Agenda Item #9

Staff Report Application for 4-Combination Drilling/Operating Permit N2-20-002P, N2-20-003P, N2-004P, N2-005P						
	Clearwater	lrop counts!				
	Hines Texas LLC c/o A.W. Hines 601 Lake Air Drive, Waco, TX 76 Telephone: 254-776-7000					
Location of Wells: 285.475 acre tract located off Stillman Valley Rd. and Brooking Rd, approximately 2.6 miles to the west of the intersection of FM 2484 and Stillman Valley Rd., Florence, TX, The proposed four wells are located at: N2-20-002P Well #1: Latitude 30.93011°/ Longitude -97.73762° N2-20-003P Well #2: Latitude 30.92810°/ Longitude -97.74383° N2-20-004P Well #3: Latitude 30.92169°/ Longitude -97.74103° N2-20-005P Well #4: Latitude 30.92325°/ Longitude -97.73594°						
Proposed Annual Withdrawal:	Proposed Use	Aquifer:	Nearest Existing Wells:			
Rate : @ 20 gpm Withdrawal/Well: 4.14 ac-ft/well/yr or 1,349,040 gallons Total: *16.56 ac-ft/yr or 5,396,092 gallons *This permit does not provide an aggregation of the wells nor aggregation of permits	Domestic 4.14 ac-ft or 1,349,040 gallons per yr per well. Each well will serve 7 homes and no more than 24 people in a shared well agreement.	Hosston Layer of the Trinity Aquifer (known as the Lower Trinity)	 Well #1: 2@1/4 mile 3@1/2 mile Well #2: 3@1/4 mile 2@1/2 mile Well #3: 3@1/4 mile 10@1/2 mile Well #4: 3@1/4 mile 12@1/2 mile Total: 11 wells @ 1/4 mile 30 wells @ 1/2 mile. 2 in the Lower Trinity 			

General Information

A.W. Hines, as <u>*Hines TX, LLC*</u> for the proposed "<u>*Brookings Ranch Subdivision*</u>" has made application to the Clearwater Underground Water Conservation District (CUWCD) on February 27, 2020, for a combination drilling/operating permit to authorize drilling and withdrawal from four proposed wells in the Lower Trinity Aquifer. Each with a 1¼ inch column pipe and equipped to produce a minimum

of 20 gallons per minute. The total tract of land is 285.475-acre tract located off Stillman Valley Rd. and Brooking Rd, approximately 2.6 miles to the west of the intersection of FM 2484 and Stillman Valley Rd., Florence, TX,

Hines TX LLC wishes to produce water for beneficial use described as "domestic use" in a proposed annual quantity (for each well) of 4.14 acre feet per year based an occupancy of 3 people per home x 7 homes thus 1,349,040 gallons per year or 4.14 acre-feet per year per proposed shared well. Each well will serve no more than 7 homes and no more than 24 people.

Mr. Hines plans to develop 28 separate tracts of land each larger than 10 acres. His plan is to serve 7 tracts with one well in a shared well agreement between landowners of each respective 7 lots.

Special Provisions will be discussed with the board should the permit be approved, to ensure compliance per set-back requirements, well construction, district access, water level measurements and conservation. The permit will be renewed annually by CUWCD staff, unless the permittee fails to meet all required reporting, and/or other special provisions are not complied with, and/or conditions of the Lower Trinity Aquifer merit curtailment of all permit holders in accordance with District Rules and Chapter 36 necessary to meet the DFC under statutory requirements. (*see attached four assessments*)

CUWCD consulting hydrogeologist, Mike Keester LRE Water LLC, has reviewed the applications, and has conducted the required drawdown analysis per district rules.

CUWCD general counsel has reviewed the applications for 4 wells in a shared well agreement by each respective landowners and has advised district GM on the elements of the applications that the district board of directors can deliberate.

This property lies within Chisholm Trail SUD (City of Georgetown) CCN # 11590 (certificate of convenience and necessity). The applicant (A.W. Hines) has investigated with City of Georgetown for the possibility of public water supply delivery and <u>will testify</u> that public water is currently either not available or unaffordable, thus the need to pursue groundwater rather than public water supply.

In the hearing Mr. Hines will layout his goals to have separate shared wells for 7 lots each and that each well system will not be aggregated with the others. The elements of a shared well agreements will be expressed to each potential property owner that a shared well agreement thus all will share in the maintenance and utility cost associated with each well. A.W. Hines will testify that at no time will the homeowners be charged for the groundwater under four separate defined shared well agreements.

Verification and approval of on-site sewage facilities (OSSF) will be conducted by Bell County Public Health District – Environmental Health Division (BCPH-EHD) once each tract is sold. Staff will confirm with BCPHD-EHD the well locations and assist them in verifying set-back from the proposed on-site septic systems. The four wells are to be completed before the tracts of land will be sold. The OSSF must be more than 50 feet from the future on-site septic system, should the wells be constructed with the prescribed sanitary seal. This assumption is based on our discussing the proposed well construction with Mr. Hines and Lovelace Water Wells. We understand Lovelace Water Wells will construct each of the four wells.

The applicant understands the importance of the district capturing a geophysical log on at least one of the wells. The applicant understands that a prescribed aquifer test for 72 hours is recommended by

the staff and consultants in-order to improve our understanding of the Lower Trinity in this grid cell of the NTWGAM.

Currently the property has two exempt wells on the northside of the property (E-02-1700G & E-02-1699G). One is inactive and the other is in use for the existing home. The applicant has agreed to plug both wells once the existing home is torn down. Mr. Hines will testify to this.

Per Rules 6.9 and 6.10

In deciding whether or not to issue a permit, the Board must consider the following:

1) The application contains all the information requested.

The application is complete—all requested information has been provided and all required application fees have been paid. All notification per District Rules have been completed.

2) The proposed use of water is dedicated to a beneficial use.

The water produced from these wells will be used for domestic use and equipped to minimum of 20 gpm/well to provide 7 homes per well with household water. This does qualify as a beneficial use under district rules and chapter 36.

3) The applicant agrees to avoid waste and achieve water conservation.

The applicant has agreed to avoid waste and achieve water conservation by signing the application form stating compliance with the District's Management Plan. Applicant understands the importance of water conservation measures in the business thus options for outside water conservation are vital to the sustainability of the aquifer. The District acknowledges that the applicant has stated they do not intend to utilize the groundwater for extensive landscape purposes. Provisions of the HOA bylaws and deed restrictions layout guidance for conservation.

