shall be of no significance or effect as regards the legality thereof and neither the City nor attorneys approving the Series 1982 Bonds as to legality are to be held responsible for CUSIP numbers incorrectly printed thereon.

SECTION 43. *Emergency.* The public importance of refunding the Refunded Bonds creates an emergency and an urgent public necessity that the refunding be accomplished as soon as possible and without delay for the immediate preservation of the public peace, health and safety of the citizens of the City of Austin, Texas; that this Ordinance take effect and be in full force immediately upon its passage; and that the rule requiring that all ordinances be read on three separate days be waived and suspended, and it is hereby suspended and further that all ordinances and charter rules governing the effective date of this Ordinance are hereby suspended and that this ordinance is hereby passed as an emergency measure and shall be effective immediately upon its passage and adoption as provided by the Charter of the City of Austin.

PASSED AND APPROVED, this

Carole Keeton McClellan
Mayor, City of Austin, Texas

(City Seal)

ATTEST: Grace Monroe
City Clerk, City of Austin, Texas

APPROVED:

Albert De La Rosa
City Attorney, City of Austin, Texas

Exhibit A

LIST OF OUTSTANDING OBLIGATIONS
PAYABLE FROM NET REVENUES OF THE
SYSTEMS, EITHER OR BOTH

1. $598,000,000 City of Austin, Texas, Water, Sewer, and Electric Revenue Bonds, Series 1982.

2. Utility Construction Contract between the City and North Austin Growth Corridor MUD No.1, pursuant to which $5,960,000 North Austin Growth Corridor MUD No.1, City of Austin Contract Bonds, Series 1981 have been issued.

3. Utility Construction Contract between the City and Northwest Travis County MUD No.1, pursuant to which $3,550,000 Northwest Travis County MUD No.1, Unlimited Tax and City of Austin Contract Bonds, Series 1982, payable by the City as to principal amount only, are expected to be issued on or about April 1, 1982.

4. Utility Construction Contract between the City and Springwoods MUD, pursuant to which $3,520,000 Springwoods MUD Combination City of Austin Contract, Unlimited Tax and Revenues Bonds, Series 1982, payable by the City as to principal amount only, are expected to be issued on or about April 1, 1982.

5. Utility Construction Contract between the City and South Austin Growth Corridor MUD No. 1.

RESPONSE TO REQUEST NO. 19

Copy of letter that was sent

August 8, 2005

Texas Commission on Environmental Quality
Utility Technical Review Team
Water Supply Division MC-153
P.O. Box 13087
Austin, TX 78711-3087

Re: North Austin MUD Water Pressure Booster System

Dear Mr. Laughlin:

I appreciate your meeting with Mr. Gary Spoonts of Eco Resources, Inc. and me on August 1, 2005 to discuss our proposal and plans to resolve the North Austin MUD water pressure problem. It was my understanding from the meeting that you were concerned primarily with surge protection and would require that such protection be installed within one year.

As you know, we have proposed using variable speed technology whereby motor speeds decrease with decreasing water demand, and consequently, discharge flows decrease. The pump/motor speed ramps up and down depending on demand and the pump/motor will not shut off until demand flows are very low. Little or no surge can be expected. In addition, with a demand base of 2600 connections, it is anticipated that the pump/motor will seldom, if ever, shut off. In any event, the District is prepared to install surge protection as dictated for design within one year if necessary.

Your letter dated August 8, 2005 states that a condition of the TCEQ's approval requires that the District install a receiving ground storage tank supposedly to create an air gap. The District proposes to install a continuous monitor pressure gauge with system shut down at a suction pressure at or below 20 psi which I understand is an acceptable exception, upon approval, in accordance with 30 TAC § 290.44(d)(2).

The TCEQ's requirement to install a ground storage receiving tank implies the installation of an air gap which the City of Austin staff also requires at this time. The

.../2

installation of an air gap will separate the District's distribution system, which serves in excess of 2500 connections from the City of Austin pressure facilities and, as a result, the District will have no elevated storage. Based on a conversation with the TCEQ staff and provisions of TAC § 290.45, the District will be required to provide 100 gallons per connection of storage at an elevation of 80 feet above the highest point in the District. In-line booster stations will not offer an acceptable alternative under this situation. Instead, pump stations with back-up power will be required. It should be appreciated that the design and construction of two ground storage receiving tanks, two water supply pump stations, emergency back-up power and an elevated storage tank represent a major project with preliminary costs in the range of $3.0 to $5.0 million dollars.

As we discussed at our meeting and as outlined in my submittal report dated May 2005, the District currently has adequate fire protection from the City of Austin system. Domestic pressures are generally adequate but fall below State standards on a frequent basis. The purpose of this proposed in-line booster station installation is to correct the occasional domestic pressure deficiencies only. This situation represents a specific condition that is not actually addressed in the TCEQ rules.

Any requirement for ground storage receiving tanks effectively eliminates this internal pressure boosting alternative. The installation of the required facilities will undoubtedly require the construction of detention and water quality ponds to secure a City of Austin site development permit owing to increased impervious cover. Available land restrictions may require the acquisition of additional existing residential property adjacent to the existing available lots. Additional financing will also have to be arranged through perhaps a future bond election and bond application process. The time required to completely design, construct and finance a $3.0 to $5.0 million dollar utility project will encompass several years.

Alternately, the variable speed booster stations as proposed and designed will solve the domestic water pressure problems currently observed within the District within a few months utilizing available but limited financial resources. This proposed system will not significantly reduce suction pressure on the City of Austin's delivery system nor will its operation introduce an excessive water hammer. The District has expended significant financial and time resources in an effort to solve this pressure problem but has been stalled by State and local requirements that I believe are not technically substantiated. It is not the intent of the District to solve an immediate pressure problem and at the same time collapse a suction line and/or jeopardize the integrity of discharge mains of the distribution system with water hammer. Such results will, of course, be inconsistent with the attempt to solve the problem and therefore these considerations were integrated into the design. While your concerns are based on past experience and observations, a careful review of the proposed design will show that such adversarial conditions will not exist.

.../3

The District has exhausted essentially all alternatives to quickly resolve this problem and I welcome your suggestions to address this immediate public health and safety problem. Low pressure will continue to be observed within the District until a feasible solution is identified and implemented. Please advise with any other ideas.

Sincerely,

David Malish, P.E.
District Engineer

cc: Gary Spoonts, Eco Resources, Inc.
Sharlene Collins, Armbrust & Brown

PWS ID #2270226 CO

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

August 8, 2005

Mr. David Malish, P.E.
Murfee Engineering Company, Inc.
1101 Capital of Texas Highway South, Bldg. D Suite 110
Austin, Texas 78746-6482

Re: North Austin MUD No. 1 - Public Water System I.D. #2270226
Proposed North Booster Pump Station
Engineer Contact Telephone. 512/327-9204
Plan Review Log Number 200506-065
Travis County, Texas

Dear Mr. Malish:

The planning material received on June 7, 2005, with your letter dated June 7, 2005 and additional material received on July 12, 2005 for the proposed booster pump station has been reviewed. The commission's public drinking water program does not examine plans and specifications in regard to the structural features of design, such as strength of concrete or adequacy of reinforcing. Only the features covered by these sections will be reviewed [§290.39(d)(3)(B)]. The project generally meets the minimum requirements of the TCEQ's Chapter §290 - Rules and Regulations for Public Water Systems (Rules) and is **conditionally approved for construction** if the project plans and specifications meet the following requirement:

