10	0.23	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.23
10/26/2004	0.23	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.27	0.15	0.13	0.00	-0.02	-0.03	0.20
10/27/2004	0.00	0.125	1.93	0.318	1.61	1.74	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.33
10/28/2004	0.00	0.125	0.31	0.049	0.26	0.39	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.45
10/29/2004	0.00	0.125	0.01	0.000	0.01	0.13	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.58
10/30/2004	0.23	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.27	0.15	0.13	0.00	-0.02	-0.03	0.55
10/31/2004	0.22	0.125	0.00	0.000	0.00	0.13	0.075	0.004	0.26	0.14	0.13	0.00	-0.02	-0.02	0.53
Subtotal	5.17	3.89	5.91	0.61	5.30	9.19	1.51	0.08	6.08	3.35	2.51	1.38	-0.84		
11/1/2004	0.00	0.125	1.50	0.147	1.35	1.48	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.66
11/2/2004	0.20	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.24	0.13	0.13	0.00	0.00	-0.01	0.65
11/3/2004	0.20	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.23	0.13	0.13	0.00	0.00	0.00	0.64
11/4/2004	0.19	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.23	0.12	0.12	0.00	0.00	0.00	0.64
11/5/2004	0.19	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.22	0.12	0.12	0.00	0.00	0.00	0.64
11/6/2004	0.18	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.22	0.12	0.12	0.01	0.00	0.00	0.65
11/7/2004	0.18	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.21	0.12	0.12	0.01	0.00	0.01	0.65
11/8/2004	0.18	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.21	0.12	0.12	0.01	0.00	0.01	0.66
11/9/2004	0.19	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.22	0.12	0.12	0.00	0.00	0.00	0.66
11/10/2004	0.19	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.22	0.12	0.12	0.01	0.00	0.00	0.66
11/11/2004	0.18	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.21	0.12	0.12	0.01	0.00	0.01	0.67
11/12/2004	0.18	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.21	0.11	0.11	0.01	0.00	0.01	0.68
11/13/2004	0.17	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.20	0.11	0.11	0.01	0.00	0.01	0.69
11/14/2004	0.00	0.125	1.60	0.183	1.42	1.54	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.81
11/15/2004	0.00	0.125	0.85	0.172	0.68	0.80	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	0.94
11/16/2004	0.00	0.125	0.35	0.039	0.31	0.44	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	1.06
11/17/2004	0.00	0.125	4.83	3.503	1.32	1.45	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	1.19
11/18/2004	0.00	0.125	0.33	0.045	0.28	0.40	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	1.31
11/19/2004	0.15	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.18	0.10	0.10	0.03	0.00	0.02	1.34
11/20/2004	0.15	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.17	0.09	0.09	0.03	0.00	0.03	1.37
11/21/2004	0.00	0.125	0.18	0.093	0.08	0.21	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	1.49
11/22/2004	0.00	0.125	0.75	0.124	0.63	0.75	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	1.62
11/23/2004	0.00	0.125	0.23	0.075	0.15	0.28	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	1.74
11/24/2004	0.00	0.125	0.15	0.103	0.05	0.17	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	1.87
11/25/2004	0.14	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.17	0.09	0.09	0.03	0.00	0.03	1.90
11/26/2004	0.14	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.16	0.09	0.09	0.04	0.00	0.03	1.93
11/27/2004	0.13	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.16	0.09	0.09	0.04	0.00	0.04	1.97
11/28/2004	0.13	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.15	0.08	0.08	0.04	0.00	0.04	2.00
11/29/2004	0.13	0.125	0.00	0.000	0.00	0.13	0.053	0.003	0.15	0.08	0.08	0.04	0.00	0.04	2.05
11/30/2004	0.00	0.125	0.30	0.052	0.25	0.37	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	2.17
Subtotal	3.19	3.76	11.05	4.54	6.51	10.28	1.02	0.06	3.76	2.07	2.06	1.70	-0.01		
12/1/2004	0.08	0.125	0.00	0.000	0.00	0.13	0.034	0.002	0.10	0.05	0.05	0.07	0.00	0.07	2.24
12/2/2004	0.08	0.125	0.00	0.000	0.00	0.13	0.034	0.002	0.10	0.05	0.05	0.07	0.00	0.07	2.31
12/3/2004	0.08	0.125	0.00	0.000	0.00	0.13	0.034	0.002	0.10	0.05	0.05	0.07	0.00	0.07	2.38
12/4/2004	0.09	0.125	0.00	0.000	0.00	0.13	0.034	0.002	0.10	0.06	0.06	0.07	0.00	0.07	2.45
12/5/2004	0.00	0.125	0.20	0.084	0.12	0.24	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	2.57
12/6/2004	0.00	0.125	0.10	0.000	0.10	0.23	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	2.70
12/7/2004	0.00	0.125	0.06	0.000	0.06	0.18	0.000	0.000	0.00	0.00	0.00	0.13	0.00	0.13	2.82
12/8/2004	0.09	0.125	0.00	0.000	0.00	0.13	0.034	0.002	0.10	0.06	0.06	0.07	0.00	0.07	2.89
12/9/2004	0.09	0.125	0.00	0.000	0.00	0.13	0.034	0.002	0.10	0.06	0.06	0.07	0.00	0.07	2.96
12/10/2004	0.09	0.125	0.00	0.000	0.00	0.13	0.034	0.002	0.11	0.06	0.06	0.07	0.00	0.07	3.02
12/11/2004	0.09	0.125	0.00	0.000	0.00	0.13	0.034	0.002	0.11	0.06	0.06	0.07	0.00	0.07	3.09
12/12/2004	0.09	0.125	0.00	0.000	0.00	0.13	0.034	0.002	0.11	0.06	0.06	0.07	0.00	0.06	3.15
12/13/2004	0.09	0.125	0.00	0.000											

Weibull Plotting Position
2004 Exceeds 25-year Period of Record (Annual Basis)

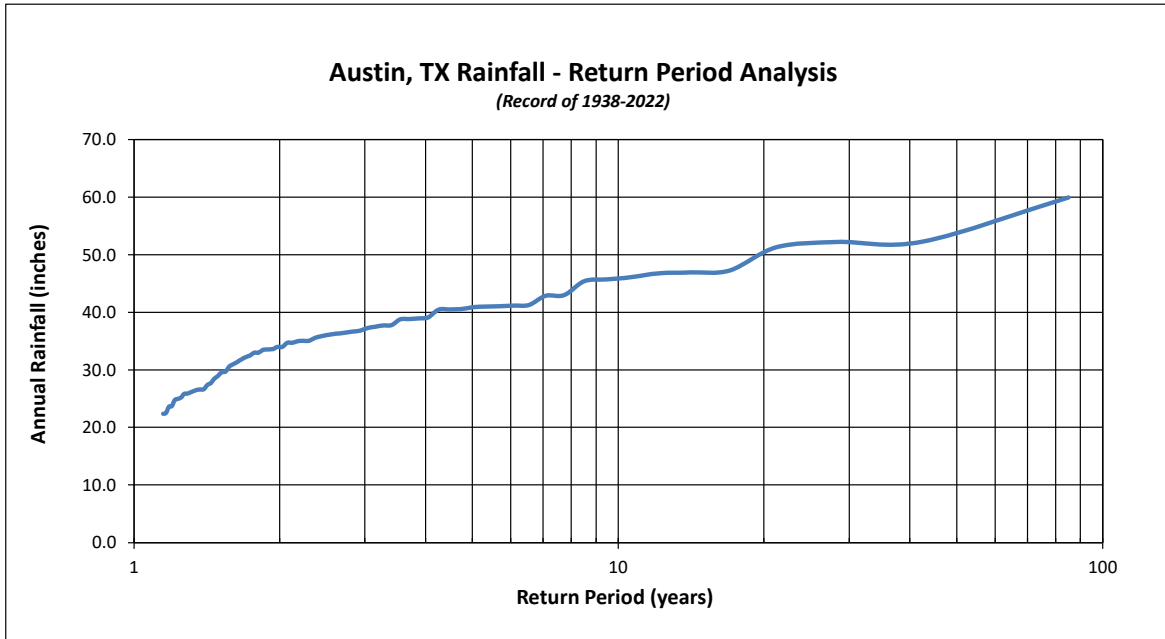
NCDC Camp Mabry, 1938 - 2022

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	RANK	FREQ	RETURN
(in.)	(in.)	(in.)	(in.)	(in.)	(in.)	(in.)	(in.)	(in.)	(in.)	(in.)	(in.)	(in.)	(in.)	(#)	(%)	(year)
2015	5.02	0.50	4.83	2.31	17.59	8.89	0.00	0.35	1.89	11.85	3.73	3.00	59.96	1	1.18%	85.00
2004	4.15	3.73	2.31	3.97	3.34	11.41	0.83	1.91	1.57	4.62	14.10	0.33	52.28	2	2.35%	42.50
1991	9.20	2.99	0.91	4.92	3.99	4.41	1.16	4.28	2.24	3.06	0.91	14.16	52.22	3	3.53%	28.33
1957	0.56	3.14	4.59	9.93	7.38	5.25	1.10	0.00	6.43	8.79	2.95	1.20	51.33	4	4.71%	21.25
1946	3.76	2.29	2.77	7.92	6.13	1.34	1.48	3.36	6.00	1.63	7.91	2.71	47.31	5	5.88%	17.00
2007	6.92	0.14	5.94	2.24	7.01	5.41	9.83	2.50	3.97	1.13	1.16	0.67	46.94	6	7.06%	14.17
1997	1.07	3.94	1.58	5.60	7.10	8.97	2.13	2.34	1.46	5.43	2.91	4.28	46.81	7	8.24%	12.14
1992	4.84	6.56	5.44	1.90	9.06	4.97	0.96	1.95	1.98	1.38	3.76	3.30	46.10	8	9.41%	10.63
1981	1.61	1.18	3.05	0.81	9.02	14.96	3.39	0.91	2.65	7.04	0.72	0.39	45.75	9	10.59%	9.44
1941	1.55	3.00	4.55	5.33	3.50	11.11	4.17	0.07	1.89	6.75	1.15	2.34	45.41	10	11.76%	8.50
1944	5.39	3.89	1.83	0.33	9.26	2.01	0.32	4.47	4.66	0.35	4.55	5.91	42.98	11	12.94%	7.73
2001	2.72	1.41	5.51	0.50	3.27	0.85	0.34	9.48	1.71	2.46	10.00	4.63	42.89	12	14.12%	7.08
1976	1.16	1.11	2.11	8.13	6.06	3.19	4.72	0.80	3.80	5.93	1.79	2.48	41.28	13	15.29%	6.54
1994	1.43	2.13	1.70	1.69	3.69	0.74	0.26	8.50	5.69	7.85	1.83	5.67	41.19	14	16.47%	6.07
1958	3.09	6.39	2.56	4.24	3.67	2.89	3.42	0.68	6.89	5.18	0.87	1.15	41.04	15	17.65%	5.67
2013	2.88	0.38	1.17	3.22	6.03	0.92	2.91	0.27	5.82	13.28	3.43	0.72	41.03	16	18.82%	5.31
1945	2.83	3.94	4.98	4.12	1.76	5.69	1.61	5.78	2.76	3.00	1.47	2.94	40.88	17	20.00%	5.00
1965	4.09	5.06	1.30	1.91	9.98	0.89	0.37	1.32	5.46	3.26	2.65	4.28	40.58	18	21.18%	4.72
2018	0.28	1.71	3.74	0.47	4.57	2.13	4.02	0.33	7.96	7.74	1.73	5.84	40.52	19	22.35%	4.47
1973	3.42	2.05	2.92	3.09	1.38	4.70	2.95	0.06	7.44	11.12	0.58	0.76	40.47	20	23.53%	4.25
1998	2.69	3.27	3.07	0.78	0.73	1.56	0.90	1.40	6.75	12.39	4.04	1.56	39.14	21	24.71%	4.05
1940	0.73	3.70	1.22	5.85	1.05	7.69	1.22	1.28	2.51	3.11	5.13	5.46	38.97	22	25.88%	3.86
2016	0.34	1.34	3.51	7.12	7.15	2.61	1.94	6.93	2.09	0.17	3.11	2.54	38.85	23	27.06%	3.70
1968	7.94	1.64	2.10	1.87	8.75	3.10	3.11	0.74	3.43	0.60	4.91	0.56	38.76	24	28.24%	3.54
2010	3.29	3.07	3.32	2.13	1.88	5.93	3.38	0.00	13.20	0.08	0.68	0.79	37.76	25	29.41%	3.40
2021	1.63	1.91	1.11	3.43	7.23	3.59	4.05	3.60	1.79	5.30	2.40	1.69	37.73	26	30.59%	3.27
1979	2.11	3.54	3.76	2.98	7.30	0.83	10.54	0.61	1.41	0.45	0.59	3.41	37.52	27	31.76%	3.15
2000	2.85	1.76	1.15	2.40	3.25	5.27	1.87	0.13	1.76	6.04	7.95	2.88	37.30	28	32.94%	3.04
1975	1.11	2.30	0.80	3.87	8.17	7.07	2.25	2.54	3.62	2.54	0.52	2.04	36.83	29	34.12%	2.93
1987	0.92	2.88	1.37	0.45	6.76	10.85	3.46	0.27	5.03	0.31	3.08	1.31	36.69	30	35.29%	2.83
1961	1.27	4.85	0.67	0.10	1.03	11.43	8.40	0.40	3.68	0.91	2.82	0.91	36.48	31	36.47%	2.74
1949	3.98	2.35	2.24	6.91	0.83	3.52	1.95	2.37	3.77	4.38	0.01	4.04	36.35	32	37.65%	2.66
1974	2.75	0.36	1.34	1.79	5.88	0.21	0.61	8.89	1.58	3.44	7.35	2.00	36.22	33	38.82%	2.58
2002	1.69	0.66	1.25	0.76	1.25	5.64	4.94	2.35	3.24	6.68	3.04	4.53	36.04	34	40.00%	2.50
1960	1.03	2.37	1.37	1.01	0.81	4.26	2.41	2.60	1.68	12.31	1.90	4.08	35.84	35	41.18%	2.43
2014	0.45	0.38	1.27	1.89	7.09	3.08	5.58	0.12	6.98	1.85	5.78	1.06	35.53	36	42.35%	2.36
2020	2.38	2.29	4.01	2.88	7.84	2.67	0.65	1.25	5.96	0.35	0.73	4.07	35.08	37	43.53%	2.30
1986	0.45	1.14	0.41	1.46	7.36	2.20	0.45	1.20	4.78	7.98	1.82	5.77	35.05	38	44.71%	2.24
1959	0.42	2.31	0.23	4.35	1.67	3.30	3.49	4.80	4.37	5.98	1.96	2.12	35.00	39	45.88%	2.18
2017	4.13	2.09	2.48	1.22	2.86	3.05	0.23	10.44	2.03	1.76	0.12	4.31	34.72	40	47.06%	2.13
2006	1.80	0.90	7.54	2.89	5.29	3.18	0.48	0.22	3.00	3.93	1.29	4.20	34.72	41	48.24%	2.07
1995	0.81	1.44	2.22	3.08	9.50	2.74	0.64	5.71	2.70	1.43	3.22	0.51	34.00	42	49.41%	2.02
1983	1.88	2.84	6.03	0.16	5.33	3.85	2.85	2.21	2.83	2.82	2.66	0.53	33.99	43	50.59%	1.98
1969	0.40	4.18	3.26	5.05	3.25	2.66	0.12	5.78	1.17	2.65	0.79	4.29	33.60	44	51.76%	1.93
1967	0.25	1.52	1.09	4.44	3.35	0.00	1.15	3.71	5.72	4.56	4.36	3.41	33.57	45	52.94%	1.89
1962	0.56	0.63	1.19	4.04	1.06	8.21	0.00	4.58	4.75	4.07	0.92	3.48	33.49	46	54.12%	1.85
2012	4.70	3.05	5.47	0.22	5.46	0.07	5.83	1.25	5.70	0.96	0.00	0.31	33.02	47	55.29%	1.81
1964	2.57	1.48	1.95	1.47	1.87	7.54	0.65	2.09	6.29	3.74	2.45	0.88	32.99	48	56.47%	1.77
1985	1.34	2.10	1.85	2.39	1.65	5.64	1.54	0.37	3.98	5.84	4.74	1.06	32.50	49	57.65%	1.73
1942	0.01	1.44	0.52	5.19	2.52	1.16	2.46	2.17	8.10	5.15	1.98	1.53	32.22	50	58.82%	1.70
2019	3.39	0.59	0.41	7.28	7.52	4.45	0.39	1.51	0.64	4.19	0.66	0.83	31.86	51	60.00%	1.67
2009	0.74	1.47	3.04	2.84	1.77	1.35	0.25	0.77	6.87	6.87	2.80	2.61	31.40	52	61.18%	1.63
1978	0.89	1.95	0.84	1.72	5.78	2.98	1.19	1.50	4.44	1.38	5.48	2.84	30.99	53	62.35%	1.60
1970	1.83	5.70	2.47	1.36	8.18	0.29	0.66	1.00	3.82	5.22	0.00	0.11	30.63	54	63.53%	1.57
1953	0.63	1.33	1.73	4.69	1.88	1.59	0.51	2.10	2.98	6.57	0.39	5.29	29.70	55	64.71%	1.55
1996	0.06	0.62	0.60	1.90	1.82	4.48	0.15	8.82	4.03	0.78	4.13	2.19	29.59	56	65.88%	1.52
1951	0.51	2.96	3.73	1.04	3.52	6.19	0.19	2.07	6.46	0.93	1.06	0.34	29.00	57	67.06%	1.49
1990	1.28	3.56	2.08	3.12	3.65	1.55	3.15	0.33	1.76	3.39	3.87	0.73	28.48	58	68.24%	1.47
1952	0.26	1.74	2.25	5.08	4.06	1.88	0.69	0.00	3.26	0.00	5.36	3.15	27.74	59	69.41%	1.44
1980	0.85	2.33	3.20	2.20	5.43	0.31	0.28	1.18	5.67	1.29	3.41	1.24	27.40	60	70.59%	1.42
1982	0.85	0.80	1.39	4.17	5.69	2.99	0.13	0.77	1.88	2.67	3.20	2.12	26.65	61	71.76%	1.39
2022	2.21	2.90	0.99	1.72	2.03	2.28	0.00	5.72	0.47	2.18	4.14	1.95	26.59	62	72.94%	1.37
1993	3.40	3.15	2.09	2.94	5.31	3.99	0.00	0.75	0.34	2.42	1.00	1.15	26.54	63	74.12%	1.35
1984	1.67	1.00	2.49	0.06	1.27	1.69	1.44	0.45	0.79	10.34	1.88	3.24	26.32	64	75.29%	1.33
1972	1.49	0.31	0.00	1.46	7.88	2.20	2.55	2.53	1.55	2.96	2.62	0.53	26.09	65	76.47%	1.31
1989	3.80	0.86	2.13	2.44	6.91	3.10	0.09	2.72	0.27	2.20	1.26	0.15	25.91	66	77.65%	1.29
1950	0.75	3.80	0.80	7.59	4.19	1.98	0.73	0.59	4.77	0.59	0.03	0.00	25.82	67	78.82%	1.27
1966	1.58	3.23	0.50	3.74	3.13	1.53	0.47	6.22	3.22	0.60	0.11	0.87	25.21	68	80.00%	1.25
1971	0.04	0.69	0.79	1.07	1.37	1.69	1.23	5.69	2.13	3.02	3.02	4.22	24.97	69	81.18%	1.23
1943	0.80	0.45	2.54	2.68	5.38	1.28	3.91	0.92	3.31	0.33	1.73	1.43	24.76	70	82.35%	1.21
1999	0.20	0.03	4.09	0.79	6.83	3.38	4.44	0.70	0.28	1.67	0.15	1.16	23.74	71	83.53%	1.20
1939	2.77	1.13	0.67	2.26	1.35	1.09	5.48	3.05	1.00	1.77	2.26	0.78	23.61	72	84.71%	1.18
1955	1.88	4.22	0.83	0.75	4.48	2.61	2.02	1.92	1.33	0.09	1.40	1.01	22.56	73	85.88%	1.16
2005	2.24	2.22	4.31	0.72	3.14	0.89	2.75	2.44	1.44	1.78	0.33	0.09	22.36	74	87.06%	1.15
1977	2.26	2.58	2.19	6.08	1.24	1.22	0.21	0.06	3.10	1.19	1.70	0.34	22.18	75	88.24%	1.13
1947	3.62	0.43	3.28	2.24	3.56	0.11	2.18	2.12	0.07	0.02	2.07	1.89	21.58			

Weibull Plotting Position
2004 Exceeds 25-year Period of Record (Annual Basis)

NCDC Camp Mabry, 1938 - 2022

YEAR	JAN (in.)	FEB (in.)	MAR (in.)	APR (in.)	MAY (in.)	JUN (in.)	JUL (in.)	AUG (in.)	SEP (in.)	OCT (in.)	NOV (in.)	DEC (in.)	TOTAL (in.)	RANK (#)	FREQ (%)	RETURN (year)
1948	0.93	2.72	1.35	1.68	4.48	1.25	2.29	0.27	1.24	1.78	1.35	1.67	21.02	78	91.76%	1.09
2011	2.92	0.48	0.09	0.27	3.65	2.01	0.05	0.00	0.18	2.19	2.92	4.93	19.69	79	92.94%	1.08
1988	0.27	0.33	2.66	2.02	3.33	2.60	2.77	1.67	1.43	0.66	0.34	1.14	19.22	80	94.12%	1.06
1963	0.59	2.83	0.22	3.51	1.32	2.10	0.58	0.88	1.50	0.78	1.57	1.43	17.33	81	95.29%	1.05
2008	0.83	0.51	2.87	3.52	1.70	0.74	0.38	2.39	0.02	2.01	0.72	0.41	16.09	82	96.47%	1.04
1956	1.65	1.74	0.26	0.56	3.13	0.94	0.11	1.21	0.09	0.84	2.13	2.76	15.42	83	97.65%	1.02
1954	1.02	0.28	0.27	1.67	2.86	0.68	0.85	1.14	0.82	0.89	0.35	0.61	11.45	84	98.82%	1.01
Average	2.05	2.17	2.25	2.86	4.54	3.52	1.98	2.33	3.33	3.55	2.54	2.33	33.46			
25-year	3.18	3.36	3.49	4.43	7.03	5.45	3.07	3.61	5.15	5.50	3.93	3.61	51.80			



Daily Precipitation Data

LMUD doesn't have historical data sufficient to apply Weibull Frequency analysis. Rainfall trend in Lakeway is less than Camp Mabry and more closely compares to TWDB Quad (709/710) data. 2004 based on an annual and 6-month period (Nov-April) evaluation, exceeds the 25-yr return period for wettest 6-month period. As such, 2004 is conservative for use in the daily evaluation. (See Weibull Frequency Analyses)

2004; Conservative Wet Yr

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
2004	3.56	4.07	2.07	4.24	2.02	7.53	1.83	1.45	0.44	5.91	11.05	0.65	44.80
# days w/o rain	25	19	19	21	23	18	25	28	28	20	19	25	270

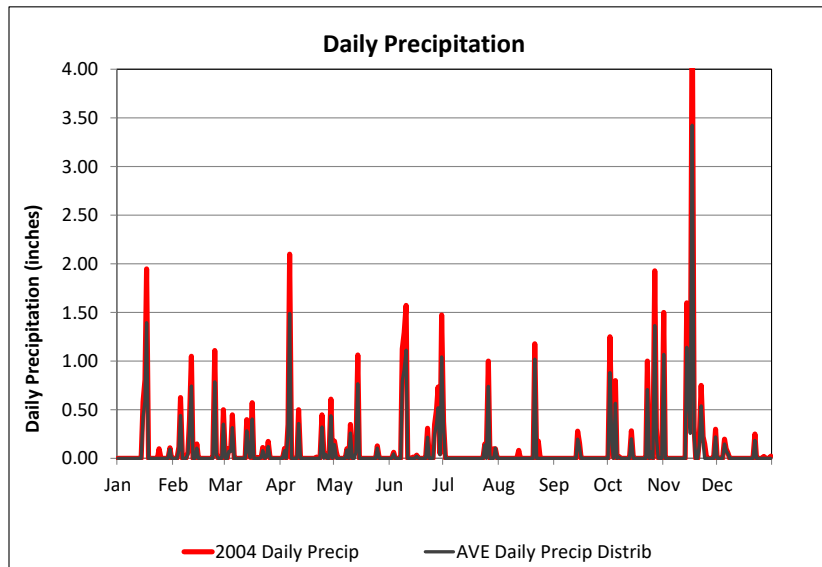
AVE Year

To develop an average year that creates average daily system consumption applicable to the 2004 year, the average daily pattern needs to stay relatively the same as 2004.