4) The applicant has agreed that reasonable diligence will be used to protect groundwater quality and that the applicant will follow well plugging guidelines at the time of well closure.

The applicant has agreed (by signing the application form) should any of the wells deteriorate over time that state law and district rules require such wells to be plugged, before a replacement well can be drilled. Applicant has also agreed to plug Middle Trinity wells "E-02-1700G" & "E-02-1699G" in a reasonable time as the development goes forward.

5) The proposed water wells comply with spacing and production limitations identified in these rules.

The four proposed wells will have a column pipe size not to exceed an inside diameter of 1 1/4 inch. Based on this column pipe size, a minimum size tract of 2 acres is required, with a 100-foot spacing requirement from other wells. The 50-foot setback requirement from adjacent property lines will be met for each of the proposed wells in the proposed "*Brookings Ranch Subdivision*" which includes the new property lines. District Rule 9.5 Spacing Requirements will be adhered to.

The District rules do not impose production limitations other than those determined applicable in the review of the today's permit request or to prevent unacceptable level

of decline in water quality of the aquifer, or as may be necessary to prevent waste and achieve water conservation, minimize as far as practicable the drawdown of the water table or the reduction of artesian pressure, lessen interference between wells, or control and prevent subsidence. These issues are considered in Items 6 & 7 below and with staff recommendations to address potential concerns of adjacent property owners.

 6) The proposed use of water does or does not unreasonably affect existing groundwater and surface water resources or existing permit holders. Based upon available information, there are the following number of wells as defined: Well #1: 2 wells within 1/4 mile and 2 wells within 1/2 mile

Well #2: 3 wells within 1/4 mile and 0 wells within 1/2 mile Well #3: 3 wells within 1/4 mile and 8 wells within 1/2 mile Well #4: 3 wells within 1/4 mile and 10 wells within 1/2 mile

Total: 9 wells within 1/4 mile and 14 wells within 1/2 mile

All of these wells are listed as exempt in our database and two of the referenced wells are completed in the Lower Trinity Aquifer. These wells are <u>*E*-15-044P</u> (399 feet from Well #3) and <u>*E*-10-035P</u> (2361 feet from Well #3) and are both exempt wells for domestic use. <u>attached proposed Brookings Ranch Map</u>

Mike Keester, Hydrogeologist, LRE Water, has reviewed this application and has determined anticipated drawdown and has provided the <u>attached MK reports for each</u> <u>well</u>, with his conclusions and recommendations stating that the proposed wells and permitted amount of 4.14 acre feet/year each will not diminish the ability of other aquifer users to produce water for a beneficial use from the Lower Trinity Aquifer known as the Lower Trinity. He will offer testimony as needed.

7) The proposed use of water is consistent with the District's water management plan.

The District's Management Plan reflects a groundwater availability figure in the Lower Trinity Aquifer of **7193 ac-ft/year Modeled Available Groundwater** (then reserve 178 ac-ft/year for exempt well use) thus **7,015 ac-ft/year is the Managed Available Groundwater for permitting.**

The board, per the district management plan, has evaluated groundwater available for permitting the three Layer of the Trinity Aquifer and most recently evaluated the available groundwater for permitting (*consistent with the management plan as stated on pages 9-10*).

The requested permit amount relative to the modeled available groundwater MAG determined by the Texas Water Development Board (TWDB) based on the desired future conditions (DFCs) established by the District for the Lower Trinity Aquifer was set by CUWCD based on drawdown of 330 feet for the next 60 years. These drawdowns were approved by the board in January 2019. To achieve this DFC, the TWDB used a model that indicated the MAG was equal to 7193 acre-feet per year from the Hosston Layer (Lower) Trinity Aquifer.

A summary of YTD 2020 permit production, HEUP & OP Permit Analysis, pending applications and *Exempt Well Reservations for the Trinity Aquifer, per District Report (*see attached Trinity Aquifer Status Report, April 2020*).

- 8) The Modeled Available Groundwater calculations determined by the Executive Administrator of the Texas Water Development Board.
 Refer to #7 above. The modeled available groundwater will not be exceeded by granting this permit. *(see attached Trinity Aquifer Status Report, April 2020)*.
- 9) The Executive Administrator of the Texas Water Development Board's estimate of the current and projected amount of groundwater produced under the exemptions in District Rule 8.3.
 Befer to #7 above. Beservation of Modeled available groundwater for exempt well use

Refer to #7 above. Reservation of Modeled available groundwater for exempt well use will not be exceeded by granting this permit. 178 ac-ft reserved vs 52 ac-ft estimated being used in the Lower Trinity. (*see district exempt use report December 2019*)

10) The amount of groundwater authorized under permits previously issued by the District.

Refer to #7 above. Existing permits do not exceed the managed available groundwater (*modeled available groundwater – exempt well use = Managed available groundwater*) for the Lower Trinity Aquifer 7,015 ac-ft per year.

11) A reasonable estimate of the amount of groundwater that is actually produced under permits issued by the District.

The actual production from all permitted wells in the Lower Trinity Aquifer in 2019 was **1009.73 acre-feet (25.9%)** and YTD in 2020 is **125.18 acre-feet (3.2%)** of permitted amount. (*Figures are based upon monthly production reports submitted to Clearwater by the permit holders in 2019 and YTD in 2020*).

12) Yearly precipitation and production patterns.

Clearwater is currently in no drought management stage based on the PDI system (average running total annual rainfall) over the Aquifer in the District, is currently at <u>**35.057**</u> inches rain received in the last 365 days (4/23/20) thus 106.23% of annual expected rainfall of 33 inches. Currently the permit holders in the first 2 months of 2020 have used only 3.2% of total permitted amounts. Permit holders did not exceed their total permitted amounts in 2019. The gravity of the drought of 2011-2013 necessitated the need for all permit applications to be evaluated based on conservative needs and usage that is not contradicted by the current drought contingency plan stage.

Conclusions:

• CUWCD well records indicate that <u>1 existing well</u> (Lower Trinity) E-15-044P is located within a ¹/₄-mile radius and <u>1 existing well</u> (Lower Trinity) E-10-035P within ¹/₂ of the proposed sites of all four well sites. These wells are listed as exempt with conformed depths in the Lower Trinity Aquifer and confirmed by the district geoscience community.