- Planning material for this plan submittal state that construction shall be in accordance with standard specifications of the City of Austin. Please note that TCEQ's specifications for location of waterlines as required in Title 30 TAC, §Chapter 290.44(e) (Rules and Regulations for Public Water Systems) are minimum requirements. When conflicts are noted with local requirements, the more stringent requirement shall be required. Construction for public water systems must always, at a minimum, meet TCEQ's "Rules and Regulations for Public Water Systems

We have reviewed your request for a temporary exception to the Texas Commission's on Environmental Quality's requirement contained in 30 TAC §290.44(d)(2) that booster pumps are to take suction from storage tanks. You are proposing to install in-line booster pump stations to take suction directly from the City of Austin's distribution. This is to correct low pressure problems being encountered by the North Austin MUD No. 1 (MUD) in their south pressure plane as a result of adequate pressure maintenance facilities to meet peak hour customer demands. Based on our review, **we are granting a temporary exception for the two proposed in-line booster pump stations to take suction from the City of Austin's distribution under the following conditions:**

1. Both in-line booster pump stations must be equipped with automatic pressure cut-off devices located on the suction side of the pumps so that the pumps will become inoperable if the suction side pressure drops below 20 pounds per square-inch (psi).

2. Both in-line booster pump stations must be equipped with continuous pressure recording devices on the suction side of the pumps. These devices must be equipped with emergency power backup in the event of loss of normal power.

3. At any time the continuous pressure recorders indicate a suction pressure of less than 20 psi during normal operating conditions, the MUD this temporary exception shall be revoked. At that time the MUD must take immediate action to submit engineering plans and specifications for TCEQ review and approval for properly sized storage tanks for the booster pumps to take suction from and pressure maintenance facilities as specified in 30 TAC §290.44(d)(2). The MUD must begin construction of the facilities within 30 days of receiving written TCEQ approval to construct.

4. This exception will expire in one year from the date of this letter. If an extension is needed, it must be submitted in writing with documentation verifying that compliance with TCEQ's minimum capacity requirements is being made by either a written agreement with the City of Austin or the construction of the MUD's on storage and pressure maintenance facilities.

Please note that the granting of the above exception **is not** an exception to the TCEQ's minimum requirement that system's serving greater 2,500 connections provide at least 100 gallons of elevated storage capacity per connection for each pressure plane as specified in 30 TAC §290.45. We do understand that the MUD has a written agreement with the City of Austin to meet all capacity requirements. Also, we understand that discussions are underway between the MUD and the City of Austin to resolve the current lack of pressure maintenance facilities under all customer demand conditions. Based on your submittal, the City of Austin's elevated storage tanks will continue to provide emergency flow and pressure (20 psi) through the four proposed check valves during the event of the loss of normal power. Therefore, **we are granting a one year temporary exception to this requirement under the following conditions:**

1. All of the conditions for the in-line booster pump exception are met.

2. There is not an increase in distribution line leaks or plumbing failures on the customers' sides of the meters due to surge pressures.

The TCEQ's definition of elevated storage is that water store at least 80 feet above the highest connection on the pressure plane. Based on the submitted pressure readings recorded below 30 psi within the MUD's south pressure plane, it would indicate that the possibility of a low water level during demand periods less than this 80-foot mark. You raised the concern that the City of Austin's customers in the adjacent service area may also be experiencing low pressures during peak demand periods. We are passing this information on to our Austin Regional Office staff.

It is noted that the MUD is proposing to install checks at the two interconnections not to be equipped with in-line booster pumps and in bypass lines at the in-line booster pump stations. This is to prevent the flow of water out of the MUD's system and a reduction of pressure and not for cross-connection protection. The TCEQ staff agree's that there has not been a historical concern for the existence of potential sources of pollution within the MUD's system that would require the interconnections to be through air-gaps. The installation of the checks and in-line booster pumps does not change this condition. The MUD should continue to maintain an adequate cross-connection and customer service inspection program in place.

The TCEQ's concern is for the potential of the in-line booster pumps to create backflow/backsiphonage conditions on the City of Austin's mains feeding water to the in-line booster pump stations under reduced pressures on this lines. This is the reason the TCEQ considers in-line booster pumps a temporary solution where water demand has outgrown the provided storage and pressure maintenance facilities until a proper pressure model can be developed for modifications to a system that meet the TCEQ's minimum requirements.

The submittal consisted of an engineering report, nine sheets of engineering drawings and technical specifications. The approved project is a booster pump station consisting of:

- Two 2,200 g.p.m. at 55 feet total dynamic head (TDH) variable speed centrifugal pumps;
- Three 1,800 g.p.m. at 55 feet total dynamic head (TDH) variable speed centrifugal pumps
- 106 linear feet (l.f.) of 12-inch ductile iron (DI) AWWA C151 waterline with valves, and fittings; and,
- Electrical controls, fencing and related appurtenances.

The North Pump Station will be located at the northwest corner of Tamayo Drive and Palmer Lane. The South Pump

Station will be located at the southwest corner of Dallas Drive and Palmer Lane. The Austin Water and Waste Water Utility public water supply system provides water treatment for the system.

An appointed engineer must notify the TCEQ's Region 11 Office at (512) 339-2929 when construction will start.

Please keep in mind that upon completion of the water works project, the engineer or owner will notify the commission's Water Supply Division, in writing, as to its completion and attest to the fact that the completed work is substantially according to the plans and change orders on file with the commission as required in §290.39(h)(3) of the Rules.

Please refer to the Utility Technical Review Team's Log No. 200506-065 in all correspondence for this project. This will help complete our review and prevent it from being considered a new project.

Please complete a copy of the most current Public Water System Plan Review Submital form for future submital to TCEQ for review of improvements to a Public Water System. Every blank on the form must be completed to minimize any delays in review of your project. The document is available on our WEB site at the address shown below.

http://www.tceq.state.tx.us/permitting/waterperm/ud/sf.pdf

For future reference, you can review part of the Utility Technical Review Team's database to see if we have received your project. This is available on the TCEQ's homepage on the Internet at the following address:

http://www.tceq.state.tx.us/assets/public/permitting/watersupply/ud/planrev_list.html

You can download most of the well construction checklists and the latest revision of Chapter 290 "Rules and Regulations for Public Water Systems" from this site.

If you have any questions please contact me at (512)239-6970 or the Internet address: "DLAUGHLI@tceq.state.tx.us " or if by correspondence, include MC 153 in the letterhead address below.

Sincerely,

David D. Laughlin

David D. Laughlin, P.E.
Utility Technical Review Team
Water Supply Division MC-153

DDL/mmg

cc: North Austin MUD No. 1 - Attn.: Eco Resources, 9511 620 N, Austin, TX 78726
TCEQ Central Records PWS File #2270226
TCEQ Technical Review & Oversight Team - Attn.: Ms. Marlo Berg, P.E.
TCEQ Region No. 11Office - Austin (w/approved materials)

MEC

Sept 13, 05

Murfee Engineering Company

David D. Laughlin, P.E.
Texas Commission on Environmental Quality
Utility Technical Review Team
Water Supply Division MC-153
P.O. Box 13087
Austin, TX 78711-3087

Ron Humphrey, P.E.
City of Austin
Austin Water Utility
625 E 10th St, Suite 415
Austin, TX 78701

Re: **North Austin MUD #1**
Low Domestic Water Pressure
Proposed Resolution with Installation of VFD Booster Pumps

Dear Gentleman,

After reviewing the design comments received from both the City of Austin and TCEQ, it has become apparent that there is perhaps some misunderstanding of the operational characteristics and performance of variable frequency drive (VFD) technology when used for domestic water supply purposes. Both the City of Austin and TCEQ staff have expressed or implied a concern that the imposition of this technology to solve the low domestic water pressure problem within North Austin MUD No. 1 may result in severely reduced pressure in the City of Austin's water supply mains. While no actual explanation is provided, it is suspected that the reviewers have reason to believe that the in-line pumps will attempt to withdraw or divert water for service within the District at a rate significantly exceeding the original design capacity of the water supply main thereby causing a possible collapse of the main.