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
AVE	1.93	2.13	2.20	2.80	4.13	3.23	1.90	2.21	3.28	3.39	2.40	2.06	31.68
AVE # days w/o rain	27	20	20	22	25	19	27	30	30	21	20	27	289
Δ # days w/o rain (AVE - Wet Yr)	2	1	1	1	2	1	2	2	2	1	1	2	* Modified AVE
AVE Precip., Distrib. per 2004 (in.)	2.52	2.88	1.46	2.99	1.43	5.32	1.29	1.02	0.31	4.18	7.81	0.46	31.68

Daily Precipitation

	Actual 2004 Daily Precip. (in.)	Rep. AVE Daily Precip. (in.)
Date	Precip. (in.)	Precip. (in.)
1-Jan	0	0.000
2-Jan	0	0.000
3-Jan	0	0.000
4-Jan	0	0.000
5-Jan	0	0.000
6-Jan	0	0.000
7-Jan	0	0.000
8-Jan	0	0.000
9-Jan	0	0.000
10-Jan	0	0.000
11-Jan	0	0.000
12-Jan	0.005	0.000
13-Jan	0	0.000
14-Jan	0	0.000
15-Jan	0.585	0.432
16-Jan	0.81	0.591
17-Jan	1.95	1.397
18-Jan	0	0.000
19-Jan	0	0.000
20-Jan	0	0.000
21-Jan	0	0.000
22-Jan	0	0.000
23-Jan	0	0.000
24-Jan	0.1	0.000
25-Jan	0	0.000
26-Jan	0	0.000
27-Jan	0	0.000
28-Jan	0	0.000
29-Jan	0	0.000
30-Jan	0.11	0.096
31-Jan	0	0.000
Σ Month	3.5600	2.517
1-Feb	0	0.000
2-Feb	0	0.000
3-Feb	0	0.000
4-Feb	0.12	0.086
5-Feb	0.625	0.443
6-Feb	0	0.000
7-Feb	0	0.000
8-Feb	0	0.000
9-Feb	0.065	0.047
10-Feb	0.385	0.273
11-Feb	1.05	0.744
12-Feb	0	0.000
13-Feb	0	0.000
14-Feb	0.15	0.107
15-Feb	0	0.000
16-Feb	0	0.000
17-Feb	0	0.000
18-Feb	0	0.000
19-Feb	0	0.000
20-Feb	0	0.000
21-Feb	0	0.000
22-Feb	0	0.000
23-Feb	0.015	0.000
24-Feb	1.11	0.786
25-Feb	0.05	0.037
26-Feb	0	0.000
27-Feb	0	0.000
28-Feb	0	0.000
29-Feb	0.5	0.355
Σ Month	4.0700	2.878



Daily Precipitation

	Actual 2004 Daily	Rep. AVE Daily
Date	Precip. (In.)	Precip. (In.)
1-Mar	0	0.000
2-Mar	0	0.000
3-Mar	0.105	0.075
4-Mar	0.1	0.071
5-Mar	0.45	0.319
6-Mar	0	0.000
7-Mar	0	0.000
8-Mar	0	0.000
9-Mar	0	0.000
10-Mar	0	0.000
11-Mar	0	0.000
12-Mar	0	0.000
13-Mar	0.4	0.283
14-Mar	0.09	0.064
15-Mar	0.01	0.008
16-Mar	0.575	0.407
17-Mar	0	0.000
18-Mar	0	0.000
19-Mar	0.01	0.000
20-Mar	0	0.000
21-Mar	0.01	0.008
22-Mar	0.115	0.082
23-Mar	0	0.000
24-Mar	0.025	0.018
25-Mar	0.175	0.124
26-Mar	0	0.000
27-Mar	0	0.000
28-Mar	0	0.000
29-Mar	0	0.000
30-Mar	0	0.000
31-Mar	0	0.000
Σ Month	2.0650	1.460
1-Apr	0	0.000
2-Apr	0	0.000
3-Apr	0.105	0.081
4-Apr	0	0.000
5-Apr	0.35	0.254
6-Apr	2.1	1.492
7-Apr	0	0.000
8-Apr	0	0.000
9-Apr	0	0.000
10-Apr	0	0.000
11-Apr	0.5	0.360
12-Apr	0	0.000
13-Apr	0	0.000
14-Apr	0	0.000
15-Apr	0	0.000
16-Apr	0	0.000
17-Apr	0	0.000
18-Apr	0	0.000
19-Apr	0	0.000
20-Apr	0	0.000
21-Apr	0.015	0.000
22-Apr	0	0.000
23-Apr	0	0.000
24-Apr	0.45	0.325
25-Apr	0.05	0.000
26-Apr	0.055	0.045
27-Apr	0	0.000
28-Apr	0	0.000
29-Apr	0.61	0.438
30-Apr	0	0.000
Σ Month	4.2350	2.995
1-May	0.18	0.143
2-May	0.065	0.000
3-May	0	0.000
4-May	0	0.000
5-May	0	0.000
6-May	0	0.000
7-May	0	0.000
8-May	0.1	0.086
9-May	0	0.000
10-May	0.35	0.263
11-May	0	0.000
12-May	0.065	0.000
13-May	0.065	0.061
14-May	1.065	0.768
15-May	0	0.000
16-May	0	0.000
17-May	0	0.000

Daily Precipitation

	Actual 2004 Daily	Rep. AVE Daily
Date	Precip. (In.)	Precip. (In.)
18-May	0	0.000
19-May	0	0.000
20-May	0	0.000
21-May	0	0.000
22-May	0	0.000
23-May	0	0.000
24-May	0	0.000
25-May	0.13	0.107
26-May	0	0.000
27-May	0	0.000
28-May	0	0.000
29-May	0	0.000
30-May	0	0.000
31-May	0	0.000
Σ Month	2.0200	1.428
1-Jun	0	0.000
2-Jun	0	0.000
3-Jun	0.065	0.047
4-Jun	0	0.000
5-Jun	0	0.000
6-Jun	0	0.000
7-Jun	0	0.000
8-Jun	1.125	0.796
9-Jun	1.295	0.917
10-Jun	1.575	1.115
11-Jun	0	0.000
12-Jun	0	0.000
13-Jun	0	0.000
14-Jun	0.015	0.000
15-Jun	0	0.000
16-Jun	0.035	0.026
17-Jun	0	0.000
18-Jun	0	0.000
19-Jun	0	0.000
20-Jun	0	0.000
21-Jun	0	0.000
22-Jun	0.31	0.220
23-Jun	0	0.000
24-Jun	0	0.000
25-Jun	0	0.000
26-Jun	0.35	0.248
27-Jun	0.5	0.355
28-Jun	0.735	0.521
29-Jun	0.05	0.036
30-Jun	1.475	1.044
Σ Month	7.5300	5.325
1-Jul	0.375	0.301
2-Jul	0	0.000
3-Jul	0	0.000
4-Jul	0	0.000
5-Jul	0	0.000
6-Jul	0	0.000
7-Jul	0	0.000
8-Jul	0	0.000
9-Jul	0	0.000
10-Jul	0	0.000
11-Jul	0	0.000
12-Jul	0	0.000
13-Jul	0	0.000
14-Jul	0	0.000
15-Jul	0	0.000
16-Jul	0	0.000
17-Jul	0	0.000
18-Jul	0	0.000
19-Jul	0	0.000
20-Jul	0	0.000
21-Jul	0	0.000
22-Jul	0	0.000
23-Jul	0	0.000
24-Jul	0.15	0.141
25-Jul	0.1	0.000
26-Jul	1	0.742
27-Jul	0	0.000
28-Jul	0	0.000
29-Jul	0.1	0.000
30-Jul	0.1	0.106
31-Jul	0	0.000
Σ Month	1.8250	1.291
1-Aug	0	0.000
2-Aug	0	0.000

Daily Precipitation

	Actual 2004 Daily	Rep. AVE Daily
Date	Precip. (In.)	Precip. (In.)
3-Aug	0	0.000
4-Aug	0	0.000
5-Aug	0	0.000
6-Aug	0	0.000
7-Aug	0	0.000
8-Aug	0	0.000
9-Aug	0	0.000
10-Aug	0	0.000
11-Aug	0	0.000
12-Aug	0.085	0.000
13-Aug	0	0.000
14-Aug	0	0.000
15-Aug	0	0.000
16-Aug	0	0.000
17-Aug	0	0.000
18-Aug	0	0.000
19-Aug	0	0.000
20-Aug	0	0.000
21-Aug	1.18	1.022
22-Aug	0	0.000
23-Aug	0.18	0.000
24-Aug	0	0.000
25-Aug	0	0.000
26-Aug	0	0.000
27-Aug	0	0.000
28-Aug	0	0.000
29-Aug	0	0.000
30-Aug	0	0.000
31-Aug	0	0.000
Σ Month	1.4450	1.022
1-Sep	0	0.000
2-Sep	0	0.000
3-Sep	0	0.000
4-Sep	0	0.000
5-Sep	0	0.000
6-Sep	0	0.000
7-Sep	0	0.000
8-Sep	0	0.000
9-Sep	0	0.000
10-Sep	0	0.000
11-Sep	0	0.000
12-Sep	0	0.000
13-Sep	0	0.000
14-Sep	0.28	0.200
15-Sep	0.155	0.111
16-Sep	0	0.000
17-Sep	0	0.000
18-Sep	0	0.000
19-Sep	0	0.000
20-Sep	0	0.000
21-Sep	0	0.000
22-Sep	0	0.000
23-Sep	0	0.000
24-Sep	0	0.000
25-Sep	0	0.000
26-Sep	0	0.000
27-Sep	0	0.000
28-Sep	0	0.000
29-Sep	0	0.000
30-Sep	0	0.000
Σ Month	0.4350	0.310
1-Oct	0	0.000
2-Oct	1.25	0.885
3-Oct	0.2	0.142
4-Oct	0.01	0.000
5-Oct	0.8	0.566
6-Oct	0	0.000
7-Oct	0.02	0.015
8-Oct	0	0.000
9-Oct	0	0.000
10-Oct	0	0.000
11-Oct	0	0.000
12-Oct	0	0.000
13-Oct	0	0.000
14-Oct	0.285	0.202
15-Oct	0	0.000
16-Oct	0	0.000
17-Oct	0	0.000
18-Oct	0	0.000
19-Oct	0	0.000

Daily Precipitation

	Actual 2004 Daily	Rep. AVE Daily
Date	Precip. (In.)	Precip. (In.)
20-Oct	0	0.000
21-Oct	0	0.000
22-Oct	0	0.000
23-Oct	1	0.708
24-Oct	0	0.000
25-Oct	0.1	0.071
26-Oct	0	0.000
27-Oct	1.93	1.365
28-Oct	0.31	0.220
29-Oct	0.005	0.004
30-Oct	0	0.000
31-Oct	0	0.000
Σ Month	5.9100	4.179
1-Nov	1.5	1.071
2-Nov	0	0.000
3-Nov	0	0.000
4-Nov	0	0.000
5-Nov	0	0.000
6-Nov	0	0.000
7-Nov	0	0.000
8-Nov	0	0.000
9-Nov	0	0.000
10-Nov	0	0.000
11-Nov	0	0.000
12-Nov	0	0.000
13-Nov	0	0.000
14-Nov	1.6	1.142
15-Nov	0.85	0.612
16-Nov	0.35	0.258
17-Nov	4.825	3.423
18-Nov	0.325	0.240
19-Nov	0	0.000
20-Nov	0	0.000
21-Nov	0.175	0.134
22-Nov	0.75	0.541
23-Nov	0.225	0.170
24-Nov	0.15	0.000
25-Nov	0	0.000
26-Nov	0	0.000
27-Nov	0	0.000
28-Nov	0	0.000
29-Nov	0	0.000
30-Nov	0.3	0.223
Σ Month	11.0500	7.814
1-Dec	0	0.000
2-Dec	0	0.000
3-Dec	0	0.000
4-Dec	0	0.000
5-Dec	0.2	0.149
6-Dec	0.1	0.079
7-Dec	0.055	0.047
8-Dec	0	0.000
9-Dec	0	0.000
10-Dec	0	0.000
11-Dec	0	0.000
12-Dec	0	0.000
13-Dec	0	0.000
14-Dec	0	0.000
15-Dec	0	0.000
16-Dec	0	0.000
17-Dec	0	0.000
18-Dec	0	0.000
19-Dec	0	0.000
20-Dec	0	0.000
21-Dec	0	0.000
22-Dec	0.25	0.185
23-Dec	0	0.000
24-Dec	0	0.000
25-Dec	0	0.000
26-Dec	0	0.000
27-Dec	0.02	0.000
28-Dec	0	0.000
29-Dec	0	0.000
30-Dec	0	0.000
31-Dec	0.025	0.000
Σ Month	0.6500	0.460

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Daily Evaporation Data

Annual pattern should resemble low evaporation from 2004 (exceeds 25-yr return period).

Net Evaporation should be zero on rain days

Wet Year, Min. 25-yr Low

Determine annual net low evaporation using actual monthly gross evaporation data 2004 precipitation data.

Distribute the net low evaporation per the monthly gross evaporation pattern and allocate daily net low evaporation on days without rain per month.

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	
Actual Monthly Gross Evap. (in.)	2004	1.90	1.78	2.88	3.60	4.38	5.14	5.97	6.48	4.82	3.75	2.53	2.12	45.33
Actual 2004 Monthly Precip. (in.)	2004	3.56	4.07	2.07	4.24	2.02	7.53	1.83	1.45	0.44	5.91	11.05	0.65	44.80
Net Evaporation (0 if <0) (in.)	2004	0.00	0.00	0.81	0.00	2.36	0.00	4.15	5.03	4.39	0.00	0.00	1.47	18.20
Net Low Evap. Distrib. per Gross (in.)	2004	0.76	0.71	1.15	1.45	1.76	2.06	2.40	2.60	1.93	1.51	1.02	0.85	18.20
# days w/o rain	2004	25	19	19	21	23	18	25	28	28	20	19	25	270
Daily Average (inches)	2004	0.0304	0.0376	0.0607	0.0688	0.0764	0.1145	0.0959	0.0928	0.0691	0.0753	0.0535	0.0340	

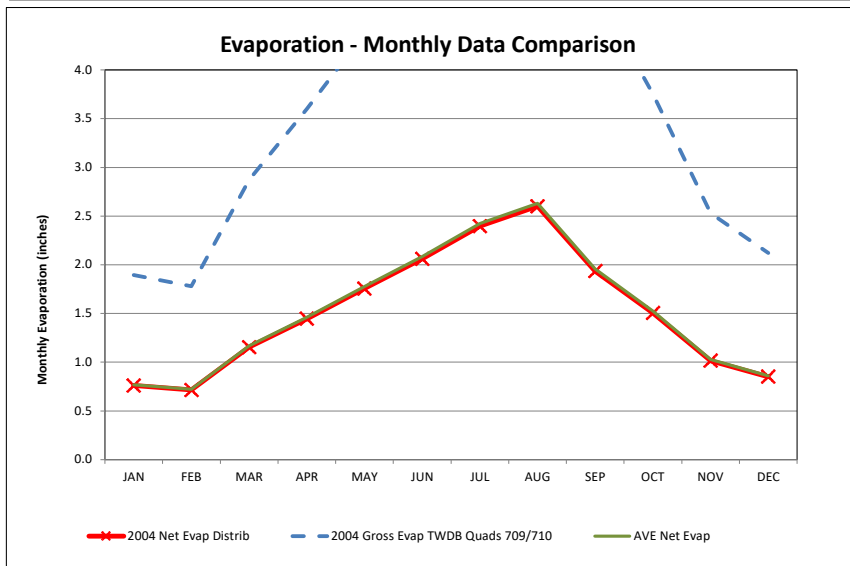
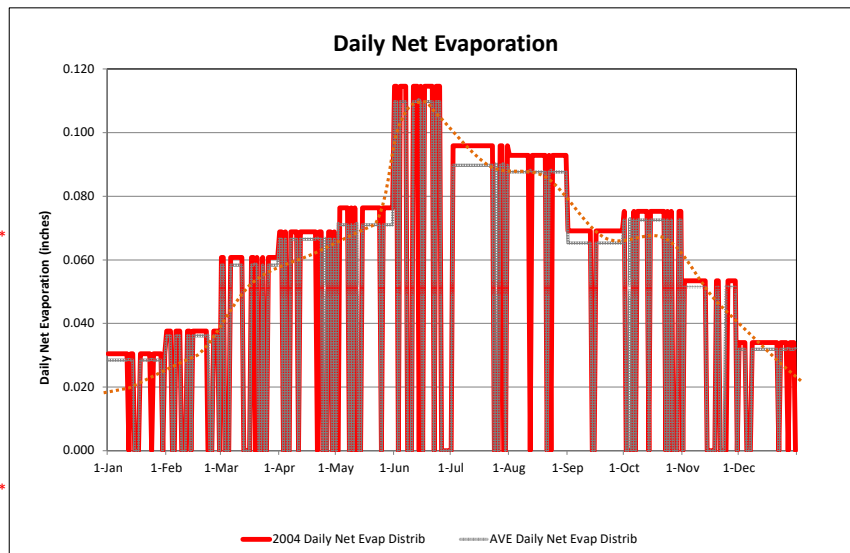
AVE Year

To develop an average year that creates average daily system consumption applicable to the 2004 Low Evap year, the average daily pattern needs to stay the same as 2004.