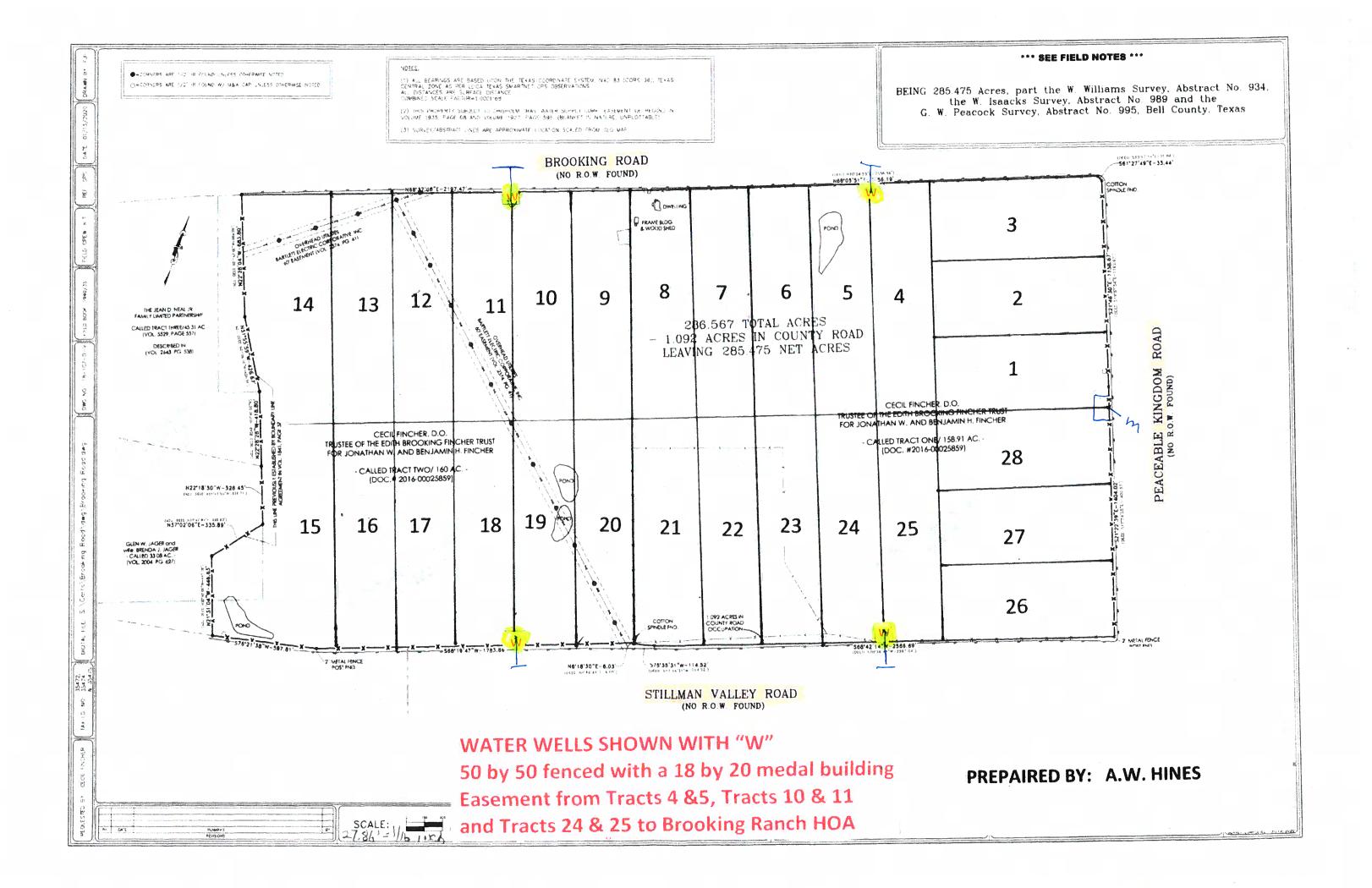
- Proposed annual permit amount of <u>4.14 acre-feet/well/year</u> (1,349,040 gallons/year) and the collective amount <u>16.56 acre-feet/year</u> (5,396,092gallons/year) is substantially less than the allowed production of an <u>one exempt well</u> under Chapter 36 and District rules. Exempt well owner are allowed to produce at the maximum rate of 17 gallons per minute (or 25,000 gallons per day) for 365 days equaling <u>28 acre feet/year</u>.
- The long-term pumping effects from the proposed four wells at the requested pumping amount are negligible and the combined effects from many wells across the district with relatively small pumping rates can have a noticeable long-term effect on aquifer water levels per Keester's review, thus the drawdown will not diminish the ability of other aquifer users to produce water for a beneficial use. (*see attached Keester's Report*)

Recommendations:

- 1) Approve the applications for the Hines LLC applications with the following special permit conditions:
 - a) All "N2" operating permits required that the wells be equipped with a meter for monthly reporting.
 - b) Confirm per the application that each well is to serve no more than 7 homes and 24 people under the discussed shared well agreements thus permitted amounts meet the anticipated needs of the future home owners.
 - c) Confirm the applicant clarify in testimony that groundwater ownership for the proposed Brookings Ranch Subdivision owned by A.W. Hines described in his "Special Warranty Deed" reservation from conveyance of the groundwater rights to each respective Lot.
 - d) Confirm that no cross connection for the purpose of having an aggregated system for the subdivision will exist.
 - e) Confirm the applicant will install during well construction a meter at each well head for the purpose of reporting monthly production of groundwater.
 - g) Confirm the applicant will install during well construction a removable plug that is placed in the sanitary seal for clear access into the well for acoustic water level measurements by District personnel.
 - h) Confirm that the well driller/pump installer will install a measuring tube alongside the column pipe to allow for measurement of the water level using an e-line or other direct measurement method.
 - i) Confirm that District will have access for the purpose of assessing actual changes in water levels due to pumping from each of the proposed wells.
 - j) Confirm that the District will have access for the purpose of water quality screening/testing the groundwater from each well on an annual base.
 - k) Confirm that the District will conduct a 72-hour aquifer/pump test after the construction of a minimum two wells in-order that an on-site observation well is in place for the purposes defined in a prescribed aquifer test.
 - Confirm that the applicant will plug exempt wells E-02-1700G and E-02-1699G in accordance with District guidelines and TDLR guidelines for plugging of wells with more than 100 feet of standing water.