Any requirement for the installation of a ground storage tank with an air gap is not only technically unjustified in this case considering the employment of VFD technology, but will also eliminate this alternative from further consideration as it becomes technically, economically, and socially unfeasible. The installation of an air gap will require the installation of not only large ground storage tanks but also fire demand pumps with backup emergency power. Fire protection from the City of Austin system will no longer be available and will have to be reproduced mechanically, which is less reliable. In addition, it becomes questionable if any elevated storage is provided to the District which serves in excess of 2,500 connections and perhaps on-site elevated storage will now be required. A former plan to install an elevated storage tank was previously eliminated from consideration at the request of the City of Austin as referenced in the third amendment to the consent for creation agreement between the District and the City.

The addition of ground storage tanks, fire pumps, enclosed structures with HVAC systems, back-up power facilities possibly an elevated storage tank and an on-site water quality and detention ponds will

1101 Capital of Texas Highway South • Building D, Suite 110 • Austin, Texas 78746 • 512/327-9204

increase the cost of this alternative by several million dollars and will require the acquisition of additional adjacent properties at both sites. In addition, at this time, the installation of these facilities will be delayed a minimum of two (2) years owing to the permitting and plan approval process that will need to be re-initiated. With this increased cost and time considerations, other previously rejected alternatives should possibly be reconsidered.

The following discussion is provided to assist in more clearly understanding the use of VFD technology in an effort to support reconsideration of the required air gap and the subsequent facilities requirement consequence. It is unnecessary to address any other issues at this time as this alternative becomes unfeasible with the requirement of an air gap. Therefore, other issues will only be addressed if the requirement for the air gap is reconsidered. It should also be completely understood that the District and consultants have no intention to jeopardize in any way the integrity or operation of the City of Austin's water supply facilities.

The use of VFD technology to increase domestic water pressure will not effect domestic demands or result in increased domestic flows at any time. Instantaneous flows in the City of Austin water supply mains will remain essentially unaffected with or without the installation of the proposed VFD motors/pumps. VFD water pressure boosting systems are configured and designed to maintain a set or specified discharge pressure. The actual motor/pump speed will vary directly and simultaneously with system water demand to deliver a water demand rate precisely coinciding with actual system demands. As no internal storage facilities exist within the District, the VFD facilities cannot pump or deliver flow rates in excess of system demands at any time.

It is important to note that the District currently receives water supply at four locations through water master meters as shown in Figure 1. Water supply at Amarillo is delivered from a 36" main along McNeil Drive, at Dallas Drive from a 36"/24" main along Parmer Lane, and at Tamayo Drive and Anderson Mill from the 24" main along Parmer Lane. With the installation of the proposed booster stations, water supply locations to the District will be reduced to two sites as shown in Figure 2. Note that the current water supply to the District at the intersection of McNeil Drive and Amarillo will essentially be eliminated with the installation of a check valve. To satisfy current and projected water demands within the District, water supply currently entering the District at this intersection must be redirected to one of the two entry (booster station) sites along Parmer Lane at either Dallas Drive or Tamayo Drive. In either case, additional flows, equal to that eliminated at the McNeil Drive/Amarillo intersection, will be redirected for supply through the 36"/24" transmission main in Parmer Lane.

To assess the impact of this system supply modification, water model simulations were used to determine projected domestic flows through water supply mains under existing conditions and under reconfigured and rerouted conditions. The results of the water models are provided in Table 1. As is shown, approximately 1365 gpm of domestic flow under peak hours use conditions will be diverted from the intersection at McNeil Drive and Amarillo to a point of supply to the District at the intersection of Dallas Drive and Parmer Lane. It is interesting to note that the actual flow through the 24" main along Parmer Lane from the intersection with Dallas to Tamayo is projected to actually decrease by approximately 400 gpm. The estimated effect on headloss and the subsequent reduction in pressure in

the City of Austin water supply mains is summarized in Table 2. As is shown, the reduction in pressure in the 36"/24" to Dallas is negligible. Pressure in the City of Austin 24" main is also negligible.

The pumps selected for this application are designated as Flowserve 10LR-16A. The variable speed curves for this pump using a 12.75" propeller are provided in Figure 3. These pumps were selected in an effort to deliver up to collectively approximately 6600 gpm of water flow to the District at a discharge pressure of near 60 psi.

Referencing the pump performance curves, it is shown that the three pumps can each deliver approximately 3800gpm at near pump cavitation. This situation, however, will only occur if all pump controls fail during a low water pressure period with a coincidental peak demand of 11400 gpm – an unlikely if not impossible condition. At this point, cavitations will be initiated. Assuming an 11,400 gpm flow through the City of Austin's 36"/24" water supply main in Parmer Lane from McNeil Drive to Dallas Drive, a total estimated pressure drop of only 3 psi will be observed under this extreme condition. Assuming a minimum delivery pressure of 35 psi, a low pressure of 32 psi will result in the main. Little, if any, headloss will be observed in the City's water supply mains. Even under these extreme and unlikely conditions a pressure decrease to 20 psi in the City water supply mains cannot result from the installation of the proposed booster pumps. Again, it is reiterated that the imposition of variable speed technology will not increase flows but will only supply flows as dictated by demand which is independent of the proposed booster station installation.

The TCEQ staff has expressed additional concern that adequate surge protection has not been considered. Water hammer from surge results from a sudden significant decrease in pipeline velocity generally caused by rapid valve closure, a sudden loss of power at a pump station or any other situation which suddenly disrupts the velocity of the water. The resulting pressure from water hammer is directly related to the water velocity at the time of disruption of flow.

As discussed previously, VFD pumps are controlled by a set discharge pressure. The speed of the pumps and consequently the resulting flow will vary precisely with system demands as dictated by routine operations. As system demand increases the motor/pump speed increases in an effort to maintain the set discharge pressure.

The more recent advances in VFD technology over the last decade have allowed motor speeds to slow significantly before forced shut off. Low flows in the range of 200 to 300 gpm can be maintained by the specified pumps. With a statistical user base of approximately 2900 connections it is anticipated that the pumps will run continuously as the low flow delivered will range from 0.07 to 0.10 gpm per connection. In any event, system flows in the range of 200 to 300 gpm range will be observed at system shut off if it ever occurs.

In the event of a line break or an unusual system demand such as a major fire flow, the motor/pump speed will quickly increase in an effort to maintain the set discharge pressure of near 60 psi. The pump will deliver flows at precisely the system demand. In an effort to protect the pumps from possible cavitation, the pump controls are designed to deactivate the pumps when a discharge pressure of 53.5 psi

cannot be maintained. At the time of shut off, the integrated check valves will open and system demand will be provided exclusively from the City of Austin system as if the booster stations were never installed. Water hammer from surge will not occur under this situation as water pressure and flows will be released at the line break or fire hydrant at the time of pump shut off. This situation does not represent a sudden valve closure.