	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Ave Gross Evaporation (1954-2022)	AVE	2.13	2.32	3.54	4.19	4.91	5.69	6.43	6.39	5.07	4.28	2.96	2.17	50.08
Ave Precipitation (1940-2022)	AVE	1.93	2.13	2.20	2.80	4.13	3.23	1.90	2.21	3.28	3.39	2.40	2.06	31.68
Ave Net Evaporation	AVE	0.20	0.19	1.34	1.39	0.78	2.46	4.53	4.18	1.79	0.89	0.55	0.11	18.41
Ave Net Evap Distrib. per 2004 (in.)	AVE	0.77	0.72	1.17	1.46	1.78	2.09	2.42	2.63	1.96	1.52	1.03	0.86	18.41
# days w/o rain	AVE	27	20	20	22	25	19	27	30	30	21	20	27	289
Δ # days w/o rain (AVE - Wet Yr)		2	1	1	1	2	1	2	2	2	1	1	2	* Mod. AVE
Daily Average (inches)	AVE	0.0285	0.0361	0.0584	0.0664	0.0711	0.1097	0.0898	0.0876	0.0652	0.0725	0.0514	0.0319	

2004 Daily AVE Daily

Date	Net Evap. (in.)	Net Evap. (in.)
1-Jan	0.0304	0.0285
2-Jan	0.0304	0.0285
3-Jan	0.0304	0.0285
4-Jan	0.0304	0.0285
5-Jan	0.0304	0.0285
6-Jan	0.0304	0.0285
7-Jan	0.0304	0.0285
8-Jan	0.0304	0.0285
9-Jan	0.0304	0.0285
10-Jan	0.0304	0.0285
11-Jan	0.0304	0.0285
12-Jan	0.0000	0.0287
13-Jan	0.0304	0.0285
14-Jan	0.0304	0.0285
15-Jan	0.0000	0.0000
16-Jan	0.0000	0.0000
17-Jan	0.0000	0.0000
18-Jan	0.0304	0.0285
19-Jan	0.0304	0.0285
20-Jan	0.0304	0.0285
21-Jan	0.0304	0.0285
22-Jan	0.0304	0.0285
23-Jan	0.0304	0.0285
24-Jan	0.0000	0.0287
25-Jan	0.0304	0.0285
26-Jan	0.0304	0.0285
27-Jan	0.0304	0.0285
28-Jan	0.0304	0.0285
29-Jan	0.0304	0.0285
30-Jan	0.0000	0.0000
31-Jan	0.0304	0.0285
Σ Month	0.7607	0.7698
1-Feb	0.0376	0.0361
2-Feb	0.0376	0.0361
3-Feb	0.0376	0.0361
4-Feb	0.0000	0.0000
5-Feb	0.0000	0.0000
6-Feb	0.0376	0.0361
7-Feb	0.0376	0.0361
8-Feb	0.0376	0.0361
9-Feb	0.0000	0.0000
10-Feb	0.0000	0.0000
11-Feb	0.0000	0.0000
12-Feb	0.0376	0.0361
13-Feb	0.0376	0.0361
14-Feb	0.0000	0.0000
15-Feb	0.0376	0.0361
16-Feb	0.0376	0.0361
17-Feb	0.0376	0.0361
18-Feb	0.0376	0.0361
19-Feb	0.0376	0.0361
20-Feb	0.0376	0.0361
21-Feb	0.0376	0.0361
22-Feb	0.0376	0.0361
23-Feb	0.0000	0.0363
24-Feb	0.0000	0.0000



2004 Daily AVE Daily

Date	Net Evap. (In.)	Net Evap. (In.)
25-Feb	0.0000	0.0000
26-Feb	0.0376	0.0361
27-Feb	0.0376	0.0361
28-Feb	0.0376	0.0361
29-Feb	0.0000	0.0000
Σ Month	0.7146	0.7230
1-Mar	0.0607	0.0584
2-Mar	0.0607	0.0584
3-Mar	0.0000	0.0000
4-Mar	0.0000	0.0000
5-Mar	0.0000	0.0000
6-Mar	0.0607	0.0584
7-Mar	0.0607	0.0584
8-Mar	0.0607	0.0584
9-Mar	0.0607	0.0584
10-Mar	0.0607	0.0584
11-Mar	0.0607	0.0584
12-Mar	0.0607	0.0584
13-Mar	0.0000	0.0000
14-Mar	0.0000	0.0000
15-Mar	0.0000	0.0000
16-Mar	0.0000	0.0000
17-Mar	0.0607	0.0584
18-Mar	0.0607	0.0584
19-Mar	0.0000	0.0587 *
20-Mar	0.0607	0.0584
21-Mar	0.0000	0.0000
22-Mar	0.0000	0.0000
23-Mar	0.0607	0.0584
24-Mar	0.0000	0.0000
25-Mar	0.0000	0.0000
26-Mar	0.0607	0.0584
27-Mar	0.0607	0.0584
28-Mar	0.0607	0.0584
29-Mar	0.0607	0.0584
30-Mar	0.0607	0.0584
31-Mar	0.0607	0.0584
Σ Month	1.1541	1.1678
1-Apr	0.0688	0.0664
2-Apr	0.0688	0.0664
3-Apr	0.0000	0.0000
4-Apr	0.0688	0.0664
5-Apr	0.0000	0.0000
6-Apr	0.0000	0.0000
7-Apr	0.0688	0.0664
8-Apr	0.0688	0.0664
9-Apr	0.0688	0.0664
10-Apr	0.0688	0.0664
11-Apr	0.0000	0.0000
12-Apr	0.0688	0.0664
13-Apr	0.0688	0.0664
14-Apr	0.0688	0.0664
15-Apr	0.0688	0.0664
16-Apr	0.0688	0.0664
17-Apr	0.0688	0.0664
18-Apr	0.0688	0.0664
19-Apr	0.0688	0.0664
20-Apr	0.0688	0.0664
21-Apr	0.0000	0.0668 *
22-Apr	0.0688	0.0664
23-Apr	0.0688	0.0664
24-Apr	0.0000	0.0000
25-Apr	0.0000	0.0668 *
26-Apr	0.0000	0.0000
27-Apr	0.0688	0.0664
28-Apr	0.0688	0.0664
29-Apr	0.0000	0.0000
30-Apr	0.0688	0.0664
Σ Month	1.4452	1.5291
1-May	0.0000	0.0000
2-May	0.0000	0.0715 *
3-May	0.0764	0.0711
4-May	0.0764	0.0711
5-May	0.0764	0.0711
6-May	0.0764	0.0711
7-May	0.0764	0.0711
8-May	0.0000	0.0000
9-May	0.0764	0.0711
10-May	0.0000	0.0000
11-May	0.0764	0.0711
12-May	0.0000	0.0715 *
13-May	0.0000	0.0000
14-May	0.0000	0.0000

2004 Daily AVE Daily

Date	Net Evap. (In.)	Net Evap. (In.)
15-May	0.0764	0.0711
16-May	0.0764	0.0711
17-May	0.0764	0.0711
18-May	0.0764	0.0711
19-May	0.0764	0.0711
20-May	0.0764	0.0711
21-May	0.0764	0.0711
22-May	0.0764	0.0711
23-May	0.0764	0.0711
24-May	0.0764	0.0711
25-May	0.0000	0.0000
26-May	0.0764	0.0711
27-May	0.0764	0.0711
28-May	0.0764	0.0711
29-May	0.0764	0.0711
30-May	0.0764	0.0711
31-May	0.0764	0.0711
Σ Month	1.7563	1.7774
1-Jun	0.1145	0.1097
2-Jun	0.1145	0.1097
3-Jun	0.0000	0.0000
4-Jun	0.1145	0.1097
5-Jun	0.1145	0.1097
6-Jun	0.1145	0.1097
7-Jun	0.1145	0.1097
8-Jun	0.0000	0.0000
9-Jun	0.0000	0.0000
10-Jun	0.0000	0.0000
11-Jun	0.1145	0.1097
12-Jun	0.1145	0.1097
13-Jun	0.1145	0.1097
14-Jun	0.0000	0.1104 *
15-Jun	0.1145	0.1097
16-Jun	0.0000	0.0000
17-Jun	0.1145	0.1097
18-Jun	0.1145	0.1097
19-Jun	0.1145	0.1097
20-Jun	0.1145	0.1097
21-Jun	0.1145	0.1097
22-Jun	0.0000	0.0000
23-Jun	0.1145	0.1097
24-Jun	0.1145	0.1097
25-Jun	0.1145	0.1097
26-Jun	0.0000	0.0000
27-Jun	0.0000	0.0000
28-Jun	0.0000	0.0000
29-Jun	0.0000	0.0000
30-Jun	0.0000	0.0000
Σ Month	2.0614	2.0858
1-Jul	0.0000	0.0000
2-Jul	0.0959	0.0898
3-Jul	0.0959	0.0898
4-Jul	0.0959	0.0898
5-Jul	0.0959	0.0898
6-Jul	0.0959	0.0898
7-Jul	0.0959	0.0898
8-Jul	0.0959	0.0898
9-Jul	0.0959	0.0898
10-Jul	0.0959	0.0898
11-Jul	0.0959	0.0898
12-Jul	0.0959	0.0898
13-Jul	0.0959	0.0898
14-Jul	0.0959	0.0898
15-Jul	0.0959	0.0898
16-Jul	0.0959	0.0898
17-Jul	0.0959	0.0898
18-Jul	0.0959	0.0898
19-Jul	0.0959	0.0898
20-Jul	0.0959	0.0898
21-Jul	0.0959	0.0898
22-Jul	0.0959	0.0898
23-Jul	0.0959	0.0898
24-Jul	0.0000	0.0000
25-Jul	0.0000	0.0903 *
26-Jul	0.0000	0.0000
27-Jul	0.0959	0.0898
28-Jul	0.0959	0.0898
29-Jul	0.0000	0.0903 *
30-Jul	0.0000	0.0000
31-Jul	0.0959	0.0898
Σ Month	2.3966	2.4253
1-Aug	0.0928	0.0876
2-Aug	0.0928	0.0876

2004 Daily AVE Daily

Date	Net Evap. (In.)	Net Evap. (In.)
3-Aug	0.0928	0.0876
4-Aug	0.0928	0.0876
5-Aug	0.0928	0.0876
6-Aug	0.0928	0.0876
7-Aug	0.0928	0.0876
8-Aug	0.0928	0.0876
9-Aug	0.0928	0.0876
10-Aug	0.0928	0.0876
11-Aug	0.0928	0.0876
12-Aug	0.0000	0.0881 *
13-Aug	0.0928	0.0876
14-Aug	0.0928	0.0876
15-Aug	0.0928	0.0876
16-Aug	0.0928	0.0876
17-Aug	0.0928	0.0876
18-Aug	0.0928	0.0876
19-Aug	0.0928	0.0876
20-Aug	0.0928	0.0876
21-Aug	0.0000	0.0000
22-Aug	0.0928	0.0876
23-Aug	0.0000	0.0881 *
24-Aug	0.0928	0.0876
25-Aug	0.0928	0.0876
26-Aug	0.0928	0.0876
27-Aug	0.0928	0.0876
28-Aug	0.0928	0.0876
29-Aug	0.0928	0.0876
30-Aug	0.0928	0.0876
31-Aug	0.0928	0.0876
Σ Month	2.5993	2.6303
1-Sep	0.0691	0.0652
2-Sep	0.0691	0.0652
3-Sep	0.0691	0.0652
4-Sep	0.0691	0.0652
5-Sep	0.0691	0.0652
6-Sep	0.0691	0.0652
7-Sep	0.0691	0.0652
8-Sep	0.0691	0.0652
9-Sep	0.0691	0.0652
10-Sep	0.0691	0.0652
11-Sep	0.0691	0.0652
12-Sep	0.0691	0.0652
13-Sep	0.0691	0.0652
14-Sep	0.0000	0.0000
15-Sep	0.0000	0.0000
16-Sep	0.0691	0.0652
17-Sep	0.0691	0.0652
18-Sep	0.0691	0.0652
19-Sep	0.0691	0.0652
20-Sep	0.0691	0.0652
21-Sep	0.0691	0.0652
22-Sep	0.0691	0.0652
23-Sep	0.0691	0.0652
24-Sep	0.0691	0.0652
25-Sep	0.0691	0.0652
26-Sep	0.0691	0.0652
27-Sep	0.0691	0.0652
28-Sep	0.0691	0.0652
29-Sep	0.0691	0.0652
30-Sep	0.0691	0.0652
Σ Month	1.9349	1.8268
1-Oct	0.0753	0.0725
2-Oct	0.0000	0.0000
3-Oct	0.0000	0.0000
4-Oct	0.0000	0.0729 *
5-Oct	0.0000	0.0000
6-Oct	0.0753	0.0725
7-Oct	0.0000	0.0000
8-Oct	0.0753	0.0725
9-Oct	0.0753	0.0725
10-Oct	0.0753	0.0725
11-Oct	0.0753	0.0725
12-Oct	0.0753	0.0725
13-Oct	0.0753	0.0725
14-Oct	0.0000	0.0000
15-Oct	0.0753	0.0725
16-Oct	0.0753	0.0725
17-Oct	0.0753	0.0725
18-Oct	0.0753	0.0725
19-Oct	0.0753	0.0725
20-Oct	0.0753	0.0725
21-Oct	0.0753	0.0725
22-Oct	0.0753	0.0725

2004 Daily AVE Daily

Date	Net Evap. (In.)	Net Evap. (In.)
23-Oct	0.0000	0.0000
24-Oct	0.0753	0.0725
25-Oct	0.0000	0.0000
26-Oct	0.0753	0.0725
27-Oct	0.0000	0.0000
28-Oct	0.0000	0.0000
29-Oct	0.0000	0.0000
30-Oct	0.0753	0.0725
31-Oct	0.0753	0.0725
Σ Month	1.5054	1.5232
1-Nov	0.0000	0.0000
2-Nov	0.0535	0.0514
3-Nov	0.0535	0.0514
4-Nov	0.0535	0.0514
5-Nov	0.0535	0.0514
6-Nov	0.0535	0.0514
7-Nov	0.0535	0.0514
8-Nov	0.0535	0.0514
9-Nov	0.0535	0.0514
10-Nov	0.0535	0.0514
11-Nov	0.0535	0.0514
12-Nov	0.0535	0.0514
13-Nov	0.0535	0.0514
14-Nov	0.0000	0.0000
15-Nov	0.0000	0.0000
16-Nov	0.0000	0.0000
17-Nov	0.0000	0.0000
18-Nov	0.0000	0.0000
19-Nov	0.0535	0.0514
20-Nov	0.0535	0.0514
21-Nov	0.0000	0.0000
22-Nov	0.0000	0.0000
23-Nov	0.0000	0.0000
24-Nov	0.0000	0.0517 *
25-Nov	0.0535	0.0514
26-Nov	0.0535	0.0514
27-Nov	0.0535	0.0514
28-Nov	0.0535	0.0514
29-Nov	0.0535	0.0514
30-Nov	0.0000	0.0000
Σ Month	1.0156	1.0277
1-Dec	0.0340	0.0319
2-Dec	0.0340	0.0319
3-Dec	0.0340	0.0319
4-Dec	0.0340	0.0319
5-Dec	0.0000	0.0000
6-Dec	0.0000	0.0000
7-Dec	0.0000	0.0000
8-Dec	0.0340	0.0319
9-Dec	0.0340	0.0319
10-Dec	0.0340	0.0319
11-Dec	0.0340	0.0319
12-Dec	0.0340	0.0319
13-Dec	0.0340	0.0319
14-Dec	0.0340	0.0319
15-Dec	0.0340	0.0319
16-Dec	0.0340	0.0319
17-Dec	0.0340	0.0319
18-Dec	0.0340	0.0319
19-Dec	0.0340	0.0319
20-Dec	0.0340	0.0319
21-Dec	0.0340	0.0319
22-Dec	0.0000	0.0000
23-Dec	0.0340	0.0319
24-Dec	0.0340	0.0319
25-Dec	0.0340	0.0319
26-Dec	0.0340	0.0319
27-Dec	0.0000	0.0321 *
28-Dec	0.0340	0.0319
29-Dec	0.0340	0.0319
30-Dec	0.0340	0.0319
31-Dec	0.0000	0.0321 *
Σ Month	0.8510	0.8612

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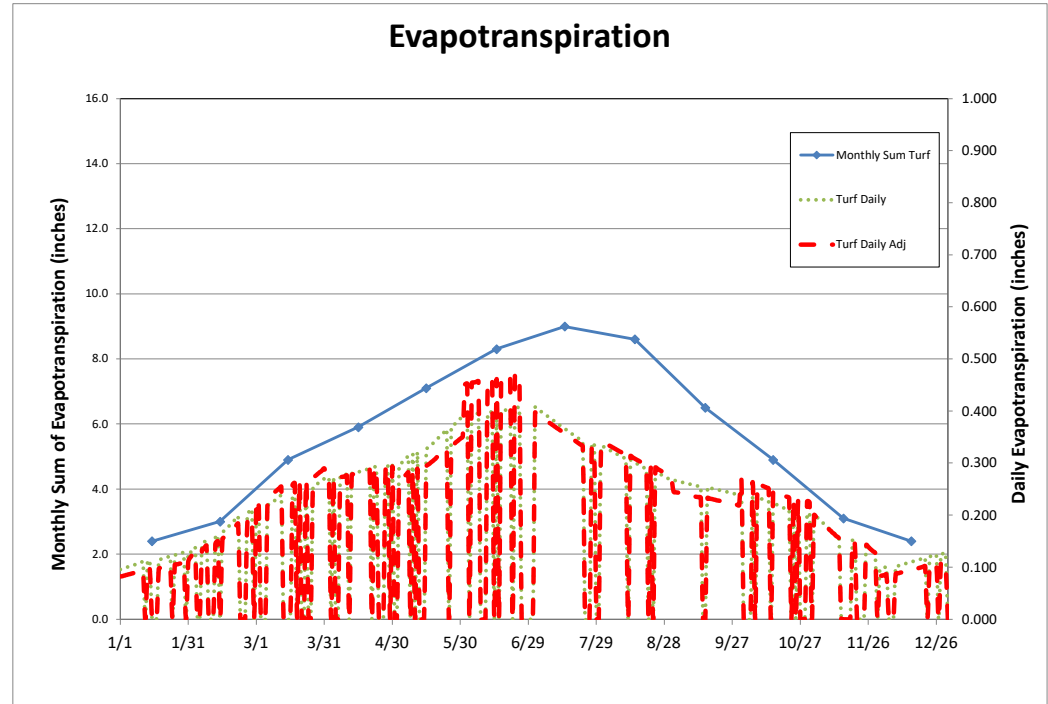
Evapotranspiration (Turf Grasses) - Daily values; No ET on rain days

Month	Van Bavel Turf (inches)	Ave Mo Daily Turf (inches)	Daily on 1st day Turf (inches)
J January	2.40	0.096	0.096
F February	3.00	0.158	0.129
M March	4.90	0.258	0.211
A April	5.90	0.281	0.270
M May	7.10	0.309	0.296
J June	8.30	0.461	0.390
J July	9.00	0.360	0.407
A August	8.60	0.307	0.332
S September	6.50	0.232	0.267
O October	4.90	0.245	0.239
N November	3.10	0.163	0.201
D December	2.40	0.096	0.127
TOTAL	66.10		

2004 Daily Precipitation Data

Date	S-4_Rain	S-5_Rain	Ave
1/1/2004	0	0	0
1/2/2004	0	0	0
1/3/2004	0	0	0
1/4/2004	0	0	0
1/5/2004	0	0	0
1/6/2004	0	0	0
1/7/2004	0	0	0
1/8/2004	0	0	0
1/9/2004	0	0	0
1/10/2004	0	0	0
1/11/2004	0	0	0
1/12/2004	0	0.01	0.005
1/13/2004	0	0	0
1/14/2004	0	0	0
1/15/2004	0.6	0.57	0.585
1/16/2004	1.1	0.52	0.81
1/17/2004	1.9	2	1.95
1/18/2004	0	0	0
1/19/2004	0	0	0
1/20/2004	0	0	0
1/21/2004	0	0	0
1/22/2004	0	0	0
1/23/2004	0	0	0
1/24/2004	0	0.2	0.1
1/25/2004	0	0	0
1/26/2004	0	0	0
1/27/2004	0	0	0
1/28/2004	0	0	0
1/29/2004	0	0	0
1/30/2004	0.1	0.12	0.11
1/31/2004	0	0	0
Σ Month			3.5600
2/1/2004	0	0	0
2/2/2004	0	0	0
2/3/2004	0	0	0
2/4/2004	0.2	0.04	0.12
2/5/2004	0.5	0.75	0.625
2/6/2004	0	0	0
2/7/2004	0	0	0
2/8/2004	0	0	0
2/9/2004	0.1	0.03	0.065
2/10/2004	0.5	0.27	0.385
2/11/2004	0.9	1.2	1.05
2/12/2004	0	0	0

ET Data Pattern		FINAL VALUES Adjusted to Match Monthly Totals
	Turf Ave Interim	Turf Ave Adj.
1-Jan	0.096	0.082
2-Jan	0.097	0.083
3-Jan	0.099	0.084
4-Jan	0.100	0.085
5-Jan	0.102	0.087
6-Jan	0.103	0.088
7-Jan	0.104	0.089
8-Jan	0.106	0.090
9-Jan	0.107	0.091
10-Jan	0.108	0.092
11-Jan	0.110	0.094
12-Jan	0.000	0.000
13-Jan	0.111	0.095
14-Jan	0.113	0.096
15-Jan	0.000	0.000
16-Jan	0.000	0.000
17-Jan	0.000	0.000
18-Jan	0.114	0.097
19-Jan	0.115	0.098
20-Jan	0.117	0.100
21-Jan	0.118	0.101
22-Jan	0.119	0.102
23-Jan	0.121	0.103
24-Jan	0.000	0.000
25-Jan	0.122	0.104
26-Jan	0.124	0.105
27-Jan	0.125	0.107
28-Jan	0.126	0.108
29-Jan	0.128	0.109
30-Jan	0.000	0.000
31-Jan	0.129	0.110
Subtotal	2.813	2.400
1-Feb	0.129	0.120
2-Feb	0.134	0.124
3-Feb	0.138	0.128
4-Feb	0.000	0.000
5-Feb	0.000	0.000
6-Feb	0.143	0.132
7-Feb	0.147	0.137
8-Feb	0.152	0.141
9-Feb	0.000	0.000
10-Feb	0.000	0.000
11-Feb	0.000	0.000
12-Feb	0.156	0.145