Attachments are as follows:

A.W. Hines Project Map		
Mike Keester, PG Drawdown Analysis	Well	# N2-20-002P
Mike Keester, PG Drawdown Analysis	Well	# N2-20-003P
Mike Keester, PG Drawdown Analysis	Well	# N2-20-004P
Mike Keester, PG Drawdown Analysis	Well	# N2-20-005P
CUWCD Trinity Aquifer Status Report		4/8/2020
CUWCD 2019 Exempt Well Estimate of Use Report	t	12/31/2019
Applications, fees and Notification Affidavit		See Attached





Proposed Well ID: N2-20-002P

Well Name: A. W. Hines Well #1

Tract Size: 71.33 Acres (7 tracts and each @ 10.19 acres as Home Sites)

Column Pipe Size: 1.25 InchesAquifer: Hosston Layer of the Trinity Aquifer (Lower)

Proposed Annual Production: 4.14 Acre-Feet per Year or 1,349,040 gallons per year

Proposed Instantaneous Pumping Rate: 20 Gallons per Minute (GPM)

The potential effects of the proposed production on local water levels in the aquifer are calculated using the Theis equation¹ which relates water level decline (that is, drawdown) to the pumping rate of a well and properties of the aquifer. While the equation does not account for aquifer conditions which may affect the calculation of long-term water level declines (for example: aquifer recharge, faulting, or changes in aquifer structure), it does provide a very good, reliable, and straightforward method for estimating relatively short-term drawdown in and near a well due to pumping. As the duration of pumping and distance from the well increase, the uncertainty in the calculated drawdown also increases. To assess the potential effects from the proposed production, the equation uses values from the groundwater availability model datasets².

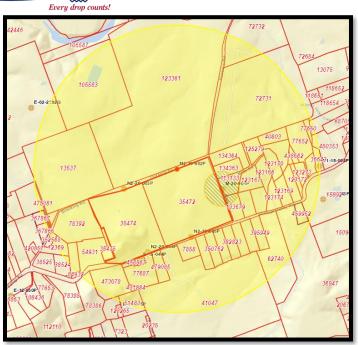
The following table presents the calculated drawdown at the proposed well and at other nearby wells completed in the same aquifer. For *1-Day Drawdown*, we applied the proposed instantaneous pumping rate for a period of 24 hours. For *30-Day Drawdown*, we assumed peak pumping during the summer of about 15 percent more than the average monthly amount (that is, the proposed annual production rate divided by 12 then multiplied by 1.15). For *1-Year Drawdown*, we used the proposed annual production amount.

	Distance from	1-Day	30-Day	1-Year
Well Name	Proposed Well (feet)	Drawdown (feet)	Drawdown (feet)	Drawdown (feet)
N2-20-002P	1	3.09	Negligible	Negligibl
M-20-001P	1833	Negligible	Negligible	Negligibl
N2-20-003P	2078	Negligible	Negligible	Negligibl
N2-20-005P	2551	Negligible	Negligible	Negligibl
N2-20-004P	3244	Negligible	Negligible	Negligibl
E-15-044P	3610	Negligible	Negligible	Negligibl

¹ Theis, C.V., 1935, The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage: American Geophysical Union Transactions, v. 16, p. 519-524.

² Groundwater availability model (GAM) datasets include the Northern Edwards GAM, the Northern Trinty/Woodbine GAM (for the Upper and Middle Trinity aquifers), and the modified Northern Trinty/Woodbine GAM (for the Lower Trinity Aquifer).





The predicted drawdown presented above is based on our current understanding of the aquifer hydraulic properties and the estimated production from the proposed well. The predicted drawdown values presented do not include the effects from other wells pumping near the proposed well. Predicted drawdown of less than one (1) foot is considered negligible for analysis purposes due to inherent uncertainty in the aquifer hydraulic characteristics and a difference in the estimated retail electricity costs for a typical domestic well being less than \$0.10.

Recommendations

- 1) To assess actual changes in water levels due to pumping from the proposed well, the well owner will need to have a pump installer make sure removable plug in the sanitary seal is in place to allow clear access into the well for water level measurement by District personnel.
- In addition, if space allows, the pump installer should install a measuring tube alongside the column pipe to allow for measurement of the water level using an e-line or other direct measurement method.
- 3) As a N2 operating permit the well owner is required to have a meter installed for monthly reporting of all production.

Geoscientist Seal

The following licensed professional geoscientist(s) have reviewed the results and recommendations presented in this report of the potential effects due to production from a proposed well.





Proposed Well ID: N2-20-003PWell Name: A. W. Hines Well #2Tract Size: 71.33 acres (7 tracts and each @ 10.19 acres per Home Site)Column Pipe Size: 1.25 InchesAquifer: Hosston Layer of the Trinity Aquifer (Lower)Proposed Annual Production: 4.14 Acre-Feet per Year or 1,349,040 gallons per year

Proposed Instantaneous Pumping Rate: *20* Gallons per Minute (GPM)

The potential effects of the proposed production on local water levels in the aquifer are calculated using the Theis equation¹ which relates water level decline (that is, drawdown) to the pumping rate of a well and properties of the aquifer. While the equation does not account for aquifer conditions which may affect the calculation of long-term water level declines (for example: aquifer recharge, faulting, or changes in aquifer structure), it does provide a very good, reliable, and straightforward method for estimating relatively short-term drawdown in and near a well due to pumping. As the duration of pumping and distance from the well increase, the uncertainty in the calculated drawdown also increases. To assess the potential effects from the proposed production, the equation uses values from the groundwater availability model datasets².

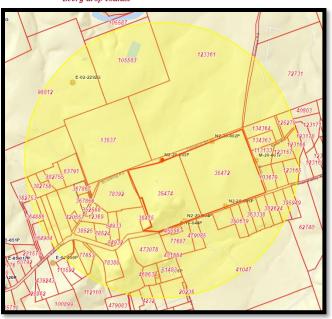
The following table presents the calculated drawdown at the proposed well and at other nearby wells completed in the same aquifer. For *1-Day Drawdown*, we applied the proposed instantaneous pumping rate for a period of 24 hours. For *30-Day Drawdown*, we assumed peak pumping during the summer of about 15 percent more than the average monthly amount (that is, the proposed annual production rate divided by 12 then multiplied by 1.15). For *1-Year Drawdown*, we used the proposed annual production amount.

Well Name	Distance from Proposed Well (feet)	1-Day Drawdown (feet)	30-Day Drawdown (feet)	1-Year Drawdown (feet)
N2-20-003P	Not Applicable	3.17	Negligible	Negligible
N2-20-002P	2071	Negligible	Negligible	Negligibl
N2-20-004P	2489	Negligible	Negligible	Negligibl
E-15-044P	2686	Negligible	Negligible	Negligibl
N2-20-005P	3030	Negligible	Negligible	Negligibl
M-20-001P	3619	Negligible	Negligible	Negligibl
E-10-035P	4457	Negligible	Negligible	Negligibl
E-02-2292G	4544	Negligible	Negligible	Negligibl

¹ Theis, C.V., 1935, The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage: American Geophysical Union Transactions, v. 16, p. 519-524.