In the event of a sudden power outage during normal operating conditions, the pumps will also suddenly deactivate and the integrated check valve will open with water supplied directly from City of Austin system as is the current situation. As the VFD pumps will only discharge a precise flow equal to the instantaneous system demands as dictated by the current valve openings (or breaks) throughout the District, surge cannot be expected as pressure and flow will be instantaneously released through the open valves which are imposing the demand at the time of deactivation. Again, this situation does not represent sudden valve closure or disruption of velocity until all energy is released.

Based on this analysis and understanding of VFD technology, it is difficult to technically justify low suction pressure or discharge surge (water hammer) concerns with this application. It will be unfortunate to deny this technically or economically feasible alternative for resolving the on-going low pressure problem following an extensive alternative analysis if such denial is based on the misunderstanding of system operation. Again the District does not intend to jeopardize the integrity of the City of Austin's water supply facilities in any way. If such concerns remain, perhaps a special condition or situation has been over-looked, please advise.

I will be glad to discuss this analysis with you at your convenience, however, if the requirement for an air gap remains, this alternative becomes unfeasible and no additional response to other comments is necessary at this time. I look forward to your response

Sincerely,

David Malish, P.E.
Vice President
Murfee Engineering

Cc: Sharlene Collins – Armbrust and Brown
Gary Spoonts – Eco Resources

[Table 1]

Scenario 1:
EXISTING CONDITIONS @ 980' HGL
Steady State Analysis
Pipe Report

Label	Length (ft)	Diameter (in)	Discharge (gpm)	Velocity (ft/s)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	From Node	To Node	Hazen-Williams C
P-3	50.00	6	0.00	0.00	0.00	0.00	J-725	PMP-2 Tamayo	100.0
P-5	1,436.00	36	3,301.63	1.04	0.26	0.18	SR-1	J-5	100.0
P-15	205.00	12	1,364.67	3.87	1.50	7.33	J-5	J-15	100.0
P-1390	1,739.00	36	1,936.96	0.61	0.12	0.07	J-5	J-90	100.0
P-1395	294.00	24	3,271.97	2.32	0.37	1 26	SR-2	J-90	100.0
P-195	1,637.00	36	5,208.93	1.64	0.68	0.42	J-100	J-165	100.0
P-205	77.00	16	2,575.09	4.11	0.45	5.85	J-165	J-170	100.0
P-975	2,737.00	24	2,633.84	1.87	2.32	0.85	J-180	J-725	100.0
P-980	1,755.00	24	823.26	0.58	0.17	0.10	J-725	J-1145	100.0
P-1150	187.00	12	1,810.58	5.14	2.31	12.37	J-725	J-720	100.0
P-1530	1,322.00	12	823.26	2.34	3.80	2.87	J-1145	J-1080	100.0
P-220	634.00	16	2,036.09	3.25	2.40	3.79	J-170	J-185	100.0
P-8	53.00	16	0.00	0.00	0.00	0.00	J-2	J-185	100.0

Scenario 2:
PRESSURE INCREASE OF 25 PSI @ TAMAYO AND DALLAS MASTER METERS
Steady State Analysis
Pipe Report

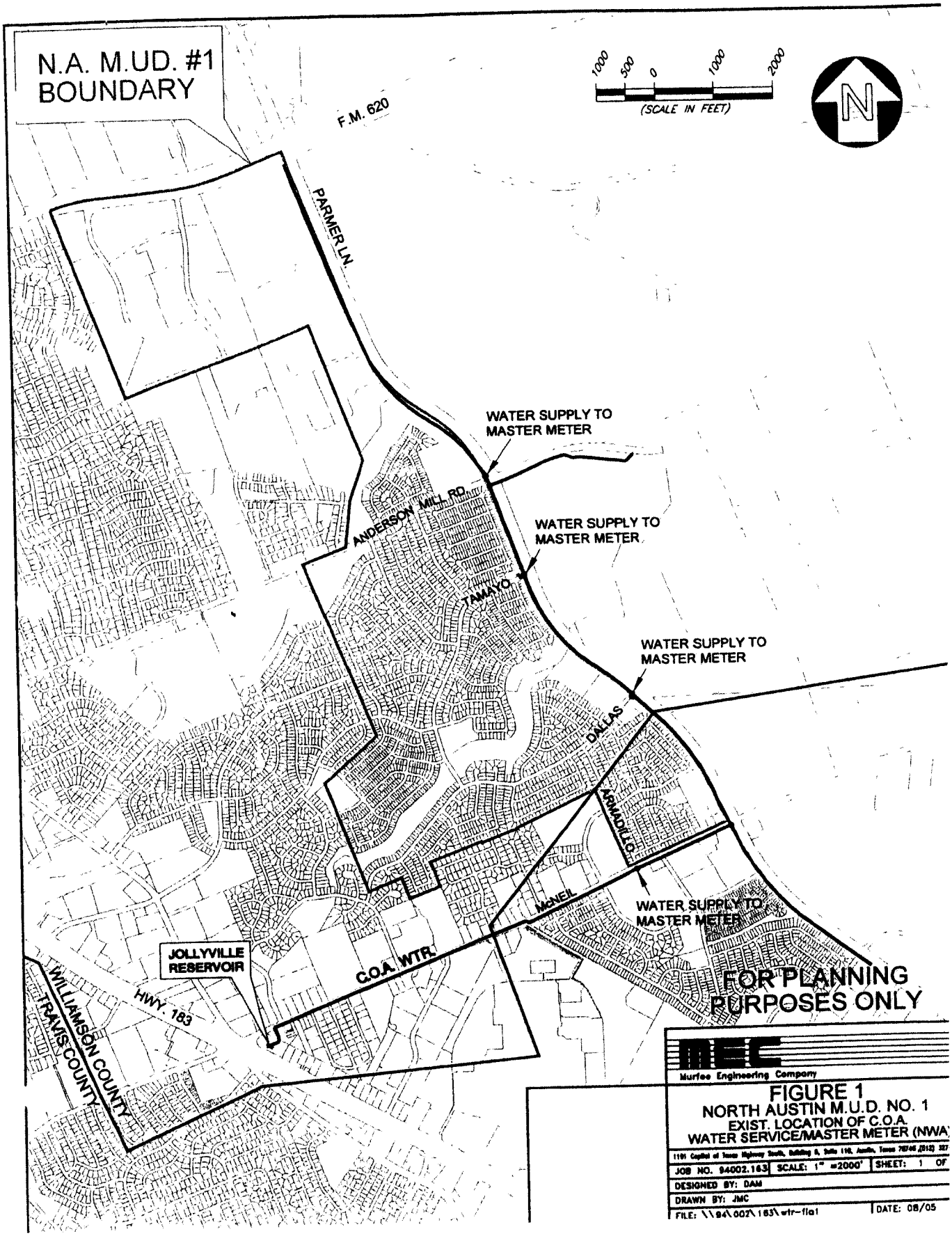
Label	Length (ft)	Diameter (in)	Discharge (gpm)	Velocity (ft/s)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	From Node	To Node	Hazen-Williams C
P-3	50.00	16	2,215.79	3.54	0 22	4.43	J-725	PMP-2 Tamayo	100.0
P-5	1,436.00	36	3,301.63	1.04	0.26	0.18	SR-1	J-5	100.0
P-15	205.00	12	0.00	0.00	0.00	0.00	J-5	J-15	100.0
P-1390	1,739.00	36	2,929.31	0.92	0.25	0.14	J-5	J-90	100.0
P-1395	294.00	24	3,644.29	2.58	0.45	1 54	SR-2	J-90	100 0
P-195	1,637.00	36	6,573.60	2.07	1 05	0.64	J-100	J-165	100.0
P-205	77.00	16	4,357.82	6.95	1.19	15.50	J-165	J-170	100.0
P-975	2,737.00	24	2,215.79	1.57	1.68	0.61	J-180	J-725	100.0
P-980	1,755.00	24	-0.00	0.00	0.00	0.00	J-725	J-1145	100.0
P-1150	187.00	12	0.00	0.00	0.00	0.00	J-725	J-720	100.0
P-1530	1,322.00	12	0.00	0.00	0.00	0.00	J-1145	J-1080	100.0
P-220	634.00	16	0.00	0.00	0.00	0.00	J-170	J-185	100.0
P-8	53.00	16	3,818.82	6.09	0.64	12.14	J-2	J-185	100.0