2/13/2004	0	0	0
2/14/2004	0	0.3	0.15
2/15/2004	0	0	0
2/16/2004	0	0	0
2/17/2004	0	0	0
2/18/2004	0	0	0
2/19/2004	0	0	0
2/20/2004	0	0	0
2/21/2004	0	0	0
2/22/2004	0	0	0
2/23/2004	0	0.03	0.015
2/24/2004	0.95	1.27	1.11
2/25/2004	0.1	0	0.05
2/26/2004	0	0	0
2/27/2004	0	0	0
2/28/2004	0	0	0
2/29/2004	0.5	0.5	0.5
5 Month			4.0700
3/1/2004	0	0	0
3/2/2004	0	0	0
3/3/2004	0	0.21	0.105
3/4/2004	0	0.2	0.1
3/5/2004	0.5	0.4	0.45
3/6/2004	0	0	0
3/7/2004	0	0	0
3/8/2004	0	0	0
3/9/2004	0	0	0
3/10/2004	0	0	0
3/11/2004	0	0	0
3/12/2004	0	0	0
3/13/2004	0.4	0.4	0.4
3/14/2004	0.1	0.08	0.09
3/15/2004	0	0.02	0.01
3/16/2004	0.7	0.45	0.575
3/17/2004	0	0	0
3/18/2004	0	0	0
3/19/2004	0	0.02	0.01
3/20/2004	0	0	0
3/21/2004	0	0.02	0.01
3/22/2004	0.2	0.03	0.115
3/23/2004	0	0	0
3/24/2004	0	0.05	0.025
3/25/2004	0.35	0	0.175
3/26/2004	0	0	0
3/27/2004	0	0	0
3/28/2004	0	0	0
3/29/2004	0	0	0
3/30/2004	0	0	0
3/31/2004	0	0	0
5 Month			2.0650
4/1/2004	0	0	0
4/2/2004	0	0	0
4/3/2004	0.08	0.13	0.105
4/4/2004	0	0	0
4/5/2004	0.3	0.4	0.35
4/6/2004	2.2	2	2.1
4/7/2004	0	0	0
4/8/2004	0	0	0
4/9/2004	0	0	0
4/10/2004	0	0	0
4/11/2004	0.9	0.1	0.5
4/12/2004	0	0	0
4/13/2004	0	0	0
4/14/2004	0	0	0
4/15/2004	0	0	0
4/16/2004	0	0	0
4/17/2004	0	0	0
4/18/2004	0	0	0
4/19/2004	0	0	0
4/20/2004	0	0	0

13-Feb	0.161	0.149
14-Feb	0.000	0.000
15-Feb	0.166	0.154
16-Feb	0.170	0.158
17-Feb	0.175	0.162
18-Feb	0.179	0.166
19-Feb	0.184	0.171
20-Feb	0.189	0.175
21-Feb	0.193	0.179
22-Feb	0.198	0.183
23-Feb	0.000	0.000
24-Feb	0.000	0.000
25-Feb	0.000	0.000
26-Feb	0.202	0.188
27-Feb	0.207	0.192
28-Feb	0.211	0.196
29-Feb	0.000	0.000
Subtotal	3.235	3.000
1-Mar	0.211	0.226
2-Mar	0.215	0.230
3-Mar	0.000	0.000
4-Mar	0.000	0.000
5-Mar	0.000	0.000
6-Mar	0.218	0.233
7-Mar	0.221	0.237
8-Mar	0.225	0.240
9-Mar	0.228	0.244
10-Mar	0.231	0.247
11-Mar	0.234	0.251
12-Mar	0.238	0.254
13-Mar	0.000	0.000
14-Mar	0.000	0.000
15-Mar	0.000	0.000
16-Mar	0.000	0.000
17-Mar	0.241	0.258
18-Mar	0.244	0.261
19-Mar	0.000	0.000
20-Mar	0.247	0.265
21-Mar	0.000	0.000
22-Mar	0.000	0.000
23-Mar	0.251	0.268
24-Mar	0.000	0.000
25-Mar	0.000	0.000
26-Mar	0.254	0.272
27-Mar	0.257	0.275
28-Mar	0.260	0.279
29-Mar	0.264	0.282
30-Mar	0.267	0.286
31-Mar	0.270	0.289
Subtotal	4.576	4.900
1-Apr	0.270	0.268
2-Apr	0.271	0.270
3-Apr	0.000	0.000
4-Apr	0.273	0.271
5-Apr	0.000	0.000
6-Apr	0.000	0.000
7-Apr	0.274	0.272
8-Apr	0.275	0.273
9-Apr	0.277	0.275
10-Apr	0.278	0.276
11-Apr	0.000	0.000
12-Apr	0.279	0.277
13-Apr	0.280	0.278
14-Apr	0.282	0.280
15-Apr	0.283	0.281
16-Apr	0.284	0.282
17-Apr	0.286	0.283
18-Apr	0.287	0.285
19-Apr	0.288	0.286
20-Apr	0.289	0.287

4/21/2004	0	0.03	0.015
4/22/2004	0	0	0
4/23/2004	0	0	0
4/24/2004	0.45	0.45	0.45
4/25/2004	0.1	0	0.05
4/26/2004	0.05	0.06	0.055
4/27/2004	0	0	0
4/28/2004	0	0	0
4/29/2004	0.5	0.72	0.61
4/30/2004	0	0	0
S Month			4.2350
5/1/2004	0.1	0.26	0.18
5/2/2004	0.13	0	0.065
5/3/2004	0	0	0
5/4/2004	0	0	0
5/5/2004	0	0	0
5/6/2004	0	0	0
5/7/2004	0	0	0
5/8/2004	0.1	0.1	0.1
5/9/2004	0	0	0
5/10/2004	0.7	0	0.35
5/11/2004	0	0	0
5/12/2004	0.1	0.03	0.065
5/13/2004	0.1	0.03	0.065
5/14/2004	0.9	1.23	1.065
5/15/2004	0	0	0
5/16/2004	0	0	0
5/17/2004	0	0	0
5/18/2004	0	0	0
5/19/2004	0	0	0
5/20/2004	0	0	0
5/21/2004	0	0	0
5/22/2004	0	0	0
5/23/2004	0	0	0
5/24/2004	0	0	0
5/25/2004	0	0.26	0.13
5/26/2004	0	0	0
5/27/2004	0	0	0
5/28/2004	0	0	0
5/29/2004	0	0	0
5/30/2004	0	0	0
5/31/2004	0	0	0
S Month			2.0200
6/1/2004	0	0	0
6/2/2004	0	0	0
6/3/2004	0	0.13	0.065
6/4/2004	0	0	0
6/5/2004	0	0	0
6/6/2004	0	0	0
6/7/2004	0	0	0
6/8/2004	1.4	0.85	1.125
6/9/2004	1	1.59	1.295
6/10/2004	1.7	1.45	1.575
6/11/2004	0	0	0
6/12/2004	0	0	0
6/13/2004	0	0	0
6/14/2004	0	0.03	0.015
6/15/2004	0	0	0
6/16/2004	0	0.07	0.035
6/17/2004	0	0	0
6/18/2004	0	0	0
6/19/2004	0	0	0
6/20/2004	0	0	0
6/21/2004	0	0	0
6/22/2004	0.3	0.32	0.31
6/23/2004	0	0	0
6/24/2004	0	0	0
6/25/2004	0	0	0
6/26/2004	0.5	0.2	0.35
6/27/2004	0.5	0.5	0.5

21-Apr	0.000	0.000
22-Apr	0.291	0.289
23-Apr	0.292	0.290
24-Apr	0.000	0.000
25-Apr	0.000	0.000
26-Apr	0.000	0.000
27-Apr	0.293	0.291
28-Apr	0.295	0.292
29-Apr	0.000	0.000
30-Apr	0.296	0.294
Subtotal	5.943	5.900
1-May	0.000	0.000
2-May	0.000	0.000
3-May	0.296	0.266
4-May	0.300	0.270
5-May	0.304	0.274
6-May	0.309	0.278
7-May	0.313	0.282
8-May	0.000	0.000
9-May	0.317	0.286
10-May	0.000	0.000
11-May	0.321	0.289
12-May	0.000	0.000
13-May	0.000	0.000
14-May	0.000	0.000
15-May	0.326	0.293
16-May	0.330	0.297
17-May	0.334	0.301
18-May	0.339	0.305
19-May	0.343	0.309
20-May	0.347	0.313
21-May	0.351	0.316
22-May	0.356	0.320
23-May	0.360	0.324
24-May	0.364	0.328
25-May	0.000	0.000
26-May	0.369	0.332
27-May	0.373	0.336
28-May	0.377	0.340
29-May	0.381	0.343
30-May	0.386	0.347
31-May	0.390	0.351
Subtotal	7.886	7.100
1-Jun	0.390	0.451
2-Jun	0.391	0.452
3-Jun	0.000	0.000
4-Jun	0.392	0.454
5-Jun	0.393	0.455
6-Jun	0.394	0.456
7-Jun	0.395	0.457
8-Jun	0.000	0.000
9-Jun	0.000	0.000
10-Jun	0.000	0.000
11-Jun	0.396	0.458
12-Jun	0.397	0.459
13-Jun	0.398	0.461
14-Jun	0.000	0.000
15-Jun	0.399	0.462
16-Jun	0.000	0.000
17-Jun	0.400	0.463
18-Jun	0.401	0.464
19-Jun	0.402	0.465
20-Jun	0.403	0.466
21-Jun	0.404	0.468
22-Jun	0.000	0.000
23-Jun	0.405	0.469
24-Jun	0.406	0.470
25-Jun	0.407	0.471
26-Jun	0.000	0.000
27-Jun	0.000	0.000

6/28/2004	0.7	0.77	0.735
6/29/2004	0.1	0	0.05
6/30/2004	1.1	1.85	1.475
S Month			7.5300
7/1/2004	0.6	0.15	0.375
7/2/2004	0	0	0
7/3/2004	0	0	0
7/4/2004	0	0	0
7/5/2004	0	0	0
7/6/2004	0	0	0
7/7/2004	0	0	0
7/8/2004	0	0	0
7/9/2004	0	0	0
7/10/2004	0	0	0
7/11/2004	0	0	0
7/12/2004	0	0	0
7/13/2004	0	0	0
7/14/2004	0	0	0
7/15/2004	0	0	0
7/16/2004	0	0	0
7/17/2004	0	0	0
7/18/2004	0	0	0
7/19/2004	0	0	0
7/20/2004	0	0	0
7/21/2004	0	0	0
7/22/2004	0	0	0
7/23/2004	0	0	0
7/24/2004	0.3	0	0.15
7/25/2004	0	0.2	0.1
7/26/2004	1	1	1
7/27/2004	0	0	0
7/28/2004	0	0	0
7/29/2004	0.2	0	0.1
7/30/2004	0.1	0.1	0.1
7/31/2004	0	0	0
S Month			1.8250
8/1/2004	0	0	0
8/2/2004	0	0	0
8/3/2004	0	0	0
8/4/2004	0	0	0
8/5/2004	0	0	0
8/6/2004	0	0	0
8/7/2004	0	0	0
8/8/2004	0	0	0
8/9/2004	0	0	0
8/10/2004	0	0	0
8/11/2004	0	0	0
8/12/2004	0.1	0.07	0.085
8/13/2004	0	0	0
8/14/2004	0	0	0
8/15/2004	0	0	0
8/16/2004	0	0	0
8/17/2004	0	0	0
8/18/2004	0	0	0
8/19/2004	0	0	0
8/20/2004	0	0	0
8/21/2004	1	1.36	1.18
8/22/2004	0	0	0
8/23/2004	0.2	0.16	0.18
8/24/2004	0	0	0
8/25/2004	0	0	0
8/26/2004	0	0	0
8/27/2004	0	0	0
8/28/2004	0	0	0
8/29/2004	0	0	0
8/30/2004	0	0	0
8/31/2004	0	0	0
S Month			1.4450
9/1/2004	0	0	0
9/2/2004	0	0	0

28-Jun	0.000	0.000
29-Jun	0.000	0.000
30-Jun	0.000	0.000
Subtotal	7.173	8.300
1-Jul	0.000	0.000
2-Jul	0.407	0.397
3-Jul	0.404	0.394
4-Jul	0.401	0.391
5-Jul	0.398	0.388
6-Jul	0.395	0.384
7-Jul	0.391	0.381
8-Jul	0.388	0.378
9-Jul	0.385	0.375
10-Jul	0.382	0.372
11-Jul	0.379	0.369
12-Jul	0.376	0.366
13-Jul	0.373	0.363
14-Jul	0.369	0.360
15-Jul	0.366	0.357
16-Jul	0.363	0.354
17-Jul	0.360	0.351
18-Jul	0.357	0.348
19-Jul	0.354	0.345
20-Jul	0.351	0.342
21-Jul	0.347	0.339
22-Jul	0.344	0.336
23-Jul	0.341	0.332
24-Jul	0.000	0.000
25-Jul	0.000	0.000
26-Jul	0.000	0.000
27-Jul	0.338	0.329
28-Jul	0.335	0.326
29-Jul	0.000	0.000
30-Jul	0.000	0.000
31-Jul	0.332	0.323
Subtotal	9.236	9.000
1-Aug	0.332	0.340
2-Aug	0.329	0.338
3-Aug	0.327	0.335
4-Aug	0.325	0.333
5-Aug	0.322	0.330
6-Aug	0.320	0.328
7-Aug	0.317	0.326
8-Aug	0.315	0.323
9-Aug	0.313	0.321
10-Aug	0.310	0.318
11-Aug	0.308	0.316
12-Aug	0.000	0.000
13-Aug	0.305	0.313
14-Aug	0.303	0.311
15-Aug	0.301	0.308
16-Aug	0.298	0.306
17-Aug	0.296	0.303
18-Aug	0.293	0.301
19-Aug	0.291	0.299
20-Aug	0.289	0.296
21-Aug	0.000	0.000
22-Aug	0.286	0.294
23-Aug	0.000	0.000
24-Aug	0.284	0.291
25-Aug	0.282	0.289
26-Aug	0.279	0.286
27-Aug	0.277	0.284
28-Aug	0.274	0.281
29-Aug	0.272	0.279
30-Aug	0.270	0.276
31-Aug	0.267	0.274
Subtotal	8.385	8.600
1-Sep	0.267	0.245
2-Sep	0.266	0.244

9/3/2004	0	0	0
9/4/2004	0	0	0
9/5/2004	0	0	0
9/6/2004	0	0	0
9/7/2004	0	0	0
9/8/2004	0	0	0
9/9/2004	0	0	0
9/10/2004	0	0	0
9/11/2004	0	0	0
9/12/2004	0	0	0
9/13/2004	0	0	0
9/14/2004	0.2	0.36	0.28
9/15/2004	0.2	0.11	0.155
9/16/2004	0	0	0
9/17/2004	0	0	0
9/18/2004	0	0	0
9/19/2004	0	0	0
9/20/2004	0	0	0
9/21/2004	0	0	0
9/22/2004	0	0	0
9/23/2004	0	0	0
9/24/2004	0	0	0
9/25/2004	0	0	0
9/26/2004	0	0	0
9/27/2004	0	0	0
9/28/2004	0	0	0
9/29/2004	0	0	0
9/30/2004	0	0	0
S Month			0.4350
10/1/2004	0	0	0
10/2/2004	1	1.5	1.25
10/3/2004	0.2	0.2	0.2
10/4/2004	0	0.02	0.01
10/5/2004	1	0.6	0.8
10/6/2004	0	0	0
10/7/2004	0	0.04	0.02
10/8/2004	0	0	0
10/9/2004	0	0	0
10/10/2004	0	0	0
10/11/2004	0	0	0
10/12/2004	0	0	0
10/13/2004	0	0	0
10/14/2004	0.2	0.37	0.285
10/15/2004	0	0	0
10/16/2004	0	0	0
10/17/2004	0	0	0
10/18/2004	0	0	0
10/19/2004	0	0	0
10/20/2004	0	0	0
10/21/2004	0	0	0
10/22/2004	0	0	0
10/23/2004	1	1	1
10/24/2004	0	0	0
10/25/2004	0.1	0.1	0.1
10/26/2004	0	0	0
10/27/2004	1.3	2.56	1.93
10/28/2004	0.4	0.22	0.31
10/29/2004	0	0.01	0.005
10/30/2004	0	0	0
10/31/2004	0	0	0
S Month			5.9100
11/1/2004	1.5	1.5	1.5
11/2/2004	0	0	0
11/3/2004	0	0	0
11/4/2004	0	0	0
11/5/2004	0	0	0
11/6/2004	0	0	0
11/7/2004	0	0	0
11/8/2004	0	0	0
11/9/2004	0	0	0

3-Sep	0.265	0.243
4-Sep	0.264	0.242
5-Sep	0.263	0.241
6-Sep	0.262	0.240
7-Sep	0.261	0.239
8-Sep	0.260	0.238
9-Sep	0.259	0.237
10-Sep	0.258	0.236
11-Sep	0.257	0.235
12-Sep	0.256	0.235
13-Sep	0.255	0.234
14-Sep	0.000	0.000
15-Sep	0.000	0.000
16-Sep	0.254	0.233
17-Sep	0.253	0.232
18-Sep	0.252	0.231
19-Sep	0.250	0.230
20-Sep	0.249	0.229
21-Sep	0.248	0.228
22-Sep	0.247	0.227
23-Sep	0.246	0.226
24-Sep	0.245	0.225
25-Sep	0.244	0.224
26-Sep	0.243	0.223
27-Sep	0.242	0.222
28-Sep	0.241	0.221
29-Sep	0.240	0.220
30-Sep	0.239	0.219
Subtotal	7.086	6.500
1-Oct	0.239	0.266
2-Oct	0.000	0.000
3-Oct	0.000	0.000
4-Oct	0.000	0.000
5-Oct	0.000	0.000
6-Oct	0.237	0.264
7-Oct	0.000	0.000
8-Oct	0.235	0.262
9-Oct	0.233	0.259
10-Oct	0.231	0.257
11-Oct	0.229	0.255
12-Oct	0.227	0.253
13-Oct	0.225	0.251
14-Oct	0.000	0.000
15-Oct	0.223	0.248
16-Oct	0.221	0.246
17-Oct	0.219	0.244
18-Oct	0.217	0.242
19-Oct	0.215	0.239
20-Oct	0.213	0.237
21-Oct	0.211	0.235
22-Oct	0.209	0.233
23-Oct	0.000	0.000
24-Oct	0.207	0.231
25-Oct	0.000	0.000
26-Oct	0.205	0.228
27-Oct	0.000	0.000
28-Oct	0.000	0.000
29-Oct	0.000	0.000
30-Oct	0.203	0.226
31-Oct	0.201	0.224
Subtotal	4.404	4.900
1-Nov	0.000	0.000
2-Nov	0.201	0.200
3-Nov	0.197	0.196
4-Nov	0.193	0.192
5-Nov	0.189	0.188
6-Nov	0.185	0.184
7-Nov	0.181	0.180
8-Nov	0.177	0.175
9-Nov	0.173	0.171

11/10/2004	0	0	0
11/11/2004	0	0	0
11/12/2004	0	0	0
11/13/2004	0	0	0
11/14/2004	1	2.2	1.6
11/15/2004	1.2	0.5	0.85
11/16/2004	0.5	0.2	0.35
11/17/2004	4.6	5.05	4.825
11/18/2004	0.3	0.35	0.325
11/19/2004	0	0	0
11/20/2004	0	0	0
11/21/2004	0.2	0.15	0.175
11/22/2004	0.9	0.6	0.75
11/23/2004	0.3	0.15	0.225
11/24/2004	0.2	0.1	0.15
11/25/2004	0	0	0
11/26/2004	0	0	0
11/27/2004	0	0	0
11/28/2004	0	0	0
11/29/2004	0	0	0
11/30/2004	0.4	0.2	0.3
S Month			11.0500
12/1/2004	0	0	0
12/2/2004	0	0	0
12/3/2004	0	0	0
12/4/2004	0	0	0
12/5/2004	0.2	0.2	0.2
12/6/2004	0	0.2	0.1
12/7/2004	0	0.11	0.055
12/8/2004	0	0	0
12/9/2004	0	0	0
12/10/2004	0	0	0
12/11/2004	0	0	0
12/12/2004	0	0	0
12/13/2004	0	0	0
12/14/2004	0	0	0
12/15/2004	0	0	0
12/16/2004	0	0	0
12/17/2004	0	0	0
12/18/2004	0	0	0
12/19/2004	0	0	0
12/20/2004	0	0	0
12/21/2004	0	0	0
12/22/2004	0.2	0.3	0.25
12/23/2004	0	0	0
12/24/2004	0	0	0
12/25/2004	0	0	0
12/26/2004	0	0	0
12/27/2004	0	0.04	0.02
12/28/2004	0	0	0
12/29/2004	0	0	0
12/30/2004	0	0	0
12/31/2004	0.05	0	0.025
S Month			0.6500

10-Nov	0.168	0.167
11-Nov	0.164	0.163
12-Nov	0.160	0.159
13-Nov	0.156	0.155
14-Nov	0.000	0.000
15-Nov	0.000	0.000
16-Nov	0.000	0.000
17-Nov	0.000	0.000
18-Nov	0.000	0.000
19-Nov	0.152	0.151
20-Nov	0.148	0.147
21-Nov	0.000	0.000
22-Nov	0.000	0.000
23-Nov	0.000	0.000
24-Nov	0.000	0.000
25-Nov	0.144	0.143
26-Nov	0.140	0.139
27-Nov	0.135	0.135
28-Nov	0.131	0.130
29-Nov	0.127	0.126
30-Nov	0.000	0.000
Subtotal	3.122	3.100
1-Dec	0.096	0.083
2-Dec	0.097	0.084
3-Dec	0.099	0.085
4-Dec	0.100	0.086
5-Dec	0.000	0.000
6-Dec	0.000	0.000
7-Dec	0.000	0.000
8-Dec	0.101	0.087
9-Dec	0.103	0.088
10-Dec	0.104	0.089
11-Dec	0.105	0.090
12-Dec	0.106	0.092
13-Dec	0.108	0.093
14-Dec	0.109	0.094
15-Dec	0.110	0.095
16-Dec	0.112	0.096
17-Dec	0.113	0.097
18-Dec	0.114	0.098
19-Dec	0.116	0.099
20-Dec	0.117	0.100
21-Dec	0.118	0.102
22-Dec	0.000	0.000
23-Dec	0.119	0.103
24-Dec	0.121	0.104
25-Dec	0.122	0.105
26-Dec	0.123	0.106
27-Dec	0.000	0.000
28-Dec	0.125	0.107
29-Dec	0.126	0.108
30-Dec	0.127	0.109
31-Dec	0.000	0.000
Subtotal	2.791	2.400

Evapotranspiration (ET) of Golf Course Turf
in the Austin, TX Area

Cornelius van Bavel - May 6, 1993

The water use rate (identical to evapotranspiration or ET, also to consumptive use or CU) of golf course turf, as determined by weather conditions, is an important ingredient in the planning and operation of irrigation facilities on a golf course. During the winter months it is also a critical factor in determining the size of a storage reservoir for the effluent of a sewage treatment facility, if this effluent is used for irrigation of the course.