² Groundwater availability model (GAM) datasets include the Northern Edwards GAM, the Northern Trinty/Woodbine GAM (for the Upper and Middle Trinity aquifers), and the modified Northern Trinty/Woodbine GAM (for the Lower Trinity Aquifer).





The predicted drawdown presented above is based on our current understanding of the aquifer hydraulic properties and the estimated production from the proposed well. The predicted drawdown values presented do not include the effects from other wells pumping near the proposed well. Predicted drawdown of less than one (1) foot is considered negligible for analysis purposes due to inherent uncertainty in the aquifer hydraulic characteristics and a difference in the estimated retail electricity costs for a typical domestic well being less than \$0.10.

Recommendations

- 1) To assess actual changes in water levels due to pumping from the proposed well, the well owner will need to have a pump installer make sure removable plug in the sanitary seal is in place to allow clear access into the well for water level measurement by District personnel.
- 2) In addition, if space allows, the pump installer should install a measuring tube alongside the column pipe to allow for measurement of the water level using an e-line or other direct measurement method.
- 3) As a N2 operating permit the well owner is required to have a meter installed for monthly reporting of all production.

Geoscientist Seal

The following licensed professional geoscientist(s) have reviewed the results and recommendations presented in this report of the potential effects due to production from a proposed well.





Proposed Well ID: N2-20-004P

Well Name: A. W. Hines Well #3

Tract Size: 71.33 Acres (7 tracts and each @ 10.19 acres as Home Sites)

Column Pipe Size: 1.25 Inches **Aquifer:** Hosston Layer of the Trinity Aquifer (Lower)

Proposed Annual Production: 4.14 Acre-Feet per Year or 1,349,040 gallons per year

Proposed Instantaneous Pumping Rate: 20 Gallons per Minute (GPM)

The potential effects of the proposed production on local water levels in the aquifer are calculated using the Theis equation¹ which relates water level decline (that is, drawdown) to the pumping rate of a well and properties of the aquifer. While the equation does not account for aquifer conditions which may affect the calculation of long-term water level declines (for example: aquifer recharge, faulting, or changes in aquifer structure), it does provide a very good, reliable, and straightforward method for estimating relatively short-term drawdown in and near a well due to pumping. As the duration of pumping and distance from the well increase, the uncertainty in the calculated drawdown also increases. To assess the potential effects from the proposed production, the equation uses values from the groundwater availability model datasets².

The following table presents the calculated drawdown at the proposed well and at other nearby wells completed in the same aquifer. For *1-Day Drawdown*, we applied the proposed instantaneous pumping rate for a period of 24 hours. For *30-Day Drawdown*, we assumed peak pumping during the summer of about 15 percent more than the average monthly amount (that is, the proposed annual production rate divided by 12 then multiplied by 1.15). For *1-Year Drawdown*, we used the proposed annual production amount.

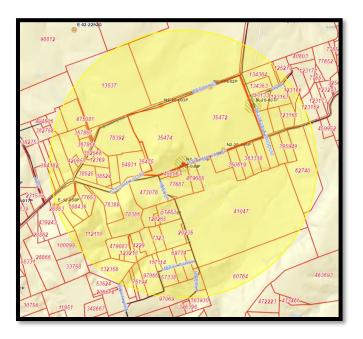
Well Name	Distance from Proposed Well (feet)	1-Day Drawdown (feet)	30-Day Drawdown (feet)	1-Year Drawdown (feet)
N2-20-004P	Not Applicable	3.0	Negligible	Negligibl
E-15-044P	399	Negligible	Negligible	Negligibl
N2-20-005P	1692	Negligible	Negligible	Negligibl
E-10-035P	2361	Negligible	Negligible	Negligibl
N2-20-003P	2481	Negligible	Negligible	Negligibl
N2-20-002P	3237	Negligible	Negligible	Negligibl
M-20-001P	3600	Negligible	Negligible	Negligibl

{Placeholder for the drawdown map}

¹ Theis, C.V., 1935, The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage: American Geophysical Union Transactions, v. 16, p. 519-524.

² Groundwater availability model (GAM) datasets include the Northern Edwards GAM, the Northern Trinty/Woodbine GAM (for the Upper and Middle Trinity aquifers), and the modified Northern Trinty/Woodbine GAM (for the Lower Trinity Aquifer).





The predicted drawdown presented above is based on our current understanding of the aquifer hydraulic properties and the estimated production from the proposed well. The predicted drawdown values presented do not include the effects from other wells pumping near the proposed well. Predicted drawdown of less than one (1) foot is considered negligible for analysis purposes due to inherent uncertainty in the aquifer hydraulic characteristics and a difference in the estimated retail electricity costs for a typical domestic well being less than \$0.10.

Recommendations

- 1) To assess actual changes in water levels due to pumping from the proposed well, the well owner will need to have a pump installer make sure removable plug in the sanitary seal is in place to allow clear access into the well for water level measurement by District personnel.
- 2) In addition, if space allows, the pump installer should install a measuring tube alongside the column pipe to allow for measurement of the water level using an e-line or other direct measurement method.
- 3) As a N2 operating permit the well owner is required to have a meter installed for monthly reporting of all production.

Geoscientist Seal

The following licensed professional geoscientist(s) have reviewed the results and recommendations presented in this report of the potential effects due to production from a proposed well.





Proposed Well ID: N2-20-005P

Well Name: A. W. Hines Well #4

Tract Size: 71.33 Acres (7 tracts and each @ 10.19 acres as Home Sites)

Column Pipe Size: 1.25 Inches **Aquifer:** Hosston Layer of the Trinity Aquifer (Lower)

Proposed Annual Production: 4.14 Acre-Feet per Year or 1,349,040 gallons per year

Proposed Instantaneous Pumping Rate: 20 Gallons per Minute (GPM)

The potential effects of the proposed production on local water levels in the aquifer are calculated using the Theis equation¹ which relates water level decline (that is, drawdown) to the pumping rate of a well and properties of the aquifer. While the equation does not account for aquifer conditions which may affect the calculation of long-term water level declines (for example: aquifer recharge, faulting, or changes in aquifer structure), it does provide a very good, reliable, and straightforward method for estimating relatively short-term drawdown in and near a well due to pumping. As the duration of pumping and distance from the well increase, the uncertainty in the calculated drawdown also increases. To assess the potential effects from the proposed production, the equation uses values from the groundwater availability model datasets².