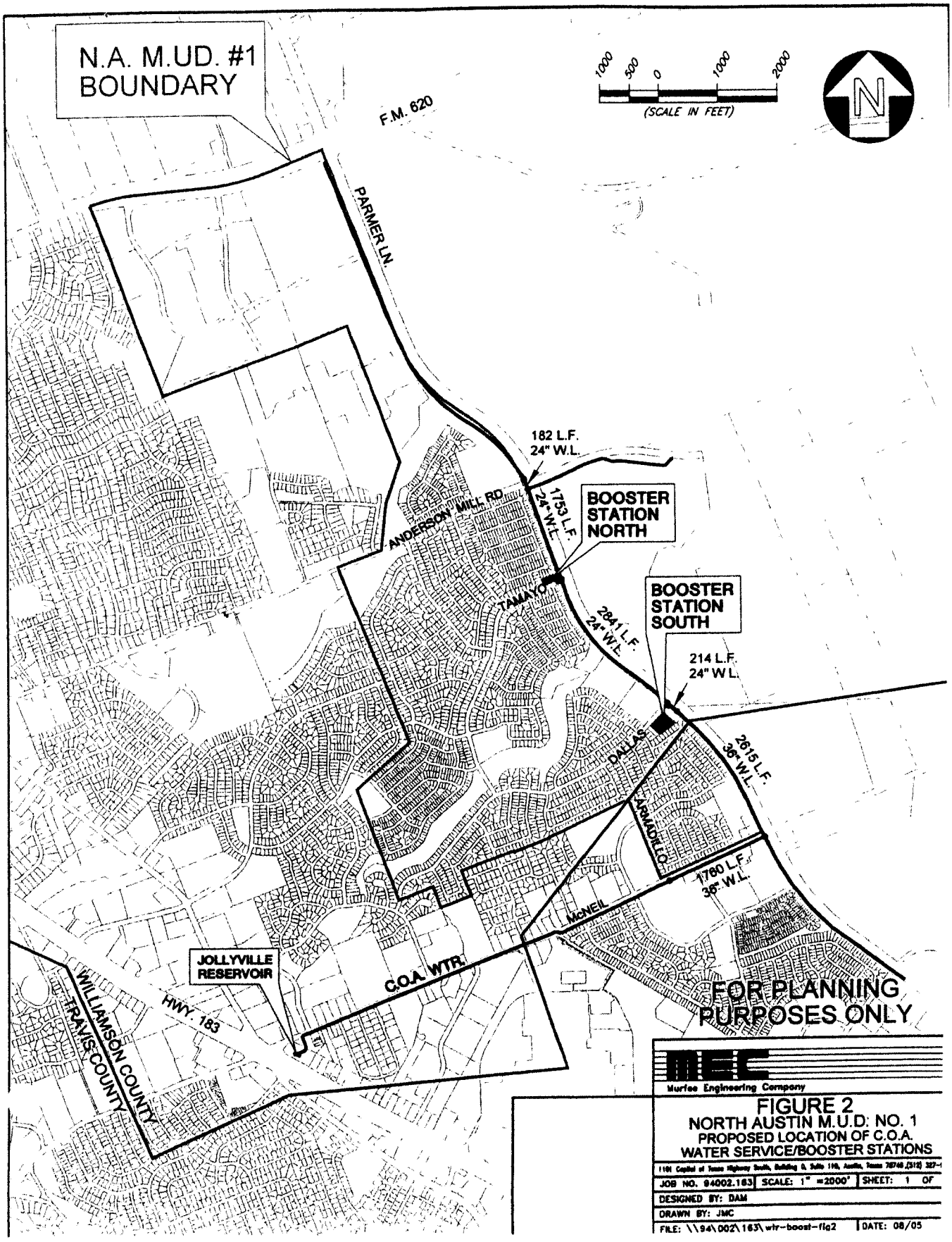
Pipe Flow Mass Balance
P-15 @ Amarillo Dr & P-195 @ Parmer Ln
Scenario 1—P-15 = 0gpm & Scenario 2—P-15 = 1.364.67gpm
Scenario 1—P-195 = 6,573.6gpm & Scenario 2—P-195=5,208.93gpm
Scenario 1—P-195 – Scenario 2—P-195 = Scenario 2—P-15 = 1.364.67gpm

[Table 2]

An Analysis of the Effect on Suction Pressure with the Installation Of Variable Frequency Drive Booster Stations Along Palmer Lane North from McNeil Drive North Austin MUD 1

Transmission Main Analysis	Scenario	Q_{DESIGN} (gpm)	Total Friction Loss (ft)	Change in Pressure	
				ft	psi
2615 lf – 36" ø and 214 lf – 24" ø Palmer Lane Main from McNeil to Near Dallas Drive	Existing Condition	5309	1.7	-0.1	-.04
	Installed VFD Booster Station	6574	1.8		
2841 lf – 24" ø Palmer Lane Main from Dallas Drive to Tamayo	Existing Condition	2634	2.42	+0.66	+0.29
	Installed VFD Booster Station	2216	1.76		


N.A. M.U.D. #1
BOUNDARY
1000 500 0 1000 2000
(SCALE IN FEET)
N
F.M. 620
PARMER LN.
WATER SUPPLY TO
MASTER METER
ANDERSON MILL RD.
WATER SUPPLY TO
MASTER METER
TAMAYO
WATER SUPPLY TO
MASTER METER
DALLAS
ARMADILLO
McNEIL
WATER SUPPLY TO
MASTER METER
JOLLYVILLE
RESERVOIR
C.O.A. WTR.
HWY. 183
WILLIAMSON COUNTY
TRAVIS COUNTY
FOR PLANNING
PURPOSES ONLY
Murfee Engineering Company
FIGURE 1
NORTH AUSTIN M.U.D. NO. 1
EXIST. LOCATION OF C.O.A.
WATER SERVICE/MASTER METER (NWA
JOB NO. 94002.163
SCALE: 1" =2000'
SHEET: 1 OF
DESIGNED BY: DAM
DRAWN BY: JMC
FILE: \\94\002\163\wtr-fig1
DATE: 08/05