The application procedure for a permit to use the effluent for irrigating the turf requires that the size of the reservoir be calculated to prevent the discharge of the effluent. The difference between the monthly estimated ET and the 25-year maximum monthly infiltration of rainfall, divided by the irrigation efficiency factor, is the irrigation requirement. If the latter is less than the permitted monthly discharge of the sewage treatment facility, the excess effluent must be stored. Typically, storage may be required only during the winter months. When, with the progress of the season, the irrigation requirement begins to exceed the permitted discharge, the storage will be depleted and lake water will supplement the effluent.

Detailed procedures for this design calculation are spelled out in the guidelines promulgated by the Texas Water Commission, specifically in Subchapter C, Land Disposal of Sewage Effluent. The method whereby the consumptive use of water (evapotranspiration, or ET) will be determined is not mandated, but it is required that the method must be documented. The example of a water balance given in the guidelines is based on the use of Bulletin 6019, Texas Board of Water Engineers (TBWE, 1960).

In this report we review the suitability of the method documented in Bulletin 6019 for determining the monthly ET rates of turf, as managed on golfcourses in the Austin area. Next, we describe and document a newer method that is based on the scientific and engineering progress in the 32 years that have elapsed since Bulletin 6019 was prepared. We show the results of its application for the Austin climate, and compare these with available experimental evidence on the actual ET rates of well-watered turf grasses. Finally, we review what is known about the differences among turfgrass species and varieties in general, and about the type of turf that is in place at the Lakeway golf courses.

We will show that the updated method for determining ET from turf in the Austin area gives an annual total of 66.1 in., compared to 49.2 in., as found on the basis of the methods of Bulletin 6019, or 47.5 in., using adjusted values for the Climatic Index (CI),

(Mercier and Brown, 15). For the critical winter months (Nov. through Feb.), the corresponding numbers are 10.9 in. and 5.7 in. (or, 5.5 in., using the adjusted CI values). While the exact effect of this difference on the calculated storage capacity remains to be determined by others, we expect it to be significant. The substance of this report is designed to be the basis upon which an improved ET estimate will be acceptable to the Texas Water Commission when it considers a permit application.

TBWE Bulletin 6019 and its use in determining ET rates for turf

Prior to 1960, little had been done to provide estimates of water requirements for use in irrigated agriculture in Texas. At that time, four empirical methods had been developed based on latitude, time of year, and records of air temperature. By using "crop coefficients", derived from local measurements of crop water use obtained by soil moisture sampling, estimates were made for the seasonal and monthly requirements of specific crops. The validity of such methods is limited to the area of measurement, a fact that was recognized by the authors of Bulletin 6019.

A generally valid method, proposed by Penman in 1948 (1), is based on physical and meteorological principles and utilizes data on sunshine duration, air temperature, air humidity, and windspeed. It was developed to estimate the potential ET (ETP), defined as the ET from well-watered short grass. This method was tested by Penman in England using turf grown in lysimeters, and in 1956-1958 by Van Bavel and Harris (2) in North Carolina, also with lysimeters, using bermudagrass and corn. In the latter study the original method of Penman was improved by using a direct method to find the radiant energy balance, rather than estimating it from sunshine duration data. In both series of experiments the Penman method was accurate within about 10 % over periods as short as several days. However, by 1960 few other tests of the method had been reported, none in the irrigated western regions of the U.S.

It was the idea of L.L. Daniels of the TBWE to make use of a fundamental method, similar to that of Penman, but developed by the then U.S. Weather Bureau in 1955-1959. It was designed to estimate lake evaporation from standard weather data and was extensively tested by the U.S. Geological Survey in 1954-1958. The result was a set of evaporation maps for the U.S. The method used to compute lake evaporation was then used by Daniels to develop a climatic index (CI) (actually, the lake evaporation) for each successive two-week period during which a specific crop would be grown in Texas. Experimental data were then obtained for the ET during these periods to find the relation between the ET and the CI, expressed as a use coefficient (UC). Using these values of UC for each crop by periods, the average ET was estimated from the average CI values, the latter derived from the average value of

the needed weather parameters. The ET values for a number of crops, in each of the 24 climatic areas in which the state was divided, were calculated and made available as a set of tables. At the time, this method was a significant improvement for use in the development of water resources and irrigation engineering in Texas, if only because it was objective and reproducible.

The basis of the Bulletin 6019, published in 1960, are, as stated, estimated average lake evaporation amounts for 1946-1955, calculated using the methods of the US Weather Bureau (published in 1959). For the Austin area the annual total is 55 in., as shown for area 7C in Table 4 of Bulletin 6019. Since 1967, we also have available lake evaporation data based on actual measurements, as documented in TWDB report #64. Using the TWDB method and data for the Lake Travis area, and for 1940-1988 (shown in attachment 20 of the Lakeway Application), we find an average annual total for 1946-1955 of 68.0 in. This updated figure should be used rather than the earlier estimate of 55 in. In other words, in Bulletin 6019 the annual value of CI appears to be underestimated by 24 %. The revised value of CI for 1940-1978 (15) is, likewise, an underestimate of 19%, compared to the 1940-1978 measured lake evaporation, based on TWDB #64.

The foregoing facts would be one argument for upwardly revising any ET estimates from Bulletin 6019 for the Austin area. But, there are two additional reasons for questioning the applicability of Bulletin 6019 for ET rates of golf course turf. No experimental data were available in 1959 and in Texas on the actual ET of turf that is kept green and watered the entire year. Beard and associates (11) made outdoor measurements on 10 turfgrasses in College Station, but only during the summer months.

The data used in Bulletin 6019 for estimating the ET rates for a perennial pasture were those measured for alfalfa in 1940, in the San Fernando Valley. The numbers were obtained by periodically measuring soil water content and recording the local rainfall. Today, we know that the soil moisture depletion method is not adequate to accurately determine actual water use, particularly when it is not limited by water availability, generally understood as the potential evapotranspiration. The standard method is recognized to be the use of lysimeters as used by Beard (12), which are buried containers of which the water content changes are measured with absolute accuracy.

Also, crop coefficients developed in the Central Valley of California for alfalfa that is irrigated infrequently may not apply in central Texas for closely mowed turf that is watered every day if necessary. The methods suggested in Bulletin 6019, using the values given for alfalfa, suggest an annual ET of 49.2 in. for the Austin area. Such a crude estimate may be useful in irrigated crop production, but for well-watered short grass a more

fundamental and more precise method to find the potential ET from turf directly from local climatic data is available. This method, originally proposed by Penman, has been extensively improved and tested since 1948, and its modern form will now be described and applied to the golf course turf at Lakeway.

In the current version used here, the net radiation is found from measured values for solar radiation and calculated values for the sky long-wave radiation, based on measured air temperature and humidity, as proposed by Kimball et al. in 1982 (3). Another improvement, made by Van Bavel in 1967 (4), replaces the generalized wind function used by Penman by one that accounts for the aerodynamic nature of the crop canopy, generally known as its roughness parameter. The same report (4) shows that, based on data from a series of experiments in Phoenix, AZ, the method gave accurate hourly values for evaporation from open water, from wet, bare soil, and for the ET from well-watered alfalfa. It was shown also that daily values of ET could be accurately calculated from daily averages or totals for the air temperature and humidity, the windspeed and the solar radiation, the error being less than 5 %. The last finding is practically important since average daily values for those four climatic variables are readily available, and the ensuing calculation greatly reduced, in contrast to using hourly averages.

A final improvement was made possible by the availability of desk and handheld computers. In order to reduce his method to a single explicit formula, Penman had to use two mathematical approximations. The computation was then possible using a slide rule or calculator, as well as a set of physical tables. In 1976, Van Bavel and Hillel (5) introduced a numerical procedure that eliminates the need for these two approximations as well as the use of tables, thus making the calculation more accurate and faster.

With all the changes mentioned, the original Penman formula has given way to a brief set of algorithms, that require the following inputs: latitude, elevation, average barometric pressure reduced to sealevel, total of solar radiation, average air temperature, average humidity of the air as the average dewpoint, average windspeed and height of measurement, surface albedo, and surface roughness. The method is named the recursive combination method (RCM), since it combines the surface energy balance with the transport equations of heat and water vapor from the surface to or from the air layer where its temperature and humidity are measured, and finds the value of ET by a recursive (iterative) numerical method.

To simplify the procedure, the barometric pressure can be set at 1000 mb and the elevation can be ignored if it is less than 1000 feet, without loss in accuracy. All the input variables are

general, except for the albedo (reflectance) and the roughness parameter of the turf. For a turf that is kept at a height of 20 mm (3/4 in.), the respective values used are 0.2, and 0.5 mm, the latter value calculated with the empirical formulas given by Campbell (6) for finding the heat and vapor transfer roughness parameters from the height of the canopy.

The program is short, about 40 lines of code, and can be formulated in BASIC, in FORTRAN, or in Pascal on any desk or lap computer, or on a programmable calculator. A software package used in combination with an automatic weather station or a computerized weather data base is commercially available.

Inputs and results for monthly potential ET from turf for Austin

Since no long term weather data are available for the Lakeway location, we used average monthly data for the Austin airport. Table 1 shows the input data and the calculated values for the ET from turf in inches/month and in mm/day, the latter for comparison with the turfgrass literature, most of which is in metric units. The monthly means of the daily average air temperature, humidity, and wind speed were obtained from the local climatological summary for Austin (7). The data were obtained at the Austin municipal airport (elevation 587 ft, average barometric pressure 994.3 mb). The length of record is 28 years or longer.

The humidity is reported for 0, 6, 12, and 18 hours as relative humidity, and the daily average dewpoint was calculated from the average air temperature and the relative humidity at 12 hours, as the best possible approximation. The windspeed was measured at an elevation of 15 ft. The average daily solar radiation for each month was taken from a summary given for the state of Texas in a report by Hall (8) that cites the data for Austin. These data are given in langley's per day (cal per cm² per day) and were converted to MJ per m² per day (1 MJ per m² = 88.06 BTU per sq.ft). The calendar day number is that for the 15th of each month.

The calculated values for the monthly ETP from turf are plotted in Figure 1, as are the figures for the average monthly lake evaporation. The latter values were based on Table 4 in Bulletin 6019 for the Austin area (7C), and on the measured long term data for Lake Travis, from TWDB Publication 64, referred to above. The measured values for Lake Travis have been displaced by one month to bring them in phase with the others, that are unaffected by seasonal heat storage.

Table 1. Monthly weather parameters and ETP from golf course turf in Austin

month	day	taf F	rh	dpr F	wsp MPH	dgr MJ/m2.day	etp in./mo	etp mm/day
JAN	015	49.1	0.60	35.8	9.7	10.1	2.4	2.0
FEB	046	53.2	0.59	39.4	10.2	12.8	3.0	2.7
MAR	074	60.5	0.55	44.2	10.9	15.9	4.9	4.0
APR	105	68.7	0.57	52.9	10.5	18.2	5.9	5.0
MAY	135	74.9	0.60	60.1	9.6	21.0	7.1	5.8
JUN	166	81.6	0.57	64.9	9.1	23.9	8.3	7.0
JUL	196	84.7	0.51	64.6	8.3	24.7	9.0	7.4
AUG	227	84.5	0.50	63.9	7.9	23.8	8.6	7.0
SEP	258	79.2	0.56	62.1	8.0	19.5	6.5	5.5
OCT	288	69.8	0.55	52.9	8.1	16.1	4.9	4.0
NOV	319	58.7	0.58	43.9	9.0	11.6	3.1	2.6
DEC	349	52.1	0.59	38.1	9.2	10.1	2.4	2.0
YEAR		67.2		51.9	9.2	17.3	66.1	1679

taf=air temp in F; rh=rel. hum.; dpr=dewpoint in F; wsp=windspeed; dgr=solar radiation; etp=potential evapotranspiration from golf course turf.

Table 1 shows the monthly average weather parameters as reported by the Weather Service, that is, degrees F for temperature, fraction (or percent/100) for the relative humidity, and windspeed in miles per hour. The value of the dewpoint is calculated from the temperature and the relative humidity, using standard tables, and also given in degrees F. Solar radiation is reported as ly/day (calories per cm2 per day), but these values have been converted to the unit now commonly used in meteorology, MJ per m2 per day (the US equivalent would be BTU per sq.ft. per day). 1 ly = 0.04186 MJ/m2 = 3.686 BTU/sq.ft.

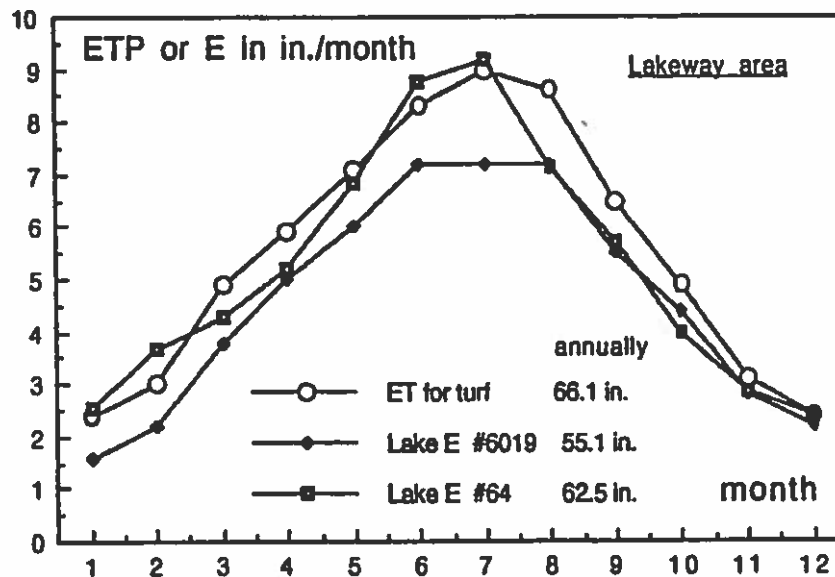
ETP is given in in. per month, this being the unit used in water balance calculations. However, we also give ETP as mm per day as most reports on measured water use by turf are now using that unit. Likewise, the annual average total is given both in inches and in mm. The RCM computations are done exclusively in metric units and converted to US units for reporting purposes.

The monthly value of ETP is based on the long-time averages for each month for solar radiation, air temperature and humidity, and windspeed, as given by the Weather Service records. However, in adjusting the value for the long-wave incoming sky radiation for the average degree of cloudiness, the monthly average value of solar radiation (dgr) is compared to its maximum possible value (mgr). The latter is not a weather parameter, but calculated from

the latitude and the sun's declination, the latter depending on the calendar day number (cdn). This calculation was made for the 15th of each month, as a close approximation of the average value for the month.

The difference, if any, has only a minor effect on the calculated effect of ETP, inasmuch as the adjustment factor varies from 1.0 for a totally clear day to 1.2 for a totally and heavily overcast day. We have calculated the value of the adjustment factor for the month of June by both methods and find that the value for the 15th is 1.026, whereas the average value for the month is 1.025. The difference could be larger for some months, but it is never significant. The cdn numbers are included in the table because they are the inputs for the calculation of mgr, but serve no other purpose.

Figure 1. Calculated ETP from turf; also, calculated and measured lake evaporation.



The difference between the estimated and the measured lake evaporation has been discussed already, as a shortcoming of the Bulletin 6019. What may be surprising is the finding that the potential evaporation from a well-watered golfcourse turf is calculated to be somewhat greater than that from a large lake such as Lake Travis. The physical explanation is that, in an arid environment, a wet surface such as open water or frequently

irrigated turf, obtains on a daily basis energy from the surrounding dry land, augmenting the solar energy driving the evaporation process. Further, this process, known as advection, increases with wind speed and with surface exposure, the latter characterized by the surface roughness parameter for heat and vapor transfer. As we indicated before, the value of this parameter for golfcourse turf is calculated as 0.5 mm. For an open water surface the corresponding value under average conditions is 0.06 mm, based on Table 5.1 in Brutsaert (9), being nearly an order of magnitude smaller and giving a decreased ET.

In contrast, in a humid climate where rainfall generally exceeds the evaporative demand, the surface loses, on a daily basis, heat to the air above it, the result being that a well-watered turf would have a smaller ET rate than open water. This was shown by Penman (1) in England, and also by Van Bavel and Harris (2) in North Carolina, the reduction being typically around 20 %. On the other hand, Van Bavel (4) found that, in Arizona, the ET rates from irrigated alfalfa were greater than those from an open water surface

In conclusion, the numbers given in Table 1 for the monthly ETP from a well-watered golfcourse turf at Lakeway are in line with those measured for nearby open water, and represent the results of a state-of-the-art method of obtaining such numbers from standard weather data, without empiricism or transfer of data from faraway regions. For the 4 winter months, the calculated total ETP is 10.9 in., which can be compared with the 5.7 in. figure from Bulletin 6019, Table 5, for alfalfa, and the corresponding evaporation from Lake Travis of 11.7 in.. Note that, during the generally wetter weather of the winter, lake evaporation is more than turf ET, as explained above.

Comparison with measured values for turf ET

The method used here to calculate ETP by the RCM approach is theoretically sound, has been experimentally verified, often using a well-watered turf in the experiments, and is widely used. Nevertheless, one should verify it with data obtained in turf grass practice and in the area of application. No systematic measurements of water use by turf have been made in the Austin area: we may, however, look at data from other places.

Water use studies by turfgrass scientists in the last two decades have generally been done with lysimeters. These can be of three types, percolation lysimeters, constant water table lysimeters, and weighable lysimeters. The first two are adequate to obtain the ET values over periods of several days or longer, whereas accurate daily ET values can only be had by daily or more frequent weighing. In all cases the methods are absolute and accurate,

provided they are made in a representative and uniform environment.

The only reported study of a turf surface, that was kept growing year around by overseeding in the winter and by constant watering, is due to Kneebone and Pepper (10). It is based on measurements made in Tucson, AZ in 1977-1979, using 1 m² constant water table lysimeters. They used three types of bermudagrass and one type of zoysiagrass, overseeded with perennial ryegrass and managed in a manner similar to that used on golfcourse fairways. They also made parallel measurements without overseeding in the winter period (November through February) from which the use of water by the overseeded turf during the winter period could be estimated. From this report, which is not greatly detailed, we can make the comparison in Table 2. The calculations were made using average monthly values for the weather parameters at the Tucson airport.

location	Tucson measured	Tucson calculated
ETP	65.1 in.	67.1 in.
cool season ET	13.5 in.	13.9 in.
warm season ET	51.6 in.	53.9 in.

Table 2. Measured water use (ET) by turf, averaged over four types of turf, in Tucson and calculated values for Tucson.

The agreement between the measured and calculated values is reasonably close. The weather parameters that prevailed at the site during the study were not reported.

A major source of data on turf water use are the studies at the Turfgrass Research Field Station at College Station, all of which pertain only to the warm season and mostly to warm-season grasses. Moreover, the climate is different from that of Austin, being less warm and more humid. On the basis of the average July weather data for College Station, turf ET should be 0.83 times less there than in Austin during the summer period. All measurements of ET quoted from College Station were made with weighable lysimeters.

Kim and Beard (11) reported water use by a number of grasses in 1982 and 1984, for the months of May, August and September. The average value for three bermudagrass types, totaled for the three months of measurement and adjusted by a factor of 1.20 (1/0.83), gave an ET value of 21.5 in., which corresponds to a figure of 22.2 in. in Table 1 of this report. In a summary of water use studies by turfgrasses, Beard (12, Table 5) gives figures for the

average summer ET rates found in College Station for two varieties of St. Augustinegrass and three varieties of bermudagrass. The average ET value for the five types of turf for the months of June through August was found, after adjustment, as 31.2 in., to be compared with a calculated value of 33.0 in. for Austin.

One should have more definitive and directly measured ET values that can be used for verifying the calculated values for the Austin area. The few data that have been reported support the results given in Table 1, and the conclusion that the values obtained by the method of Bulletin 6019 are too small.

Differences in water use among turf grass species and varieties

On the Lakeway golfcourses the principal species are bermudagrass on the fairways, overseeded with perennial rye in the winter, and bentgrass or dwarf bermuda on the greens. For practical purposes we need consider only the former two types of turf that will occupy 95 % of the irrigated area.

The RCM method that is used to obtain the ETP values in Table 1 does not differentiate between grass types, other than assigning a value for the reflectance of the turf surface for solar radiation and for the roughness parameter as a function of mowing height. The literature reports a number of field experiments in which the ET rates from different turf types have been measured side by side, showing significant differences. An extensive review and summary of this work can be found in reports by Beard (12, 13, 14), from which two main relevant conclusions can be drawn, as follows.

First, there is a significant and consistent difference in ET, all other things being equal, between cool-season grasses, such as rye grass and warm-season grasses, such as the bermuda species, the former showing ET values at least 40 % more than the latter. Table 2 in reference (13) makes this fact evident. Second, there is a great deal of variation within species among the many cultivars that have been developed and tested. In fact, Beard (12) states that there appears to be as much variation within any species as there has been found between them. Data given in reference 14 (Table 1), show that a range of as much as 50% around the mean value was measured among 24 bermudagrass cultivars studied in College Station. However, Beard also points out that the available evidence is confounded with the effects of location, weather, and management, and that more and better research, preferably under controlled conditions, is needed to draw firm conclusions.