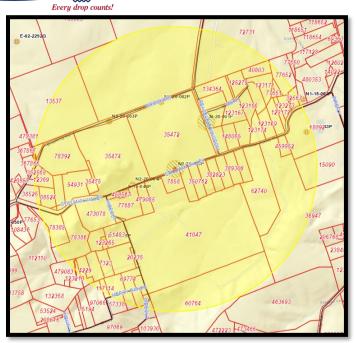
The following table presents the calculated drawdown at the proposed well and at other nearby wells completed in the same aquifer. For *1-Day Drawdown*, we applied the proposed instantaneous pumping rate for a period of 24 hours. For *30-Day Drawdown*, we assumed peak pumping during the summer of about 15 percent more than the average monthly amount (that is, the proposed annual production rate divided by 12 then multiplied by 1.15). For *1-Year Drawdown*, we used the proposed annual production amount.

Well Name	Distance from Proposed Well (feet)	1-Day Drawdown (feet)	30-Day Drawdown (feet)	1-Year Drawdown (feet
N2-20-005P	Not Applicable	2.97	Negligible	Negligibl
N2-20-004P	1688	Negligible	Negligible	Negligibl
E-15-044P	2051	Negligible	Negligible	Negligibl
M-20-001P	2105	Negligible	Negligible	Negligibl
N2-20-002P	2547	Negligible	Negligible	Negligibl
N2-20-003P	3029	Negligible	Negligible	Negligibl
E-10-035P	3753	Negligible	Negligible	Negligibl
E-16-043P	5071	Negligible	Negligible	Negligibl

¹ Theis, C.V., 1935, The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage: American Geophysical Union Transactions, v. 16, p. 519-524.

² Groundwater availability model (GAM) datasets include the Northern Edwards GAM, the Northern Trinty/Woodbine GAM (for the Upper and Middle Trinity aquifers), and the modified Northern Trinty/Woodbine GAM (for the Lower Trinity Aquifer).





The predicted drawdown presented above is based on our current understanding of the aquifer hydraulic properties and the estimated production from the proposed well. The predicted drawdown values presented do not include the effects from other wells pumping near the proposed well. Predicted drawdown of less than one (1) foot is considered negligible for analysis purposes due to inherent uncertainty in the aquifer hydraulic characteristics and a difference in the estimated retail electricity costs for a typical domestic well being less than \$0.10.

Recommendations

- 1) To assess actual changes in water levels due to pumping from the proposed well, the well owner will need to have a pump installer make sure removable plug in the sanitary seal is in place to allow clear access into the well for water level measurement by District personnel.
- In addition, if space allows, the pump installer should install a measuring tube alongside the column pipe to allow for measurement of the water level using an e-line or other direct measurement method.
- 3) As a N2 operating permit the well owner is required to have a meter installed for monthly reporting of all production.

Geoscientist Seal

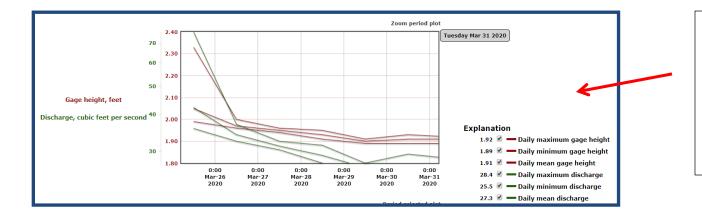
The following licensed professional geoscientist(s) have reviewed the results and recommendations presented in this report of the potential effects due to production from a proposed well.



	DFC Analysis Over Time (2000-Present)HEUP and OP Permit Analysis Relative to the Modeled Available GroundwaterModeled Available GroundwaterModeled Available Groundwater			2020 YTD Prod. Jan - Mar 327.87 Ac-ft 13.06%	Pending Applications		Exempt Well Reservations					
	DFC Adopted * Minimum Spring Flow	Status of DFC ** Current / Low	MAG *** Ac-ft	HEUP Ac-ft	OP Ac-ft	Total Permitted _{Ac-ft}	2019 Actual Production	Available for Permitting Ac-ft	Pending Applications Ac-ft	Exempt Well Reservation Ac-ft	Exempt Well Use Estimation Ac-ft	Available Exempt Use Ac-ft
Edwards (BFZ) Aquifer	100 Ac-ft per month or 1.68 cfs	2437.29 Ac-ft 3/29/2020 vs 220 Ac-ft 08/20/2014	6469	2209.7	301.44	2512.40	1,994.27 Ac-ft 79.44%	3130.28	0	825	361	464

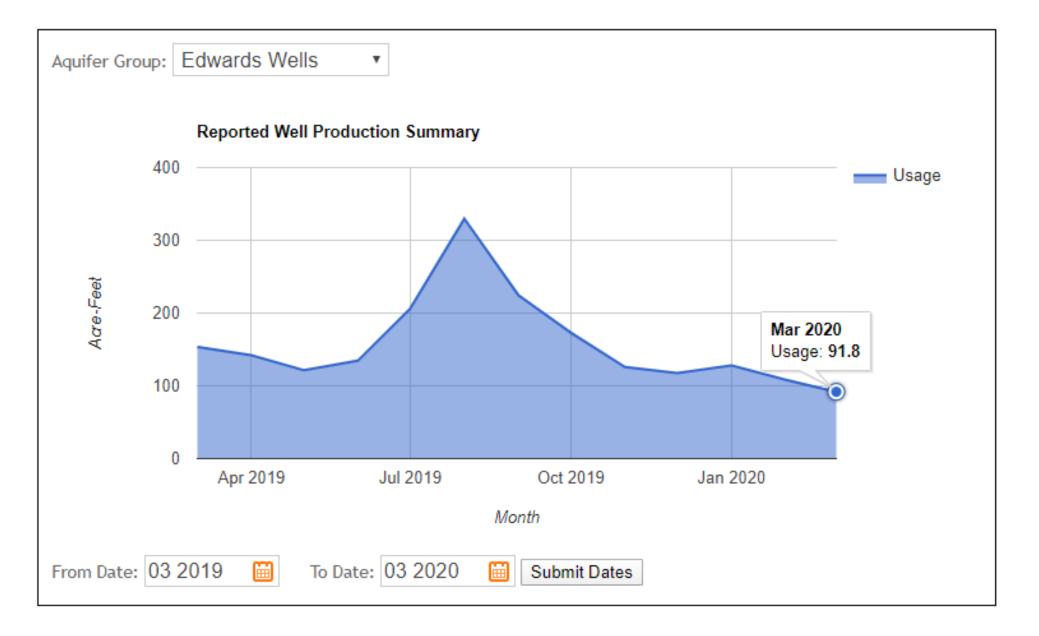
*Desired Future Conditions (DFC) established by Clearwater UWCD and approved by GMA8 and TWBD, is the description of how the aquifer should look in the future (50 years based on maintaining the Salado Spring Complex discharge during a repeat of drought conditions similar to the drought of record in the 1950's, under drought of record, a five-day average of discharge amounting to 200 ac-ft-month is preferred and 100 ac-ft-/month is the minimum acceptable spring flow. Spring flow is measured and estimated by the USGS Gage in Salado Creek located below the Salado Creek Spring Complex.