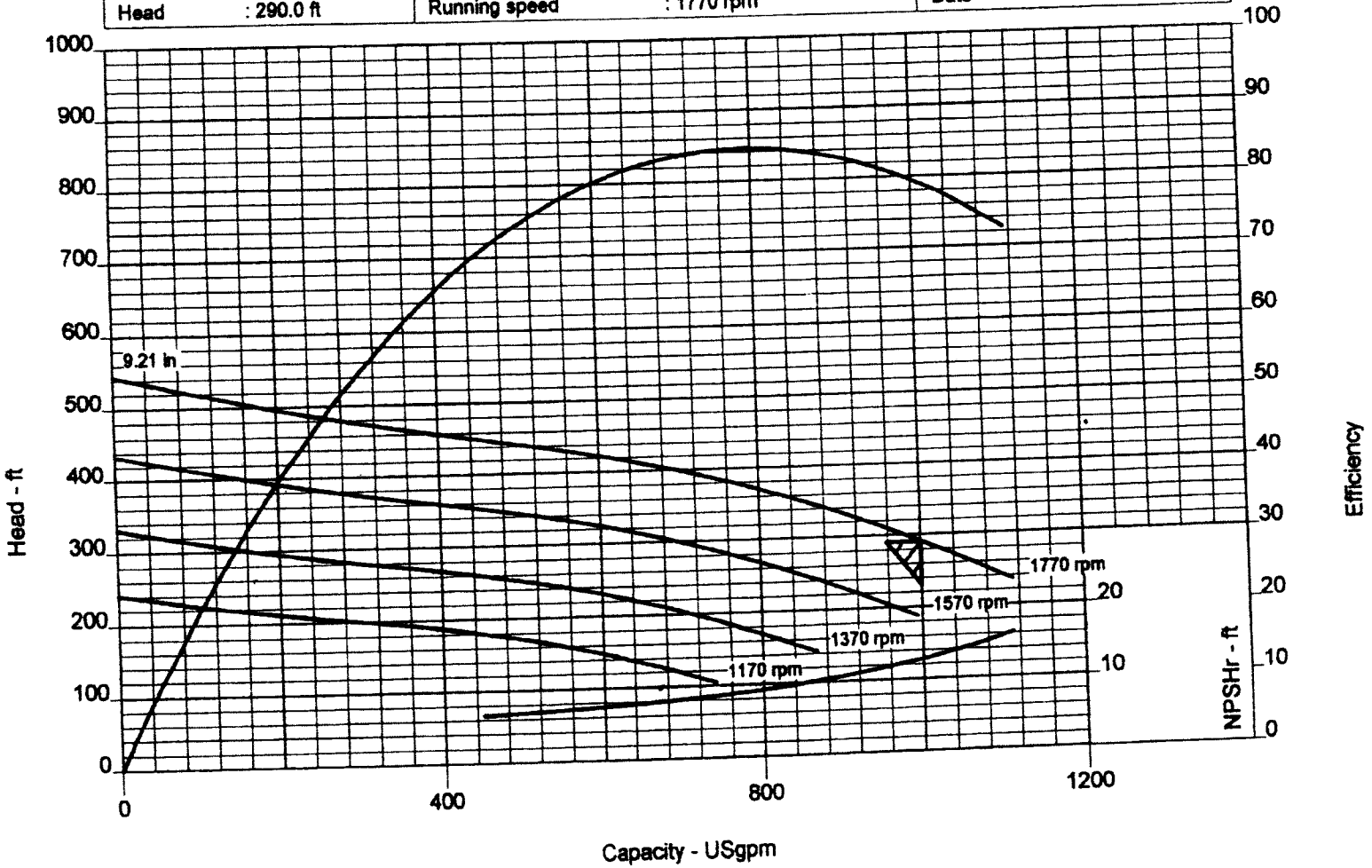
Murfee Engineering Company

FIGURE 2
NORTH AUSTIN M.U.D. NO. 1
PROPOSED LOCATION OF C.O.A.
WATER SERVICE/BOOSTER STATIONS

1101 Capital of Texas Highway South, Building G, Suite 110, Austin, Texas 78746 (512) 327-1

JOB NO. 94002.163	SCALE: 1" =2000'	SHEET: 1 OF
DESIGNED BY: DAM		
DRAWN BY: JMC		
FILE: \\94\002\163\wtr-boost-fig2		DATE: 08/05

Pump size & type	Flowserve Pump Division	Curve number
12EML		EC-2631
Capacity : 1000.0 USgpm	Specific gravity : 1.000	Stage(s) : 6
Head : 290.0 ft	Running speed : 1770 rpm	Date : Oct 13, 2005



Murfee Engineering Company

94002168

10/27/05
Mr. James Weddell
Texas Commission on Environmental Quality
Utility Technical Review Team
Water Supply Division MC-155
P.O. Box 13087
Austin, TX 78711-3087

RE: ***North Austin MUD No. 1 Booster Stations***

Dear Mr. Weddell,

Following our telephone conversation on October 10, 2005 with respect to the referenced project, it was my understanding that you agreed to provide a letter of clarification to the TCEQ letter of August 8, 2005. In August 2005, the North Austin MUD No. 1 district manager, Mr. Gary Spoonts and I met with you and Mr. Dav Laughlin, P.E. to discuss this project. Based on conversations at that meeting, Mr. Spoonts and I understood that the TCEQ would accept the installation of a low suction pressure cutoff in lieu of an air gap on the suction side of the variable speed booster station. However the TCEQ remained concerned with the potential for a pressure surg with subsequent water hammer in the absence of surge protection facilities. We were informed that the District would be required to monitor water pressure and install surge protection equipment if necessary after no more than one year of operation.

Alternatively your letter dated August 8, 2005 indicates that the acceptance of a low pressure cutoff is only temporary and an air gap with a ground storage tank would be required within one year. Such a requiremen is technically and economically prohibitive for the District as a solution as was explained in my attached letter response to Mr. Laughlin, P.E. and Mr. Ron Humphrey, P.E. of the City of Austin which was sent on Septembe 13, 2005. In addition, your should know that the City of Austin currently operates three variable speed booster stations designed and constructed without a suction air gap or discharge surge protection. Two of these stations were designed and constructed specifically at the request of the City of Austin and were approved by the TCEQ To my knowledge no problems have been observed in their 8-10 operating history.

As the Districts customers continue to receive low domestic water pressure during frequent periods, it is requested that you issue the proposed letter of clarification as quickly as possible in an effort to allow the Distri to proceed with some course of action. Although the City of Austin must also approve the proposed design, the City staff cannot approve a solution unless it is also approved by the State.