Summarizing, the ETP values calculated by the RCM procedure for Austin conditions are supported by the few available field data for bermudagrass turf. Data on overseeded perennial ryegrass are

limited to the Tucson experiments. Recent literature suggests that the ET from an overseeded turf in Austin could be greater than what we calculate, but the explanation for this fact has not been discovered, nor has a means to account for it in the calculation of ET from weather data. Measurements of water use in Central Texas by an overseeded turf are not available, but are critically needed. For now, it seems preferable to use the values as shown in Table 1, considering them as conservative estimates.

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Appendix

Potential Evapotranspiration

The potential evapotranspiration (ETP) is the maximum rate of evaporation from a vegetated surface in a given set of weather conditions. Thus, it is a different value for different types of surface, though the weather parameters are the most important in determining the value of ETP. Penman defined ETP for practical purposes as the rate of evaporation from short and well-watered grass. However, in deriving his theoretical model for calculating ETP from weather parameters, he specified that, at the entire evaporating surface, the water vapor pressure would have the saturation value, and, therefore, be determined by the temperature of that surface. The physical definition of ETP is then the rate of evaporation from a given surface that is covered with a thin layer of water. Obviously, this rate cannot be exceeded. The difference between the two definitions is not measurable in the case of well-watered turf.

The principal weather factors that determine the rate of ETP are, in order of significance, the radiant energy received at the surface from sun and sky, the air temperature, the air humidity, and the wind speed. The principal properties of the surface are its reflectance for solar radiation and its aerodynamic roughness, the latter determining the intensity of the turbulent exchange of heat and water vapor between the surface and the air above it.

The actual rate of evapotranspiration (ET) is always less than ETP, but for a well-watered vegetal cover the difference may not be measurable, or be smaller than the errors made in estimating the surface parameters and in measuring the weather parameters. In the case of a typical golf course turf, which is generally frequently watered so as to maintain a quality surface, and that is also mowed quite close, ET and ETP are essentially the same. Only if there was a soil moisture deficit, would ET decline below the ETP value. Also,

if turf becomes dormant, or is not fully established in the case of overseeding, for example, ET would be less than ETP.

In verifying the numerous variations of the Penman method, agricultural climatologists and micrometeorologists have typically used a turf field that was well watered. Such tests have been made over the past 40 years in different continents and in various climates: humid, arid, continental, maritime, and tropical. They demonstrate that the physical model estimates the ETP value with an accuracy that is adequate for engineering purposes, such as 5-10%, over periods as short as one hour, but also as long as one month, or one week. In making predictions, one can base the ETP estimate on average weekly or monthly values of weather parameters for a given locality.

Disposal of Effluent by Irrigation of Cedars (*Juniperus ashei*)

Cornelius van Bavel - May 6, 1993

1. Availability and utilization of a stand of cedar trees on the 85-acre tract at Lakeway.

Based on a personal examination of the 85-acre tract at Lakeway on March 25, 1993 and from available aerial photographs, it appears that at least 50 acres are in a contiguous and complete tree cover, mostly cedars. The remaining acreage is either incompletely covered, but shows many small cedar trees, or it has a slope exceeding 10 %. An up-to-date aerial photo and a topographical map are available. This remaining area could still be used if needed, but at a lower application rate, based on a lower value for the ET rate. Using the numbers on ETP for cedar and for the readily available acreage, a water balance can be calculated by the mandated procedures, using a part of the 85-acre tract to supplement the presently used 118 acres of fairways on the Yaupon golf course.

The cedars in question are Ashe junipers (*Juniperus ashei*), according to the documentation by Simpson (1). This species is similar to the Eastern red cedar (*Juniperus virginiana*), which occurs in all the Eastern states, the approximate dividing line being the Balcones fault. However, in the Hill Country the two species appear to have hybridized to a large extent.

Occurring mostly on eroded and relatively infertile soils, in a semi-arid climate, the cedar grows slowly, but has a competitive advantage over other tree species, being a true evergreen and tolerant of drought and cold. It has little economic value, but forms a significant wildlife habitat, according to Simpson (1) and other authors. Cedars respond readily to watering and fertilization, but because of their status as an undesirable tree in the view of farmers and ranchers, very little is known about their water relations and nutrient requirements.

By irrigating cedars frequently in small doses with effluent, one can approximate the condition that defines potential evaporation, in the same manner as this is done on a golf course where the maintenance of a rapidly growing turf is essential. As shown in the following section, the value of ETP on a month by month basis can be calculated by the exact same RCM method that is used for golf course turf grass.

Disposal of sewage treatment plant effluent by forested areas is by no means unusual. In the book on land application of municipal wastewater edited by D'Itri (2), three pages (15-17) are dedicated in the introductory chapter to forested systems on which research has been carried out in the US since 1960 and in 5 central, eastern, and southern states, using a variety of tree species and sites. Slow-rate irrigation, using sprinklers is the prevailing technique of choice, the control of nitrogen as nitrate being the foremost design constraint. For small facilities (less than 0.5 MGD) minimal management of the forested area is preferable. The

winter dormancy of trees limits the practicality of forest disposal in many areas, but this does not apply in Central Texas when cedar trees are used.

In the same book (2), chapter 9 deals entirely with effluent disposal on tree stands, citing tests in Michigan with Scotch pine, white spruce, and balsam fir, at irrigation rates of 0.4 in./day. In Table I, Chapter 11 results are shown on nutrient retention by a forested system in which the annual hydraulic load was about three times the annual ET. As one might expect, only 20% of the applied N was retained, in contrast to 95% of the P load. It was concluded that forested systems are particularly effective if removal of phosphorus is the prime objective, even if the percolation discharge is relatively high.

A summary report of research at Penn State by Sopper (3) comes to the following conclusion: "Twelve years of research have indicated that the living filter system for renovation and conservation of municipal waste water is feasible and that the combinations of *agronomic and forested areas provide the greatest flexibility in operation. Such a system is more adaptable to small cities and suburbs because of the availability of open land close to the wastewater treatment plant ...*"(Italics added).

Cole et al. (4) gave a review of disposal of wastewater and of sludge on forests and present the results of a 6-year study of the use of an established Douglas fir stand in Washington state. This forest was irrigated during the entire year with 2 in. per week of waste water from the city of Seattle. The forest received 200 lbs of N per year, of which 90% was retained. Phosphorus was entirely removed through its chemical immobilization by the soil. In their conclusions they point out that "...*(for) the lack of adequate information and understanding...some municipalities have been reluctant to select forests for this use.*" (Italics added).

In the 1981 EPA manual for land treatment of municipal wastewater (5), 7 operational forest disposal systems in the US are cited (Table 4-9), varying from 19.5 MGD to 0.01 MGD. These sites include the use of loblolly pine, slash pine, red pine, balsam fir, hemlock, and spruce. In Table 4-10, red cedar is listed as a species that responds well to irrigation with wastewater. In the same manual a relative comparison is given of crop categories and species. All forest crops are classified as high water users and good nitrogen users, the latter in comparison with turf, which was rated as an excellent user of nitrogen.

In summary, disposal of municipal wastewater by a forest can be effective and practical when the design of the system is adapted to the site and its climate, while it also complies with the regulations on hydraulic loading and nutrient removal.

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2. Potential ET from a stand of cedar trees in the Austin area.

As an introduction, reference is made to the Appendix of the report "Evapotranspiration (ET) of Golf Course Turf in the Austin, TX area". The evapotranspiration by a cedar stand differs from that by a fairway turf, under the same weather conditions, for the following reasons. One, the reflectivity of such a stand for incoming solar radiation is less, hence the absorbed radiant energy is greater. Second, the aerodynamic roughness coefficient of such a stand is much larger, hence the dissipation of the evaporated water is more rapid, as is the rate of extraction of heat by the evaporating and cooler foliage from the warmer air that flows over the stand and that originates from surrounding areas that are not being irrigated. This is known as the "oasis" or the "clothesline" effect. It can be accurately calculated as shown by Van Bavel in 1966 (1), and it was demonstrated dramatically by Van Bavel et al. in 1963 (2). The latter reported an evaporation rate of 0.58 in./day from an isolated stand of Sudangrass about 3 feet high, whereas the rate from a similar 2 acre field was found as 0.38 in./day.

With regard to the reflectivity from the cedar stand on the 85 acre tract at Lakeway, the following. In our calculations of the ET rate from fairway turf, a value of 20% was used for the reflectivity. No data for a cedar stand have been found. Campbell (3) in his textbook cites a value of 16% for coniferous woodland. In the monograph on evaporation by Brutsaert (4) a range is given of 10-15% for coniferous forests. Aerial photographs of the area in question clearly show the darker shade of the cedar brakes as compared with the irrigated and green golfcourse fairways. We have adopted a conservative value of 15 % in calculating the ET rate from a cedar brake.

In respect to the aerodynamic roughness, we have to rely again on values measured or assigned to forest stands similar to the cedar brakes at Lakeway. Fichtl and McVehil (5) made measurements at Cape Canaveral, Florida of vegetation 3 to 6 feet high, and found a value for the roughness coefficient (ZOT in our equations and measured in meters) of 0.20 m. For tree stands 30 to 45 feet

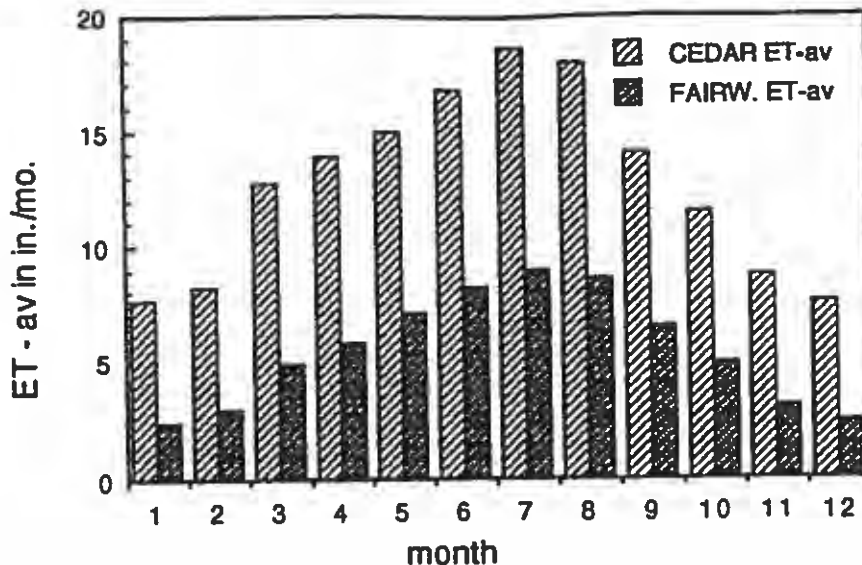
high, they measured values from 0.40 to 0.70 m. Campbell (3) gives an empirical formula for the roughness coefficient as $ZOT = 0.026 \cdot H$, in which H is the average height of the vegetation in m. For a fairway turf mowed at 3/4 in., $ZOT = 0.0005$ m which is the value we used to compute ET from well-watered turf. For the cedar brakes on the Lakeway tract we use a conservative value of 0.12 m ($0.026 \cdot 15 \cdot 0.305$), based on an average estimated tree height of 15 feet. To be further on the conservative side, we added the height of the tree stand to the elevation above the terrain at which the windspeed was recorded by the Weather Service, resulting in a value of 11.29 m for the parameter ZOM in our equations.

Using these physical characteristics for an area covered principally with cedars and that is continually kept well-watered by either rain or overhead irrigation, we find the values shown in the table below. These are calculated from the average monthly weather parameters as recorded for Austin, TX. In the table we show also the values calculated previously for fairway turf.

Table 1. Calculated monthly average ETP for a well-watered cedar brake and for a fairway turf at Lakeway, Texas, using the RCM method.

MONTH	cedar brake in./month	fairway turf in./month
JAN	7.66	2.40
FEB	8.26	3.00
MAR	12.74	4.90
APR	13.95	5.90
MAY	14.94	7.10
JUN	16.83	8.30
JUL	18.66	9.00
AUG	17.95	8.60
SEP	13.98	6.50
OCT	11.46	4.90
NOV	8.76	3.10
DEC	7.56	2.40
YEAR	152.75 in.	66.10 in.

Obviously, there is a great difference between the ETP values for the fairway turf and that of the cedar brakes, as can be seen from the following figure.



Monthly ETP in in. from a well-watered fairway turf and from a well-watered stand of cedars, both in the Austin, TX area. The data are based on average monthly weather parameters.

One might well ask why a cedar forest can evaporate so much more water than short grass. To a large extent this reflects the definition of potential evaporation, which is the maximum rate at which water can evaporate from a vegetated surface and which assumes that the entire canopy is wet at all times. This condition will be closely approximated if the tree stand is being irrigated frequently and in small dosages on dry days, which would require application of the water from above. Much of this water will be intercepted by the vegetation, thus fully exposing it to the drying action of the atmosphere above and within the canopy.

Numerous studies have shown that the fraction of intercepted rain (or overhead irrigation) by a forest is quite large. For example, in Chapter 5C by Benecke in the book "Water and Plant Life" (6), the interception by two types of coniferous tree stands of a 0.25 in. rain is given as ranging between 30 and 50 %. During the winter months in Austin, a daily dose of from 0.20 to 0.25 in. on rainless days would supply the evaporative demand as shown in Table 1 above. The water applied would be partially retained by the canopy, the remainder reaching the soil surface, to be absorbed first by the soil and next by the cedar roots, to be ultimately transpired by the leaves. In his book "Vegetation and Hydrology", Penman (7) gives in Table 7 a figure of 55% interception from a 0.2 in. rainfall on a spruce forest. He comments that "Most of the intercepted water is re-evaporated, and becomes part of the evaporation term in the hydrological balance sheet."

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3. Nutrient Uptake and Requirements of Cedar Trees.

Since no specific data on the uptake and requirements for N, P, and K by cedar trees are available, an estimate will be made based on what is known about other evergreen coniferous trees. Even this type of data are not abundant for the US, because economic interest in fertilization of forests is minimal. Further, such data as have been published reflect the fact that, typically, forest exist on the less fertile sites and are not fertilized nor irrigated. Such conditions result in low apparent nutrient requirements.

Wells and Jorgenson (1) measured the nutrient requirements of loblolly pine in a 16-year old stand in North Carolina. Their findings show the following, with the ratio of P and K to N in parentheses:

N	104 lbs./ac./yr.	(1.00)
P	18 lbs./ac./yr.	(0.17)
K	58 lbs./ac./yr.	(0.26)

They also measured the leaching losses from this stand, which were 1 lbs./ac./yr. or less, hence insignificant. These data are gross underestimates of the requirements that would exist if the stand were irrigated with wastewater. However, they realistically suggest the ratios between the three major nutrient elements.

In a review of the nutrient cycling of 36 forest sites around the world, Cole and Rapp (2) show the nutrient cycling average for 17 coniferous forests in the temperate zone (Table 6.8). These data, again, are of direct value only as an estimate of the relative requirements, as follows:

N	41 lbs./ac./yr.	(1.00)
P	5 lbs./ac./yr.	(0.12)
K	25 lbs./ac./yr.	(0.61)

Another possible indication of the nutrient requirements of conifers are the fertilizer recommendations for new plantings in the US. For loblolly pines in the Southeast, Allen (3) states that the common after-planting rates are 150-200 lbs. of N/ac., and 40-50 lbs. of K/ac. These numbers provide limited information about sustained requirements.

In its Process Design Manual, EPA (4) shows in Table 4-12 for the annual nitrogen uptake of fully stocked and vigorously growing forests of conifers in the South a range of 196-285 lbs./ac./yr. For the West, the range is given as 134-223 lbs./ac./yr. We believe these numbers to more nearly represent the conditions of a cedar forest that is irrigated with municipal wastewater than the data derived from natural stands. The average of the two ranges is assumed to be applicable to a cedar stand in Central Texas and comes to 209 lbs./ac./yr. of N. Since the manual gives no data on P and K, we have used the average ratios for P/N and K/N found at natural sites to give the following values for the annual nutrient requirement of a cedar stand irrigated with wastewater:

N	209 lbs./ac./yr.
P	30 lbs./ac./yr.
K	122 lbs./ac./yr.

In the application of these numbers in the nutrient balance calculation it must be remembered that any apparent overload of phosphorus will not show up in the groundwater, as it will be adsorbed almost entirely by the soil in the root zone. In fact, the trees must compete with this process which tends to reduce the P content of the soil solution to below 1 mg/l. In contrast, an overload of N and K could affect the ground water, but only if there were a significant hydraulic overload, which the design of the entire system will prevent.

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Appendix

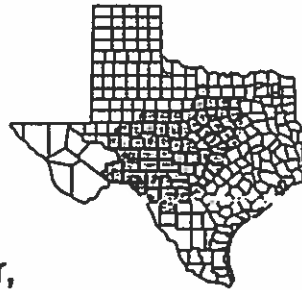
Description of the Ashe Juniper, from Simpson, A Field Guide to Texas Trees.

Texas Trees

Juniperus ashei

Ashe Juniper

(Mountain Cedar,
Rock Cedar, Post Cedar,
Mexican Juniper, Break Cedar,
Texas Cedar, Sabino)



Ashe Juniper occurs on limestone soils that were part of an ancient reef more than 60 million years old. The juniper ranges from the southern Ozarks in Arkansas and Missouri, down through the Arbuckle Mountains in Oklahoma, and into Texas, where it approximately marks the eastern edge of the Balcones Escarpment fault line. It then crosses the Pecos River into Terrell County and northern Mexico. Here it forms great thickets and drifts. When the Edwards Plateau was first settled, Ashe Juniper occupied only the stoniest, steepest hillsides and the heads of canyons, places where they were not destroyed by fires. After the settlers stopped the fires, Ashe Juniper began to colonize the lands.

Ashe Juniper is a small, many-stemmed tree growing to 38 feet in height. The bark comes off in long, narrow strips that are used for nest material by the golden-cheeked warbler. The leaves are minutely saw-toothed and smell like cedar. Male and female flowers are borne on separate trees, and the large blue berrylike cones are eagerly eaten by wildlife. The heartwood of this species makes excellent fence posts. Ashe Juniper is closely related to *Juniperus monosperma* in west Texas, but they do not overlap in distribution. Some authors believe that Ashe Juniper hybridizes with *J. virginiana*, but generally *J. virginiana* flowers later.

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Summary of Equations

Water & Storage Balance Calculations

When only one type of irrigation is applicable- (i.e. turf irrigation, requiring only one application rate)

$$IA, \text{ Irrigation Acreage Requ'd} = [Q_{\text{mgd}} * (12 \text{ in/ft} * 365 \text{ d/yr}) * 1,000,000 \text{ gal/MG}] / 325,851 \text{ gal/acft} / (A_E \text{ in/ac/yr})$$

Where: A_E = Actual Irrigation Effluent Application

Q_{mgd} = Design Flow of Plant

$$\text{For example, S-5 turf acreage} = 0.4 \text{ mgd} (12 * 365 * 1E6) / (325851) / (3.83 \text{ acft/ac} * 12 \text{ in/ac/yr}) = 117 \text{ acres}$$

When more than one type of irrigation is applicable- (i.e. turf and cedar irrigation, requiring 2 different application rates)

$$\text{Irrigation Acreage}_1 \text{ Requ'd} = [Q_{1\text{mgd}} * (12 \text{ in/ft} * 365 \text{ d/yr}) * 1,000,000 \text{ gal/MG}] / 325,851 \text{ gal/acft} / (A_{E1} \text{ in/ac/yr})$$

$$\begin{aligned} \text{Irrigation Acreage}_2 \text{ Requ'd} &= [Q_{2\text{mgd}} * (12 \text{ in/ft} * 365 \text{ d/yr}) * 1,000,000 \text{ gal/MG}] / 325,851 \text{ gal/acft} / (A_{E2} \text{ in/ac/yr}) \\ &+ [(Q_{\text{mgd}} - Q_{1\text{mgd}}) * (12 \text{ in/ft} * 365 \text{ d/yr}) * 1,000,000 \text{ gal/MG}] / 325,851 \text{ gal/acft} / (A_{E2} \text{ in/ac/yr}) \end{aligned}$$

Where: A_{E1} = Actual Irrigation Effluent Application

A_{E2} = Actual Irrigation Effluent Application

Q_{mgd} = Design Annual Flow of Plant = $Q_{1\text{mgd}} + Q_{2\text{mgd}}$

$Q_{1\text{mgd}}$ = Annual flow for application to irrigation area 1

$Q_{2\text{mgd}}$ = Annual flow for application to irrigation area 2

$A_E \text{ turf} = 4.6 \text{ acft/ac}$ (S-4 proposed)

$A_E \text{ cedar} = 4.68 \text{ acft/ac}$, limited by Nitrogen limit

$$\text{For example, S-4 turf acreage} = 0.4 \text{ mgd} (12 * 365 * 1E6) / (325851) / (4.6 \text{ ftac/ac} * 12 \text{ in/ac/yr}) = 97 \text{ acres}$$

$$\text{For example, S-4 cedar acreage} = (0.81 - 0.4) \text{ mgd} (12 * 365 * 1E6) / (325851) / (4.68 \text{ ftac/ac} * 12 \text{ in/ac/yr}) = 98 \text{ acres}$$

Water Balance - Determines Average System Consumption

P, Ave Precipitation (known from records)

R, Runoff = $(P - 0.2 * (1000 / \text{CN} - 10))^2 / (P + 0.8 * (1000 / \text{CN} - 10))$, where $P > \text{Initial Abstraction} = 0.2 * (1000 / \text{CN} - 10)$ (SCS Method)

CN varies depending on Antecedent Moisture Condition:

1st day rain, CN=74

If Cumulative Next day rain \geq Initial abstraction value, $I_a = 0.2 * (1000 / 74 - 10) = 0.70$ inches, CN = 88

R_i , Infiltrated Rainfall = (P-R)

Summary of Equations

S , Net Soil Storage = $S_{-1} + R_i - ET$; \leq Available Water Capacity_{max} (AWC)

Total Water Deficit = $ET - S_{-1}$ if $S > 0$

Leaching, $L = C_e / (C_1 - C_e) * (ET - R_i) = C_e / (C_1 - C_e) * (ET - S_{-1})$ when $S > 0$

C_e = Electrical conductivity of effluent = 0.78 millimhos/cm

C_1 = Maximum allowable electrical conductivity of soil solution = 4 millimhos/cm (for ryegrass) {=8mmhos/cm for Bermuda}

ET, Evapotranspiration (known per research)

Total Water Need = $(ET + L)$

Additional Water Needed in the Root Zone = $(\text{Total Water Need} - R_i) = (L + ET - S_{-1})$ if $S > 0$

Maximum Water Land Application = $(\text{Additional Water Needed in Root Zone})/k$

Where: k =sprinkler efficiency =0.85

Storage Balance - Determines Storage Volume Required for System, Based on 25-yr Conservative Conditions

P_{25} , 25-yr High Precipitation (known from records)

R_{25} , Runoff = $(P_{25} - 0.2 * (1000/CN - 10))^2 / (P_{25} + 0.8 * (1000/CN - 10))$ (SCS Method)

CN varies depending on Antecedent Moisture Condition:

1st day rain, CN=74

If Cumulative Next day rain \geq Initial abstraction value, $I_a = 0.2 * (1000/74 - 10) = 0.70$ inches, CN = 89

R_{i25} , 25-yr Infiltrated Rainfall = $(P_{25} - R_{25})$

Q_{eff} = Effluent Received from WRP

Available Water = $Q_{eff} + R_{i25}$

E_{25} = 25-yr Net Low Evaporation (determined from gross evaporation and precipitation records)

$EVAP_{IA}$ = Evaporation per Irrigation area = $E_{25} * (PS/IA)$

Where: PS = Pond surface acreage

IA = Irrigation acreage

Storage = System inflow - System outflow = $(Q_{eff} - E_{25T}) - \underbrace{[(ET + L)_{AVE} - R_{i25}]/k}$

I_{MAX} = Max effluent application rate allowed per ET

I_{MAX} is generally larger than allowed permit application rate over total year.