Status of the DFC is the estimated spring flow over a five-day average from the springs releasing artesian pressure from the Edwards BFZ Aquifer expressed as acre feet per month of spring flow into Salado Creek. *The Modeled Available Groundwater (MAG) is the estimated amount of water available for permitting assigned to Clearwater UWCD by the Executive Administrator of TWDB, based on the desired future conditions.



CFS is measured continuously at the downstream gage with USGS developing the rating curve according to industry standards and maintaining the information for public access on the USGS website.

- 5 day average for March 25th March 29th was 40.96 CFS = 2437.29 ac-ft/month
- 5 day average for March 8^{th} March 12^{th} was 21.16 CFS = 1259.11 ac-ft/month





CUWCD Exempt Well Use Summary

Aquifer	Total Active Registered Exempt Wells ³	Registered Domestic Wells	Estimated Domestic Use Gallons/Day ^{1,2}	Estimated Domestic Use Ac- ft/Year ^{1,2}	Registered Stock Wells	Estimated Stock Use Gallons/Day ⁴	Estimated Stock Use Ac-ft/Year ⁴	Total Estimated Use Gallons/Day ⁷	Total Estimated Exempt Well Use Ac-ft/Year ⁷
Glen Rose (Upper Trinity)	498	405	118,487	133	93	80,352	90	198,839	223
Hensell (Middle Trinity)	869	812	388,483	435	57	49,248	55	437,731	490
Hosston (Lower Trinity)	138	127	37,155	42	11	9,504	11	46,659	52
Trinity (Total) ⁶	1,505	1,344	544,125	609	161	139,104	156	683,229	765
Edwards BFZ	841	707	206,840	232	134	115,776	130	322,616	361
Edwards Equivalent	395	306	89,523	100	89	76,896	86	166,419	186
Buda	28	15	4,388	5	13	11,232	13	15,620	17
Lake Waco	8	3	878	1	5	4,320	5	5,198	6
Austin Chalk	226	141	41,251	46	85	73,440	82	114,691	128
Ozan	166	118	34,522		48	41,472	46	75,994	85
Pecan Gap	67	44	12,873	14	23	19,872	22	32,745	37
Kemp	15	11	3,218	4	4	3,456	4	6,674	7
Alluvium	573	363	106,199	119	210	181,440	203	287,639	322
Other ⁵	1,478	1,001	292,853	328	477	412,128	462	704,981	790
CUWCD Total Active	3,824	3,052	1,043,817	1,169	772	667,008	747	1,710,825	1,916

1. Domestic use estimate assumes 106 gallons/person per day (USGS estimate of domestic use outside of a municipal water system) and 2.76 persons/household (U.S. Census Bureau, Population Estimates Program (PEP) July 1, 2019)

2. Benjamin G. Wherley, Ph.D. Associate Professor- Turfgrass Science & Ecology Dept. of Soil and Crop Sciences Texas A&M University estimate of 2,000ft² warm season turfgrass requires 38,855gal/yr/lawn or 106gal/day/lawn; "Ranchette" Avg. lawn size is 13,042ft², 6.5X larger; 6.5 X 106gal/day/lawn= 689gal/day/lawn; ~217 "Ranchette" Middle Trinity Wells; 689 X 217=an additional 150,924gal/day/lawn; **490ac-ft/yr or an 89% increase in Middle Trinity exempt well use from the 2018 estimate of 258ac-ft/yr.**

3. Exempt well use estimate factors out all plugged, capped, monitor and inactive wells in the database.

4. Source of stock water estimates is Texas Agrilife Extension @ 18 gallons water per day per cow. Livestock water use estimates are based on the 2017 Census of Agriculture, USDA National Agricultural Statistics Service. 36,868 cows / 771 stock wells= 48 cows/stock well; 48* 18gpd= 846 gal/day/stock well, **747ac-ft/yr or a 34% increase in annual stock use from the 2018 estimate of 556ac-ft/yr.**

5. The "Other" designation is the total of minor aquifer and alluvium source designation of the exempt wells.

6. Trinity Aquifer wells registered with unknown depth are assigned to the Middle Trinity per Board decision.

7. All estimates of groundwater use by exempt well owners is based on assumptions and scientific data, but by no means are they to be interpreted as recommended practices by CUWCD.

NOTICE OF APPLICATION FOR DRILLING AND OPERATING PERMIT

Name Address City, TX Zip

VIA CERTIFIED MAIL RETURN RECEIPT REQUESTED

RE: Application for Combination Drilling and Operating Permit

To Whom It May Concern:

Hines Texas, LLC has made application to the Clearwater Underground Water Conservation District (CUWCD) on February 27, 2020, for a combination drilling and operating permit to authorize drilling and withdrawal from four proposed wells in the Lower Trinity Aquifer with a 1¼ inch column pipe on a 285.475 acre tract located off Stillman Valley Rd. and Brooking Rd, approximately 2.6 miles to the west of the intersection of FM 2484 and Stillman Valley Rd., Florence, TX,

The proposed four wells are located at:

Well #1: Latitude 30.93011°/ Longitude -97.73762° Well #2: Latitude 30.92810°/ Longitude -97.74383° Well #3: Latitude 30.92169°/ Longitude -97.74103° Well #4: Latitude 30.92325°/ Longitude -97.73594°

to produce water for a beneficial use described as "domestic use" in a proposed annual quantity (for each well) of 4.14 acre feet per year based on 176 gallons per day per person at an occupancy of 3 people per home x 28 homes thus 1,349,040 gallons per year or 4.14 acre-feet per year per proposed well. Each well will serve no more than 7 homes and no more than 24 people.