If you have any questions please call. I look forward to your response.
Sincerely,

David Malish P.E.
Murfee Engineering Company

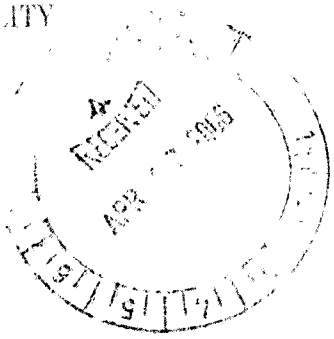
CC: Gary Spoonts – North Austin MUD No. 1
Sharlene Collins – Armbrust and Brown, LLP

1101 Capital of Texas Highway South • Building D, Suite 110 • Austin, Texas 78746 • 512/327-9204

File PWS 2270226/CO
CN 600890065
RN 102671161

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

April 7, 2006



Mr. David Malish, P.E.
Murfee Engineering Company
1101 Capitol of Texas Highway South,
Bldg. D, Suite 110
Austin, Texas 78746-6482

Subject: Meetings on Proposed Solutions to North Austin MUD No. 1's Pressure Problems
North Austin MUD No. 1 - PWS ID #2270226
Travis County, Texas

Dear Malish,

As you are aware, in our letter dated August 8, 2005 we granted the North Austin Municipal Utility District No. 1 (MUD) a temporary exception to the Texas Commission on Environmental Quality"s (TCEQ) requirement that booster pumps take suction from storage tanks. Correspondences requesting clarification were received from both of the City of Austin (City) and the MUD. Following receipt of these correspondences, the TCEQ had separate meetings with staffs representing the City and MUD and then a joint meeting with associated representatives from both systems on January 31, 2006 at the TCEQ Headquarters. This meeting was to discuss the MUD's objection to the temporary status of the TCEQ's granted exception, the City's concerns with the TCEQ's granting of the temporary exception and possible solutions to the MUD's low pressure problems.

The MUD operates their public water system with a distribution system consisting of piping and associated appurtenances only. All potable water is purchased from the City of Austin. The MUD has believed that the contractual agreement between the MUD and the City required the City to provide not only the production of treated water, but also the total storage, service pump and pressure maintenance capacities necessary to meet the TCEQ's minimum capacity requirements. The City states that the contractual agreement is only for the delivery of the TCEQ's production capacity requirement of 0.6 gallons per minute per connection (gpm)

The MUD reported to the TCEQ in 2005 that some of their customers have been experiencing pressures below 35 pounds per square-inch (psi) during normal operating conditions for four or five years. Also, it is our understanding that the MUD's low pressure problems were discussed with the City prior to this time. Discussions between the MUD and the City regarding the pressure maintenance requirements of the written contractual agreement between these two public water systems had not progressed to a resolution of this low pressure problem. Therefore, the TCEQ approved a temporary exception request from the MUD to install in-line booster pump stations that would take suction from the City's distribution in lieu of ground storage tanks. This exception was only granted for a one year period until a long term solution could be chosen and facilities constructed.

Conversations with the City staff have indicated that they are not totally in agreement with the TCEQ's temporary exception to construct in-line booster pumps. The TCEQ agrees that we cannot grant an exception

to the City's requirements. If there is a conflict in the City's and TCEQ's minimum requirements regarding the MUD's public water system, the more stringent shall apply. Also, the City can require additional conditions for the proposed installation of the temporary in-line booster pumps taking suction from distribution.

Since it has been the TCEQ's and MUD's historical understanding that the City was providing the TCEQ's required 100 gallons of elevated storage capacity per connection for the MUD's customers, the TCEQ also granted a temporary exception to this TCEQ capacity requirement until this can be corrected. The MUD had requested that the VFD in-line booster pumps be approved as an alternative pressure maintenance method in lieu of providing elevated storage or hydropneumatic tank capacity. The TCEQ does not accept that variable frequency drive (VFD) booster pumps are an acceptable alternative to providing elevated or hydropneumatic tank capacity. Also, our discussion with City staff leads us to believe that the City does not accept VFD as an acceptable alternative either.

While not an immediate solution, the construction of larger City mains to deliver water to the MUD's interconnections was discussed in the joint meeting. This project is not currently on the City's five year construction plan. However, the City staff will be reviewing the possibility of reprioritizing this project and the cost sharing of construction. Once this information is provided to the MUD, the MUD will evaluate this proposal as a solution. Also, City staff told TCEQ staff that they would do some pressure monitoring on their customers' taps in the area to verify if the City is also experiencing low pressure problems in this segment of the City's distribution.

Based on the information provided during the meetings, the TCEQ understands that the necessary approval and construction of permanent facilities, whether it be larger pipe lines or ground and elevated storage tanks, will probably require longer than one year. However, until we receive data as to a TCEQ acceptable solution and an acceptable timeline for resolving this low pressure problem, we are reluctant to revise the one year period. Once we receive this data, we will revisit the timeline for using the temporary in-line booster pumps without pressure maintenance facilities. The potential of low pressure events on the suction side of the temporary in-line booster pumps necessitates a quick solution to this problem.

The City of Austin's staff has stated that the only capacity stated in the contractual agreement between the City and the MUD is for the production capacity requirement of 0.6 gallons per minute per connection. However, each purchased water system must meet all other minimum capacity requirements specified in 30 TAC §290.45 for total storage, service pump and elevated storage capacities as referenced in 30 TAC §290.45(f)(7). If the contractual agreement between the City and the MUD only addresses the minimum production capacity requirement, then the MUD is in non compliance with all other minimum capacity requirements at this time.

The City as a water wholesaler is responsible for providing enough production, treatment and service pump capacity specified in the sum of its contractual obligations as specified in 30 TAC §290.45(e)(1). If the City has, or agrees to, dedicate total storage, elevated storage and service pump capacities to the MUD; then these capacities will be subtracted from the City's provided facilities for its own retail service connections. Also, the City may be responsible for additional emergency power requirements since the interconnections between the City and MUD are under direct pressure. If neither the MUD nor the City provides 100 gallons of elevated storage for each of the MUD's retail service connections; the City would be required to provide emergency power sufficient to deliver at least 20% of the MUD's required service pump capacity in the event of the loss of normal power as specified in 30 TAC §290.45(e)(3). If the MUD pursues and receives a TCEQ alternative

capacity requirement to use hydropneumatic tanks in lieu of elevated storage tanks, the City would still be required to meet this emergency power requirement. Please note that the provision of this emergency power by a wholesaler is required whenever the interconnection is under direct pressure and a purchased water system does not the TCEQ's elevated storage capacity requirement of 100 gallons per connection is not provided.

In summary, the City and MUD are currently investigating solutions to the low pressure and storage capacity issues. When an agreement is reached, the MUD will apply for any amendment to the TCEQ's previously granted exception for the inline booster pump stations. Also, the City and MUD will submit requests for any other exceptions and engineering plans and specifications for TCEQ review and approval needed for any agreed upon resolution.

If you have any questions concerning this letter, or if we can be of further assistance, please contact us the Public Drinking Water Section (MC 155) at the letterhead's address or me by telephone at (512) 239-239-6967.

Sincerely,

Marlo Wanielista Berg, P.E., Team Leader
Technical Review & Oversight Team
Public Drinking Water Section (MC 155)

MWB/JSW/sr

cc: TCEQ Austin Regional Office – R11
Mr. Buck Henderson, Manager, Public Drinking Water Section (MC 155)
Mr. Doug Holcomb, P.E., Manager, Utilities & Districts Section (MC 153)
Mr. Rob Cummins, P.E., Team Leader, Districts Review Team (MC 152)
Mr. David D. Laughlin, P.E., Team Leader, Utilities Technical Review Team (MC 153)
Mr. Alan McNeil, President, North Austin MUD No. 1
Mr. Gary Spoonts, ECO Resources, Inc., 9511 620 North, Austin, Texas 78726
Mr. Ron Humphrey, P.E., City of Austin Water Utility

File PWS 2270226/CO
RN 102671161
CN 600890065

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 25, 2006

Mr. David Malish, P.E.
Murfee Engineering Company, Inc.
1101 Capital of Texas highway South, Bld. D Suite 110
Austin, Texas 78746-6482

SUBJECT: Exception request for the use of in-line booster pumps
North Austin MUD No. 1 - PWS I.D. # 2270226
Travis County, Texas

Dear Mr. Malish:

We received your letter dated June 20, 2006 requesting revision of the condition to an exception granted previously to the Texas Commission on Environmental Quality's (TCEQ) requirement 30 TAC §290.44(d)(2), that booster pumps are to take suction from storage tanks. Your letter included a copy of a May 11, 2006 letter from the City of Austin to the North Austin MUD No. 1 describing the City's agreement to approve plans for the in-line booster pump and the plan to build a permanent solution to the issue in the near future. The exception information in this letter will replace, not supplement the exception information contained in our letter dated August 8, 2005.