I_D = Design effluent application rate based on monthly application distribution, manual entry less than I_{MAX}

Summary of Equations

Turf Evaluation:

$$S_D, \text{ Total Daily Storage} = S_e + D_{ST} - \text{Evap}_{IA}$$

$$\text{Where: } S_e = \text{Excess Effluent for Storage} = (Q_{\text{eff}} - I_D) \quad [+ \text{ value}]$$

$$D_{ST} = \text{Turf Demand from Storage} = (Q_{\text{eff}} - I_D) \quad [- \text{ value}]$$

$$S_T, \text{ Accumulated Storage} = S_{T-1} + S_D$$

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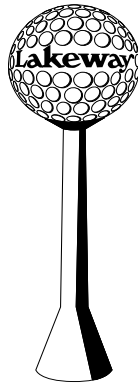
ATTACHMENT U

Reclaimed Water Operations & Maintenance Plan

(Domestic Worksheet 3.1, Section 1A)

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LAKEWAY MUNICIPAL UTILITY DISTRICT



RECLAIMED WATER OPERATION & MANAGEMENT PLAN

Prepared by: **CE&C** | P.L.L.C.

Castleberry Engineering & Consulting, P.L.L.C.

Texas Firm Registration Number 10084

P.O. Box 40546

Austin, Texas 78704

(512) 751-9272

Updated May 2014

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1.0 INTRODUCTION	1
2.0 REGULATORY REQUIREMENTS	6
2.1 Reclaimed Water Quality	6
2.2 Sampling & Analysis and Record Keeping & Reporting Overview	6
2.3 Permitted Uses	6
3.0 RESPONSIBILITIES & REQUIREMENTS OF RECLAIMED WATER USERS	9
3.1 Notification	9
3.2 General Use Requirements	9
3.3 Irrigation Using Reclaimed Water	9
3.4 Special Design Criteria	9
3.5 Inspection & Maintenance	9
4.0 RESPONSIBILITIES & REQUIREMENTS OF THE DISTRICT	10
5.1 Inspections	10
5.2 Sampling and Analysis	10
5.3 Record Keeping and Reporting.....	10
5.4 Un-Authorized Use.....	11

ATTACHMENT A – Title 30, Chapter 210, TAC – Use of Reclaimed Water

1.0 INTRODUCTION

Reclaimed water is currently produced by Lakeway Municipal Utility District's (District's) two (2) separate S-4 and S-5 Water Recycling Plants. The water recycling plants are each permitted to dispose of treated effluent through Texas Land Application Permits (TLAP) and also to produce and provide reclaimed water through Chapter 210 Reclaimed Water Use Authorizations issued by the Texas Commission on Environmental Quality (TCEQ).

It is the District's goal to maximize the use of reclaimed water in order to conserve potable water. As such, the District produces and provides reclaimed water that meets or exceeds the highest TCEQ standard for reclaimed water, Type I reclaimed water.

2.0 REGULATORY REQUIREMENTS

The production, distribution and use of reclaimed water shall be in accordance with Title 30, Chapter 210, of the Texas Administrative Code – Use of Reclaimed Water (Chapter 210). This includes the District's production and distribution facilities, and also includes each User's system and the use of that system. A reclaimed water User is defined in Chapter 210 as any "person or entity utilizing reclaimed water for a beneficial use, in accordance with the requirements of this chapter." A number of these requirements are listed in the following sections, but the entirety of Chapter 210 is incorporated into this Operation and Management Plan.

2.1 Reclaimed Water Quality

TCEQ defines in Chapter 210 two types or quality requirements for reclaimed water, Type I and Type II. Type I reclaimed water is the higher quality of the two and is permitted for use where contact between humans and reclaimed water is likely, whereas Type II is only permitted where contact between humans and the reclaimed water is unlikely. The District only produces the higher quality Type I reclaimed water in each of its systems. Type I reclaimed water is required to meet the following minimum water quality parameters on a 30-day average.

BOD ₅ or CBOD ₅	5 mg/l
Turbidity	3 NTU
Fecal coliform or <i>E. coli</i>	20 CFU/100 ml*
Fecal coliform or <i>E. coli</i>	75 CFU/100 ml**
<i>Enterococci</i>	4 CFU/100 ml*
<i>Enterococci</i>	9 CFR/100 ml**
* 30-day geometric mean	
** maximum single grab sample	

The water quality parameters dictated in the TLAP permit for each of the District's Water Recycling Plants shall also be met. The parameters contained in each of the TLAP permits is the same for each of the facilities, including BOD₅, total suspended solids (TSS), pH, and chlorine

residual requirements.

2.2 Sampling & Analysis and Record Keeping & Reporting Overview

The District, as the reclaimed water Producer, is required to sample the reclaimed water prior to distribution to any User to assure that the water quality meets the minimum requirements. Each of the water quality parameters listed in Section 2.1 shall be sampled and analyzed at minimum frequencies specified in the permits. The District will file monthly reports with the quality and volume of reclaimed water used to TCEQ. Copies of these reports, as well as any other notifications made to TCEQ and copies of Reclaimed Water Service Agreements, will be maintained on-site for a minimum period of five (5) years. Details of these procedures are given in Section 4 of this Plan.

2.3 Permitted Uses

Type I reclaimed water may be used in areas where the public may be present during use, including irrigation of public places. The reclaimed water uses listed below are permitted by TCEQ for Type I reclaimed water, but each system and use of that system must first be approved by the District as the District may not necessarily approve of each of these. As later described, each reclaimed water User must execute a Reclaimed Water Service Agreement with the District prior to any use.

- a. Irrigation, including residential irrigation; irrigation of public parks, golf courses with unrestricted public access, school yards, or athletic fields; as well as sites where public contact is not expected.
- b. Irrigation of food crops where the applied reclaimed water avoids contact with the edible portions of the food crop or when the food crop will be substantially processed prior to human consumption, as detailed further in Chapter 210.
- c. Irrigation of pastures or feed crops for animals, including milking animals.
- d. Fire protection, either in sprinkler systems or external fire hydrants.
- e. Maintenance of impoundments or natural water bodies where recreational activities, such as wading or fishing, are anticipated even though the water body was not specifically designed for such a use.
- f. Toilet or urinal flush water.
- g. Soil compaction or dust control in construction areas.
- h. Cooling water makeup water. Use for cooling towers which produce significant aerosols adjacent to public access areas may have special requirements.
- i. Other similar activities where the potential for unintentional human exposure may occur.

3.0 RESPONSIBILITIES & REQUIREMENTS OF RECLAIMED WATER USERS

3.1 Notification

3.1.1 Reclaimed Water Service Agreement

Each reclaimed water User is required to execute a Reclaimed Water Service Agreement with the District prior to receiving service. Each reclaimed water User has varying needs and requirements in order to be served with recycled water, and as such each individual Agreement may contain additional terms and conditions specific to that User.

3.1.2 Construction Plans

Construction Plans and Specifications shall be submitted to the District for review and approval prior to beginning construction of any irrigation or system that will use reclaimed water, and/or prior to any modifications being made to a system. The system shall be designed in accordance with the District's standards, as well as the Uniform Plumbing Code edition adopted by the District at the time of submittal, TCEQ standards, requirements included in this Plan, and any other requirements of applicable governing agencies. Construction Plans shall be drawn to scale and show the following:

- a. All existing and proposed water, reclaimed water and/or wastewater lines.
- b. All existing and/or proposed facilities to be used to distribute, store, control and apply the reclaimed water. Adequate information shall be provided to enable the review of the Plans and ensure that the applicable regulations have been met.

Systems proposing to use reclaimed water for irrigation shall first obtain a District irrigation system plumbing permit and meet the associated District irrigation requirements. The Construction Plans submitted shall include the following, in addition to the requirements listed above:

- a. Existing and/or proposed property boundaries and site improvements.
- b. Areas to be irrigated.
- c. Water balance and proposed use amounts, reduced pressure zone (RPZ) back-flow prevention device, and all other requirements included in the District's Landscape Irrigation System Requirements.

3.1.3 Inspections During Construction

Representatives of the District and other applicable regulatory agencies will have access to the site at all times. The proposed User shall notify the District a minimum of 48-hours

prior to the following points during construction:

- Beginning construction of the system.
- Testing of back-flow prevention devices.
- System start-up.

3.1.4 Un-Authorized Uses

User agrees to notify the District of any un-authorized reclaimed water use including, but not limited to: discharge or release of reclaimed water into or adjacent to Waters of the State (except when the discharge is caused by rainfall events); discharge, release or irrigation onto adjacent property, buildings or streets; spills; and/or leaks. Notice shall be given to the District within 24-hours of obtaining knowledge of any such un-authorized use. District personnel will then assist in assessing the extent of the un-authorized use and determining what reports, if any, need to be made. The District will then provide written notice to TCEQ, as required, within five (5) working days.

3.2 General Use Requirements

Below is a summary of the general use requirements for reclaimed water systems.

- a. Reclaimed water users shall use the reclaimed water in accordance with Chapter 210, the District's standards and regulations, and this Plan.
- b. The District will perform periodic inspections and/or audits of appropriate use.
- c. There shall be no nuisance conditions resulting from the user's distribution, use and/or storage of reclaimed water.
- d. Reclaimed water shall not be utilized in a way that degrades ground water quality.
- e. Reduced pressure zone (RPZ) back-flow prevention devices shall be installed on both the potable water service line and the reclaimed water service line. Each of these devices shall be tested by a TCEQ certified tester prior to placing the system in service. Proposed User to notify the District prior to testing the device in accordance with Section 3.1.3 of this Plan.
- f. All piping shall be labeled as described in Section 3.4.b.
- g. A reclaimed water User may not resell, trade or transfer reclaimed water to any other person or entity. The User is also prohibited from conveying the reclaimed water to a location not included in their specific Reclaimed Water Service Agreement.
- h. Any reclaimed water storage facilities shall be designed, constructed and operated in accordance with Chapter 210.
- i. Reclaimed water managed in storage ponds must be prevented from discharge into

water of the state, except for discharges directly resulting from rainfall events.

- j. Reclaimed water storage areas shall have signs posted in accordance with Chapter 210, as described in Section 3.4.b of this Plan.
- k. Reclaimed water systems shall be designed to prevent operation by unauthorized personnel.

3.3 Irrigation Using Reclaimed Water

Users designing and/or operating an irrigation system using reclaimed water are responsible for ensuring the authorized use of the reclaimed water, in accordance with Chapter 210, including:

- a. Designing and operating the system to avoid ponding and/or runoff, as well as over-spraying onto adjacent properties, sidewalks, roadways, buildings or any other unintended uses.
- b. Providing reasonable control of the application rates for reclaimed water. These controls shall encourage the efficient use of reclaimed water and avoid excessive application of reclaimed water.
- c. Utilizing partial-circle sprinklers, when spray irrigation systems are used, along boundaries, sidewalks, roadways, and/or buildings to avoid over-spray and/or irrigation of un-authorized areas.
- d. Ensuring that reclaimed water overflow, crop stress, and undesirable soil contamination by a salt does not occur.
- e. Ensuring that reclaimed water irrigation does not occur when the ground is saturated or frozen.
- f. Ensuring that human exposure is minimized by irrigating at night or when the potential for human contact is low; managing irrigation rates and times to minimize “wet grass” conditions in unrestricted landscaped areas during times when the area could be in use; and installing and maintaining backflow prevention devices on both the reclaimed water service line and the potable water service line.
- g. Ensuring the irrigation site is maintained with a vegetative cover or be under cultivation during times when reclaimed water is being applied.
- h. Ensuring that reclaimed water distribution systems are designed to prevent operation by unauthorized personnel.

3.4 Special Design Criteria

Reclaimed water systems shall be designed to meet several design criteria to minimize human exposure, in addition to the requirements for those systems when utilizing potable water. In addition to the criteria listed in this Plan all reclaimed water systems shall be designed, installed, operated, and maintained in accordance with 30 TAC Chapters 210, 217 and 290.

a. Hose Bibs and Faucets

- i. Hose bibs and faucets are prohibited unless specifically approved by the District.
- ii. If hose bibs and/or faucets are approved they shall meet the following:
 1. Signs, as described below, shall be posted at each hose bib and faucet.
 2. All hose bibs and faucets shall be painted purple and designed to prevent connection to a standard water hose.
 3. Hose bibs shall either be located in locked, below grade vaults; or may be located in a non-lockable service box which can only be operated by a special tool.

b. Labeling

- i. Signs having a minimum size of eight (8) inches by eight (8) inches, as shown in Chapter 210, shall be posted at all storage areas, on all hose bibs and on all faucets reading “Reclaimed Water, Do Not Drink” and “Agua Reclamada, No Bebe El Agua.”
- ii. All exposed piping and piping within a building shall be either manufactured in purple or painted purple and shall be stenciled in white with a label reading “NON-POTABLE WATER.”
- iii. All buried piping installed after the effective date of Chapter 210 shall be either manufactured in purple, installed in purple polyethylene bag encasement, or installed with purple metallic tracer tape located above the piping.
- iv. All sprinkler heads and sprinkler control box covers shall be purple.

c. Separation

- i. Reduced pressure zone (RPZ) back-flow prevention devices shall be installed on both the reclaimed water service line and the potable water service line.
- ii. Reclaimed water lines shall not be connected to other utility lines.
- iii. Irrigation systems shall be designed and operated to avoid reclaimed water leaving the authorized irrigation area(s), with specific requirements including:
 1. Irrigation of areas less than three (3) feet wide are prohibited unless specifically approved by the District.
 2. Spray irrigation systems shall utilize partial-circle sprinklers along all boundaries, sidewalks, roadways, and/or buildings to avoid over-spray and/or irrigation of un-authorized areas. Spray irrigation heads shall not be installed closer than six (6) inches to any boundary, sidewalk, roadway, and/or building.
 3. Drip irrigation systems shall not have drip irrigation lines installed closer than twelve (12) inches to any boundary, sidewalk, roadway, and/or building.

3.5 Inspection and Maintenance

Users shall inspect their reclaimed water system on a regular basis to ensure proper operation and identify any broken equipment, pipes, sprinkler heads, or other system components; as well as to ensure that the reclaimed water is only being used in an authorized way and meets the requirements listed in this Plan. Systems shall be inspected a minimum of once per week, and irrigation systems shall be inspected while the system is operating.

Any improper operation and/or broken system components shall be repaired promptly and the system, or component of the system if it can be isolated, shall not be operated until the problem is remedied.

The District will stop the delivery of reclaimed water to any system that it observes operating in an unauthorized fashion until the system is corrected.

4.0 RESPONSIBILITIES & REQUIREMENTS OF THE DISTRICT

4.1 Inspections

The District will perform inspections during construction and during on-going operation of the reclaimed water systems to verify compliance with the approved Construction Plans, TCEQ regulations, this Plan, and for general authorized use.

a. Inspections During Construction

- i. The District will periodically inspect to verify compliance with approved Construction Plans and other requirements.
- ii. The District will observe and/or verify testing of back-flow prevention devices by TCEQ certified tester.
- iii. The District will inspect the system at start-up to verify compliance.

b. Inspections During On-Going Operation of the Systems

- i. The District will monitor reclaimed water usage volume on a monthly basis to compare to approved amounts.
- ii. The District will inspect each system, including its own facilities, a minimum of one (1) time per week to include:
 1. General authorized usage
 2. That no ponding, overflow, overspray or other un-intended/un-authorized use is occurring.
 3. That crop stress is not occurring.
 4. Monitor general level and condition of any User storage ponds including evidence of overflows and/or excessive water level that may lead to overflow.
 5. Monitor for any leaks or other signs of system failure.

4.2 Sampling and Analysis

The District, as the reclaimed water Producer, is required to sample the reclaimed water prior to distribution to any User to assure that the water quality meets the minimum requirements. Each of the water quality parameters listed in Section 2.1 shall be sampled and analyzed, per the minimum frequencies specified in the TLAP permit. The water quality parameters dictated in the TLAP permit for each of the District's Water Recycling Plants shall also be sampled and analyzed in accordance with the stipulations contained in each of those permits.

4.3 Record Keeping and Reporting

The District will report to TCEQ on a monthly basis, by the 20th day of the month following the reporting period, the following information on forms furnished by the executive director of TCEQ:

- a. Volume of reclaimed water delivered to a user or other provider.
- b. Quality of reclaimed water delivered to a user or other provider, reported as a monthly average for each quality criteria except those listed as "not to exceed" which shall be reported as individual analyses.

The District will maintain records on-site for a minimum period of five (5) years, in accordance with Chapter 210. Records to be maintained include:

- a. Copies of any notifications made to TCEQ concerning reclaimed water projects.
- b. Copies of Reclaimed Water Service Agreements made with each reclaimed water User (this requirement does not include reclaimed water users at residences that have separate distribution lines for potable water).
- c. Records of volume of water delivered to each reclaimed water User (this requirement does not include reclaimed water users at residences that have separate distribution lines for potable water).
- d. Reclaimed water quality analyses.

4.4 Un-Authorized Use

Upon discovery, or upon receiving notice from User, of any suspected un-authorized use the District will assess whether or not an un-authorized use has occurred. If an un-authorized use has occurred the District will:

- a. Provide written notice to TCEQ, as required in Chapter 210, and the User if applicable as soon as possible, but within five (5) working days.
- b. If the User's system has already been repaired the District will verify that the repair is satisfactory and will avoid future un-authorized uses. If the repair is un-satisfactory the District will discontinue service to the User, regardless of any Service Agreement

provisions, until such repair is made.

- c. If the User's system has not been repaired the District will discontinue service to the User, regardless of any Service Agreement provisions, until such repair is made, or until the portion of the system causing the un-authorized use is isolated.
- d. If the un-authorized use is due to failure of the District's system the system, or that portion of the system, shall immediately be shut-off or taken off-line until repair can be made.

Robert J. Huston, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Jeffrey A. Saitas, *Executive Director*



TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

July 7, 2000

Mr. Richard W. Eason
General Manager
Lakeway Municipal Utility District
1097 Lohmans Crossing
Austin, Texas 78734-4459

Re: Reclaimed Water Project
Texas Natural Resource Conservation Commission (TNRCC) Permit Nos. 11495-001 and
11495-006
Authorization No. R11495-001
Travis County, Texas

Dear Mr. Eason:

We have completed our review of information on the above referenced project. The project under review consists of adding Lakeway Municipal Utility District wastewater treatment facility (Permit No. 11495-006) to the existing authorization. The treated effluent will be used for landscape irrigation, parklands common areas of homeowner association, homeowner landscape, greenbelt, commercial building landscapes and other beneficial irrigation uses.

Our review showed that the material generally meets the applicable minimum standards as set forth in the Texas Natural Resource Conservation Commission's rules titled Use of Reclaimed Water. The project is approved. The attachment to this letter indicates the approved site and conditions that apply to this approval.

If you have any questions please contact me at (512) 239-4552.

Sincerely,

A handwritten signature in black ink, appearing to read "Louis C. Herrin, III", followed by a stylized flourish.

Louis C. Herrin, III, P.E. (MC 148)
Permitting Section

cc: TNRCC, Region 11 Office, w/attachments
TNRCC, Wastewater Data Management Team, (Att.: Ms. Jan Sills), w/attachments
TNRCC, Application Team, (Att.: Ms. Mary Taylor), w/attachments



Authorization No. R 11495-001

This authorization supersedes
and replaces R 11495-001
approved March 26, 1999.