This application will be set for hearing before the CUWCD Board upon notice posted at the Bell County Courthouse Annex and at the CUWCD Office. If you would like to support, protest, or provide comments on this application, you must appear at the hearing and comply with District Rule 6.10. For additional information about this application or the permitting process, please contact the CUWCD at PO Box 1989, Belton, Texas 76513, 254-933-0120. The applicant may be contacted at 601 Lake Air Drive, Waco, TX 76710, 254-776-7000.

Sincerely,

A.W. Hines Hines Texas, LLC

Hines Texas, LLC Mailing List

7858	Patrick & Dorothy Beesley	18865 Stillman Valley Rd	Florence	ТХ	76527
13537	Hazel Brooking	PO Box 394	Florence	ТХ	76527
35472	Hines Texas, LLC	601 Lake Air Drive	Waco	ТХ	76710
41047	Jasper & Patricia Revocable Trust	19011 Stillman Valley Rd	Florence	ТХ	76527
77687	Kenneth Murphy & Rosalie Rubi	6231 Plainview Rd	Midlothian	ТХ	76065
78392	Jean D. Neal, Jr. Family Limited Partnership	1237 S Main St	Georgetow	ΤX	78626
113133	J Windell Sullivan	PO Box 2704	Harker Hei	ŧΤΧ	76548
123361	Vick Legacy Ranch LLC	7766 Verbena Ct.	Dallas	ТХ	75230
133679	Joseph Troxell	PO Box 3393	Harker Hei	ŧΤΧ	76548
134363	Sean & Cindy Corbin	218 Moth Rd	Killeen	ТХ	76542
134364	Paul Bowen	567 Peaceable Kingdom Rd	Killeen	ТХ	76542
350619	Kenneth & Julie Kozlowski	18855 Stillman Valley Rd	Florence	ТХ	76527
350762	Luis Bivian	508 Gilmer St.	Killeen	ТХ	76541
363338	Veterans Land Board c/o Melanio Sandico, Jr.	1512 Arkansas Ave	Killeen	ТХ	76541
382624	Veterans Land Board c/o Larry & Linda Edwards	2404 Moonstone Dr	Killeen	ТХ	76549
382823	Joseph & Evelyn Cruz	4200 Bally Dr	Killeen	ТХ	76549
458567	Louis & Barbara Robison	PO Box 30	Killeen	ТХ	76540
473078	Michael & Jacquolynn Curl	116 Crystal Knoll Blvd	Georgetow	ΤX	78626
479085	Victor & Angela Piel	19243 Stillman Valley Rd	Florence	ТХ	76527







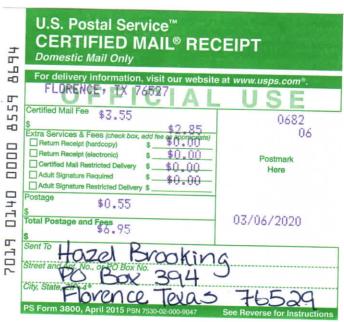


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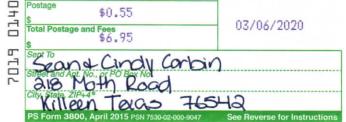
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	Florence Texas 76	527

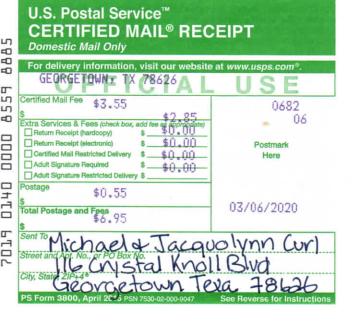
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NOTICE OF APPLICATION FOR A COMBINATION DRILLING AND OPERATING PERMIT FROM CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

Hines Texas, LLC has made application to the Clearwater Underground Water Conservation District (CUWCD) on February 27, 2020, for a combination drilling and operating permit to authorize drilling and withdrawal from four proposed wells in the Lower Trinity Aquifer with a 1¹/₄ inch column pipe on a 285.475 acre tract located off Stillman Valley Rd. and Brooking Rd, approximately 2.6 miles to the west of the intersection of FM 2484 and Stillman Valley Rd., Florence, TX,

The proposed four wells are located at:

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to produce water for a beneficial use described as "domestic use" in a proposed annual quantity (for each well) of 4.14 acre feet per year based on 176 gallons per day per person at an occupancy of 3 people per home x 28 homes thus 1,349,040 gallons per year or 4.14 acre-feet per year per proposed well. Each well will serve no more than 7 homes and no more than 24 people.

This application will be set for hearing before the CUWCD Board upon notice posted at the Bell County Courthouse Annex and at the CUWCD Office. If you would like to support, protest, or provide comments on this application, you must appear at the hearing and comply with District Rule 6.10. For additional information about this application or the permitting process, please contact the CUWCD at PO Box 1989, Belton, Texas 76513, 254-933-0120. The applicant may be contacted at 601 Lake Air Drive, Waco, TX 76710, 254-776-7000.

Publisher's Affidavit

State of Texas County of Bell

Before Me, The Undersigned Authority, this day personally appeared <u>Jane Moon</u> after being by me duly sworn, says that she is the <u>Classified Inside Sales Manager</u> of the Temple Daily Telegram, a newspaper published in Bell County, Texas and that the stated advertisement was published in said newspaper on the following date(s):

April 22, 2020

For: Hines Texas, LLC Ad #: 16656950 Cost: \$156.95 Times Published: 1

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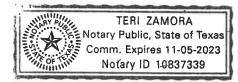
Jane Moon Classified Manager Inside Sales

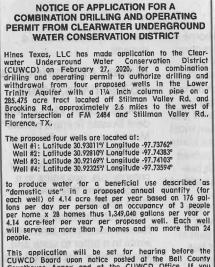
Subscribed and sworn to before me, this day: April 22, 2020

molo

Notary Public in and for Bell County, Texas

(Seal)





This application will be set for hearing before the CUWCD Board upon notice posted at the Bell County Courthouse Annex and at the CUWCD Office. If you would like to support, protest, or provide comments on this application, you must appear at the hearing and comply with District Rule 6.10. For additional information about this application or the permitting process, please contact the CUWCD at PO Box 1989, Belton, Texas 76513, 254:933-0120. The applicant may be contacted at 601 Lake Air Drive, Waco, TX 76710, 254:776-7000.