AUTHORIZATION FOR RECLAIMED WATER

Producer: Lakeway Municipal Utility District
1097 Lohmans Crossing Road
Austin, Texas 78734

Provider: Lakeway Municipal Utility District
1097 Lohmans Crossing Road
Austin, Texas 78734


Users: The reclaimed water will be used within the City of Lakeway, City of Lakeway ETJ and the Hills of Lakeway as shown on Attachment "A" in Travis County, Texas.

Location: Lakeway MUD is authorized to use the reclaimed water from the following treatment plants: Permit Nos 11495-001 and 11495-006. The irrigation sites are located between Ranch Road 620 and the plant site in Travis County, Texas shown in Attachment "A".

Authorization: Reclaimed water from the Lakeway Municipal Utility District's Wastewater Treatment Facilities (Permit Nos. 11495-001 and 11495-006) to be used for landscape irrigation, parklands common areas of homeowner association, homeowner landscape, greenbelt, commercial building landscapes and other beneficial irrigation uses.

This authorization contained the conditions that apply for the uses of the reclaimed water. The approval of a reclaimed water use project under Chapter 210 does not affect any existing water rights. If applicable, a reclaimed water use authorization in no way affects the need of a producer, provider and/or user to obtain a separate water right authorization from the commission.

Issued Date: July 7, 2000


Louis C. Herrin, III, P.E.
Wastewater Permitting Section
Water Permits & Resource
Management Division

Limitations: The authorization is subjected to the following requirements:

I. General Requirements.

- (a) No wastewater treatment plant operator (producer) shall transfer to a user reclaimed water without first notifying the commission.
- (b) Irrigation with untreated wastewater is prohibited.
- (c) Food crops that may be consumed raw by humans shall not be spray irrigated. Food crops including orchard crops that will be substantially processed prior to human consumption may be spray irrigated. Other types of irrigation that avoid contact of reclaimed water with edible portions of food crops are acceptable.
- (d) There shall be no nuisance conditions resulting from the distribution, the use, and/or storage of reclaimed water.
- (e) Reclaimed water shall not be utilized in a way that degrades ground water quality to a degree adversely affecting its actual or potential uses.
- (f) Reclaimed water managed in ponds for storage must be prevented from discharge into waters in the state, except for discharges directly resulting from rainfall events or in accordance with a permit issued by the commission. All other discharges are unauthorized. If any unauthorized overflow of a holding pond occurs causing discharge into or adjacent to waters in the state, the user or provider, as appropriate, shall report any noncompliance. A written submission of such information shall also be provided to the commission regional office and to the Austin Office, Water Enforcement Section (MC-149), within five (5) working days of becoming aware of the overflow. The written submission shall contain a description of the noncompliance and its cause; the potential danger to human health or safety, or the environment; the period of noncompliance, including exact dates and times; 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 recurrence of the noncompliance, and to mitigate its adverse effects.
- (g) Unless otherwise provided in this authorization, there shall be no off-site discharge, either airborne or surface runoff, of reclaimed water from the user's property except to a wastewater treatment system or wastewater treatment collection system unless the reclaimed water user applies for and obtains a permit from the commission which authorizes discharge of the water.
- (h) Signs in both English and Spanish shall be posted at storage areas, hose bibs and faucets reading "Reclaimed Water, Do Not Drink" or similar warnings. Alternately, the area may be secured to prevent access by the public.
- (i) Reclaimed water piping shall be separated from potable water piping when trenched by a distance of at least nine feet. Exposed piping shall be painted purple and all piping shall be stenciled with a warning reading "NON-POTABLE WATER".
- (j) The design of distribution systems which will convey reclaimed water to a user shall be approved by the executive director. Materials shall be submitted for approval by the executive director in accordance with the Texas Engineering Practice Act (Article 3271a, Vernon's Annotated Texas Statutes). The plans and specifications for the distribution systems authorized by this authorization must be approved pursuant to state law, and failure to secure approval before commencing construction of such works or making a transfer of reclaim water therefrom is a violation of this authorization, and each day of a transfer is an additional violation until approval has been secured.
- (k) Nothing in this authorization modifies any requirements of the Texas Department of Health found in Title 25 Texas Administrative Code (TAC), Chapter 337.

- (l) Major changes from a prior notification for use of reclaimed water must be approved by the executive director. A major change includes:
 - (1) a change in the boundary of the approved service area not including the conversion of individual lots within a subdivision to reclaimed water use;
 - (2) the addition of a new producer;
 - (3) major changes in the intended use, such as conversion from irrigation of a golf course to residential irrigation; or
 - (4) changes from either Type I or Type II uses to the other.
- (m) The reclaimed water producer and user shall maintain on the sites a current operation and maintenance plan. The operation and maintenance plan which shall contain, as a minimum the following:
 - (1) a copy of a signed contracts between the user, producer and provider;
 - (2) a labeling and separation plan for the prevention of cross connections between reclaimed water distribution lines and potable water lines;
 - (3) the measures that will be implemented to prevent unauthorized access to reclaimed water facilities (e.g., secured valves);
 - (4) procedures for monitoring reclaimed water;
 - (5) a plan for how reclaimed water use will be scheduled to minimize the risk of inadvertent human exposure;
 - (6) schedules for routine maintenance;
 - (7) a plan for worker training and safety; and
 - (8) contingency plan for system failure or upsets.

II. Storage Requirements for Reclaimed Water

- (a) All initial holding ponds designed to contain Type I effluent shall conform to the following requirements:
 - (1) The ponds, whether constructed of earthen or other impervious materials, shall be designed and constructed so as to prevent groundwater contamination;
 - (2) Soils used for pond lining shall be free from foreign material such as paper, brush, trees, and large rocks;
 - (3) All soil liners must be of compacted material having a permeability less than or equal to 1×10^{-4} cm/sec, at least 24 inches thick, compacted in lifts no greater than 6 inches each;
 - (4) Synthetic membrane linings shall have a minimum thickness of 40 mils. In situ liners at least 24 inches thick meeting a permeability less than or equal to 1×10^{-4} cm/sec are acceptable alternatives;
 - (5) Certification shall be furnished by a Texas Registered Professional Engineer that the pond lining meets the appropriate criteria prior to utilization of the facilities;
 - (6) Soil embankment walls shall have a top width of at least five feet. The interior and exterior slopes of soil embankment walls shall be no steeper than one foot vertical to three feet horizontal unless alternate methods of slope stabilization are utilized. All soil embankment walls shall be protected by a vegetative cover or other stabilizing material to prevent erosion. Erosion stops and water seals shall be installed on all piping penetrating the embankments;
 - (7) An alternative method of pond lining which provides equivalent or better water quality protection than provided under this section may be utilized with the prior approval of the executive director; and

- (8) A specific exemption may be obtained from the executive director if, after the review of data submitted by the reclaimed water provider or user, as appropriate, the executive director determines containment of the reclaimed water is not necessary, considering:
 - (A) soil and geologic data, and ground water data, including its quality, uses, quantity and yield; and
 - (B) adequate demonstration that impairment of ground water for its actual or potential use will be prevented.
- (b) Reclaimed water may be stored in leak-proof, fabricated tanks.

III. Specific Uses and Quality Standards for Reclaimed Water

Numerical parameter limits pertaining to specific reclaimed water use categories are contained in this section. These limits apply to reclaimed water before discharge to initial holding ponds or a reclaimed water distribution system. It shall be the responsibility of the reclaimed water producer to establish that the reclaimed water meets the quality limits at the sample point for the intended use in accordance with the monitoring requirements identified in Section IV relating to Sampling and Analysis.

- (a) Type I Reclaimed Water Use. The type of use where the public would come in contact with the reclaimed water. The following use is allowed by this authorization maintenance of impoundments or natural water bodies where direct human contact is likely and the irrigation of parkland.
- (b) The following conditions apply to this type of use of reclaimed water. At a minimum, the reclaimed water producer shall only transfer reclaimed water of the following quality as described for each type of specific use:
for Type I reclaimed water use, reclaimed water on a 30-day average shall have a quality of:

BOD ₅ or CBOD ₅	5 mg/l
Turbidity	3 NTU
Fecal Coliform	20 CFU/100 ml*
Fecal Coliform (not to exceed)	75 CFU/100 ml**
* geometric mean	
** single grab sample	

IV. Sampling and Analysis.

The reclaimed water producer shall sample the reclaimed water prior to distribution to user to assure that the water quality is in accord with the intended contracted use. Analytical methods shall be in accord with those specified in Chapter 319 (relating to Monitoring and Reporting). The minimum sampling and analysis frequency for Type I reclaimed water is twice per week.

The monitoring shall be done after the final treatment unit. These records shall be maintained on a monthly basis and be available at the plant site for inspection by authorized representatives of the Commission for at least five years.

V. Record Keeping and Reporting.

- (a) The reclaimed water provider and user shall maintain records on site for a period of five years.
 - (1) Records to be maintained by the provider include:
 - (A) copies of notifications made to the commission concerning reclaimed water projects.
 - (B) as applicable, copies of contracts made with each reclaimed water user (this requirement does not include reclaimed water users at residences that have separate distribution lines for potable water).
 - (C) records of volume of water delivered to each reclaimed water user per delivery (this requirement does not apply to reclaimed water users at residences that have separate distribution lines for potable water).
 - (D) reclaimed water quality analyses.
- (b) The reclaimed water producer shall report to the commission on a monthly basis the following information on forms furnished by the executive director. Such reports are due to the commission by the 20th day of the month following the reporting period.
 - (1) volume of reclaimed water delivered to provider.
 - (2) quality of reclaimed water delivered to a user or provider reported as a monthly average for each quality criteria except those listed as "not to exceed" which shall be reported as individual analyses.
- (c) Monitoring requirements contained in the authorization are suspended from the effective date of the authorization until the reclaim water is transferred. The provider shall provide written notice to the Austin Office, Water Quality Division, Applications Unit and the Region 11 Office of the Commission thirty (30) days prior to transfer.

VI. Transfer of Reclaimed Water.

Reclaimed water transferred from a provider to a user shall be done on a demand only basis. This means that the reclaimed water user may refuse delivery of such water at any time. All reclaimed water transferred to a user must be of at least the treatment quality specified in Section IV. Transfer shall be accomplished via pipes or tank trucks.

VII. General Prohibitions.

Except for on-channel ponds, storage facilities for retaining reclaimed water prior to use shall not be located within the floodway and shall be protected from the 100-year flood.

VIII. Restrictions.

This authorization does not convey any property right and does not grant any exclusive privilege.

IX. Responsibilities and Contracts.

- (a) The producer of reclaimed water will not be liable for misapplication of reclaimed water by users, except as provided in this section. Both the reclaimed water provider and user have, but are not limited to, the following responsibilities:
 - (1) The reclaimed water producer shall:
 - (A) transfer reclaimed water of at least the minimum quality required by this chapter at the point of delivery to the user for the specified use;
 - (B) sample and analyze the reclaimed water and report such analyses in accordance with Sections IV and V relating to Sampling and Analysis and Record keeping and Reporting, respectively; and
 - (C) notify the executive director in writing within five (5) days of obtaining knowledge of reclaimed water use not authorized by the executive director's reclaimed water use approval.
 - (2) The reclaimed water provider shall:
 - (A) assure construction of reclaimed water distribution lines/systems in accordance with 30 TAC Chapter 317 and in accordance with approved plans and specifications;
 - (B) transfer reclaimed water of at least the minimum quality required by this chapter at the point of delivery to the user for the specified use;
 - (C) notify the executive director in writing within five (5) days of obtaining knowledge of reclaimed water use not authorized by the executive director's reclaimed water use approval; and
 - (D) not be found in violation of this chapter for the misuse of the reclaimed water by the user if transfer of such water is shut off promptly upon knowledge of misuse regardless of contract provisions.
 - (3) The reclaimed water user shall:
 - (A) use the reclaimed water in accordance with this authorization; and
 - (B) maintain and provide records as required by Section III relating to Record Keeping and Reporting.

X. Enforcement.

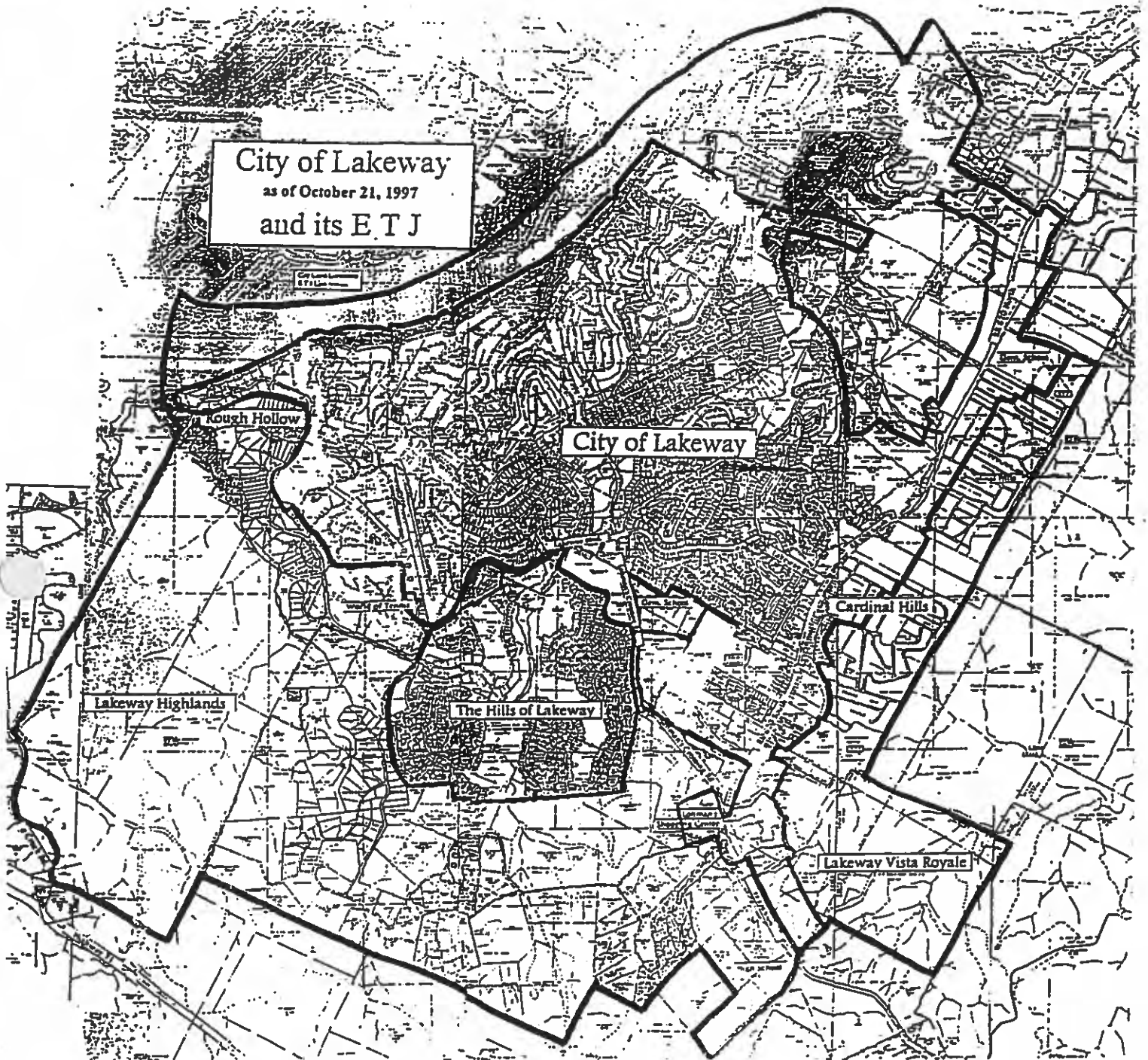
If the producer, provider and/or user fails to comply with the terms of this authorization, the executive director may take enforcement action provided by the Texas Water Code, §§26.019 and 26.136.

XI. STANDARD PROVISIONS:

- (a) This authorization is granted in accordance with the Texas Water Code and the rules and other Orders of the Commission and the laws of the State of Texas.
- (b) Acceptance of this authorization constitutes an acknowledgment and agreement that the provider and user will comply with all the terms, provisions, conditions, limitations and restrictions embodied in this authorization and with the rules and other Orders of the Commission and the laws of the State of Texas. Agreement is a condition precedent to the granting of this authorization.

ATTACHMENT "A"

City of Lakeway
as of October 21, 1997
and its E.T.J



Leah Whallon

From: Earl Foster <efoster@lakewaymud.org>
Sent: Wednesday, May 29, 2024 8:05 AM
To: Leah Whallon
Cc: Christianne Castleberry; Earl Foster
Subject: Fw: Application to Amend Permit No. WQ0011495006; Lakeway Municipal Utility District; S5 Water Recycling Plant
Attachments: Labels-Avery8160.docx; Application Transmittal Receipt.pdf; 5-29-24 LMUD Response Letter- TCEQ Letter dated 5-28-24.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Leah,
Please see attached response letter, along with attachments. Please let me know if you need anything else.

Respectfully,

Earl L. Foster, MBA
General Manager
LMUD Lakeway Municipal Utility District
1097 Lohmans Crossing
Lakeway, TX 78734
512/261-6222 x140
512/261-6681 fax
Efoster@lakewaymud.org
www.LakewayMUD.org

This email (and all attachments) is covered by the Electronic Communications Privacy Act. Unauthorized use or dissemination is prohibited. If you have received this message in error please delete it immediately. Please also be aware that the records of the Lakeway Municipal Utility District, including emails, are subject to the requirements of the Texas Public Information Act.

From: Leah Whallon <Leah.Whallon@Tceq.Texas.Gov>
Sent: Tuesday, May 28, 2024 9:49 AM
To: efoster@lakewaymud.org
Cc: c.castleberry@castleberryengineering.com
Subject: Application to Amend Permit No. WQ0011495006; Lakeway Municipal Utility District; S5 Water Recycling Plant

Good Morning,

Please see the attached Notice of Deficiency letter dated May 28, 2024 requesting additional information needed to declare the application administratively complete. Please send the complete response by June 11, 2024.

Please let me know if you have any questions.

-
Thank you,



Leah Whallon

Texas Commission on Environmental Quality

Water Quality Division

512-239-0084

leah.whallon@tceq.texas.gov

How is our customer service? Fill out our online customer satisfaction survey at www.tceq.texas.gov/customersurvey

LAKEWAY MUNICIPAL UTILITY DISTRICT

1097 LOHMANS CROSSING • LAKEWAY, TX 78734-4459

MAIN OFFICE: (512) 261-6222 x110 • CUSTOMERSERVICE@LAKEWAYMUD.ORG

AFTER HOURS EMERGENCY: (512) 314-7590 • FAX (512) 261-6681



May 29, 2024

Texas Commission on Environmental Quality
Attn: Ms. Leah Whallon
Applications Review & Processing Team (MC148)
Bldg. F, Rm. 2101
12100 Park 35 Circle
Austin, TX 78753

Transmitted via EMAIL: *Leah.Whallon@tceq.texas.gov*

RE: Lakeway MUD (CN600634513) Response to TCEQ Notice of Deficiency, dated May 28, 2024
Application to Amend Permit No. WQ0011495006
S5 Water Recycling Plant (RN101714996)
Permit Major Amendment

Dear Ms. Whallon:

This letter is in response to your letter, dated May 28, 2024, itemized according to your requests (*indicated in italics*).

1. *Administrative Report 1.1 – Mailing Labels.*

For your convenience, four (4) hard copy sets of mailing labels were provided with the application. TCEQ receipt of the labels as 'hand delivered and received' is documented on an attached copy of the transmittal. All noted items, with the exception of the application fee payment check taken to the Cashier's Office in Building A, were provided at the front desk of Bldg. F, Rm. 2101. While the permit instructions indicate that either an electronic copy or four (4) hard copy sets are to be provided, LMUD is providing an electronic copy along with this letter, per your request.

2. *Proposed NORI Language.*

The NORI language is correct, with exception of the zip code given the particular wording of the facility and irrigation areas. The facility and cedar tract are located in a different zip code (78738) than the Live Oak Golf Course irrigation area (78734). Perhaps that portion of the NORI language could be modified to read:

"The domestic wastewater treatment facility is located at 251 Highlands Boulevard near the city of Lakeway, in Travis County, Texas 78738, the Cedar Tract disposal site is located southwest of the facility, and the Live Oak Golf Course disposal site is located northeast of the facility."

continued

Please contact us if there are any further questions or needs regarding this application for Permit WQ0011495006.

Respectfully,

A handwritten signature in blue ink that reads "Earl Foster". The signature is fluid and cursive, with the first name "Earl" and last name "Foster" clearly distinguishable.

Earl Foster, MBA
LMUD General Manager

Enclosures:

1. Copy of Permit Application Submittal Transmittal, marked as "Received".
2. Electronic file of Avery 5160 Microsoft Word mailing labels.

cc: Christianne Castleberry, LMUD Engineer

TRANSMITTAL

CE&C | P.L.L.C.

Castleberry Engineering & Consulting, P.L.L.C.

Texas Registered Engineering Firm F-10084

Date: May 17, 2024

To:

From:

Texas Commission on Environmental Quality	Christianne Castleberry, P.E.
Applications Review & Processing Team	Castleberry Engineering & Consulting, P.L.L.C.
Bldg. F, Rm. 2101	P.O. Box 40546
12100 Park 35 Circle	Austin, TX 78704
Austin, TX 78753	512.751.9272

RE: Lakeway MUD Application for Major Amendment of Permit # WQ0011495006

Transmitting:

Quantity	Description
1	Unbound original copy of Permit # WQ0011495006 Major Amendment Application
3	Folder copies of Permit # WQ0011495006 Major Amendment Application
4	Affected Landowner Mailing Label sets
1	Check for \$2,300 -Application Fee (\$2,050 >1MGD Major Amendment + \$250 Postage fee)

Comments:

Hand delivered

RECEIVED

MAY 17 2024

WATER QUALITY DIVISION
TCEQ

[Signature]

Respectfully,

Castleberry Engineering & Consulting, P.L.L.C.