You are proposing to install in-line booster pump stations to take suction directly from the City of Austin's distribution. This is to temporarily correct low pressure problems being encountered by the North Austin MUD No. 1 (MUD) in their south pressure plane. **Based on our review, we are revising the conditions to the previously granted temporary exception for the two proposed in-line booster pump stations under the following conditions:**

1. Both in-line booster pump stations must be equipped with automatic pressure cut-off devices located on the suction side of the pumps so that the pumps will become inoperable if the suction side pressure drops below 20 pounds per square-inch (psi). These cut-off devices must be tested to assure accuracy before installation and each year thereafter.

2. Both in-line booster pump stations must be equipped with continuous pressure recording devices on the suction side of the pumps. The pressure sensors and devices must be equipped with emergency power backup in the event of loss of normal power.

3. At any time the continuous pressure recorders indicate a suction pressure of less than 20 psi during normal operating conditions, this temporary exception shall be revoked. At that time, the MUD must take immediate action to submit engineering plans and specifications for TCEQ review and approval for properly sized storage tanks for the booster pumps to take suction from and pressure maintenance facilities as specified in 30 TAC §290.44(d)(2). The MUD must begin construction of the facilities within 30 days of receiving written TCEQ approval to construct.

4. This exception will expire in **three years** from the date of this letter. At that time an extension can be requested. The request must be submitted in writing with documentation showing progress towards a permanent solution for compliance with TCEQ's minimum capacity requirements. Progress can be shown by providing plans for the discussed 84" water main or any other permanent operating or infrastructure improvements that will eliminate the need for the in-booster pumps.

From discussions between the City of Austin and North Austin MUD No. 1, it appears there is a disagreement concerning what the contract between the two entities includes. The two entities need to have a discussion and come to a joint agreement on this issue. One of the issues is an understanding of which party is responsible for providing the required high service, elevated storage and total storage capacities for North Austin MUD No. 1. Please contact us when a joint resolution has been reached.

It is noted that the MUD is proposing to install checks at the two interconnections not to be equipped with in-line booster pumps and in bypass lines at the in-line booster pump stations. This is to prevent the flow of water out of the MUD's system and a reduction of pressure and not for cross-connection protection. The TCEQ staff agrees that there has not been a historical concern for the existence of potential sources of pollution within the MUD's system that would require the interconnections to be through air-gaps. The installation of the checks and in-line booster pumps does not change this condition. The MUD should continue to maintain an adequate cross-connection and customer service inspection program in place.

Should you have additional questions or comments concerning this letter, or if we may be of further assistance, please contact us at the letterhead's address or me by telephone at (512) 239-6967.

Sincerely,

Marlo Wanielista Berg, P.E.
Public Drinking Water Section (MC 155)
Water Supply Division

MWB/ac

cc: TCEQ Austin Regional Office - 11
Mr. David Laughlin, P.E., TCEQ Utilities Technical Review Team (MC 153)
Mr. James Weddell, P.E., TCEQ Technical Review and Oversight Team (MC 155)
Mr. Buck Henderson, TCEQ Public Drinking Water Section (MC 155)
Mr. Doug Holcomb, P.E., TCEQ Utilities and Districts Section (MC 155)
Mr. Michael Cowan, TCEQ Water Supply Division (MC 155)
Mr. Bart Jennings, Austin Water Utility
North Austin MUD No. 1, Attn: Eco Resources, 9511 620 N, Austin, TX 78726

RESPONSE TO REQUEST NO. 20

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TITLE 30 ENVIRONMENTAL QUALITY
PART 1 TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CHAPTER 290 PUBLIC DRINKING WATER
SUBCHAPTER D RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS
RULE §290.45 **Minimum Water System Capacity Requirements**

(a) General provisions.

(1) The requirements contained in this section are to be used in evaluating both the total capacities for public water systems and the capacities at individual pump stations and pressure planes which serve portions of the system that are hydraulically separated from, or incapable of being served by, other pump stations or pressure planes. The capacities specified in this section are minimum requirements only.

(2) The executive director will require additional supply, storage, service pumping, and pressure maintenance facilities if a normal operating pressure of 35 pounds per square inch (psi) cannot be maintained throughout the system, or if the system's maximum daily demand exceeds its total production and treatment capacity. The executive director will also require additional capacities if the system is unable to maintain a minimum pressure of 20 psi during fire fighting, line flushing, and other unusual conditions.

(3) The executive director may establish additional capacity requirements for a public water system using the method of calculation described in subsection (g)(2) of this section if there are repeated customer complaints regarding inadequate pressure or if the executive director receives a request for a capacity evaluation from customers of the system.

(4) Throughout this section, total storage capacity does not include pressure tank capacity.

(5) The executive director may exclude the capacity of facilities that have been inoperative for the past 120 days and will not be returned to an operative condition within the next 30 days when determining compliance with the requirements of this section.

(6) The capacity of the treatment facilities shall not be less than the required raw water or groundwater production rate or the anticipated maximum daily demand of the system.

(b) Community water systems.

(1) Groundwater supplies must meet the following requirements.

(A) If fewer than 50 connections without ground storage, the system must meet the following requirements:

(i) a well capacity of 1.5 gallons per minute (gpm) per connection; and

(ii) a pressure tank capacity of 50 gallons per connection.

(B) If fewer than 50 connections with ground storage, the system must meet the following requirements:

(i) a well capacity of 0.6 gpm per connection;

(ii) a total storage capacity of 200 gallons per connection;

(iii) two or more service pumps having a total capacity of 2.0 gpm per connection; and

(iv) a pressure tank capacity of 20 gallons per connection.

(C) For 50 to 250 connections, the system must meet the following requirements:

(i) a well capacity of 0.6 gpm per connection;

(ii) a total storage capacity of 200 gallons per connection;

(iii) two or more pumps having a total capacity of 2.0 gpm per connection at each pump station or pressure plane. For systems which provide an elevated storage capacity of 200 gallons per connection, two service pumps with a minimum combined capacity of 0.6 gpm per connection are required at each pump station or pressure plane. If only wells and elevated storage are provided, service pumps are not required; and

(iv) an elevated storage capacity of 100 gallons per connection or a pressure tank capacity of 20 gallons per connection.

(D) For more than 250 connections, the system must meet the following requirements:

(i) two or more wells having a total capacity of 0.6 gpm per connection. Where an interconnection is provided with another acceptable water system capable of supplying at least 0.35 gpm for each connection in the combined system under emergency conditions, an additional well will not be required as long as the 0.6 gpm per connection requirement is met for each system on an individual basis. Each water system must still meet the storage and pressure maintenance requirements on an individual basis unless the interconnection is permanently open. In this case, the systems' capacities will be rated as though a single system existed;

(ii) a total storage capacity of 200 gallons per connection;

(iii) two or more pumps that have a total capacity of 2.0 gpm per connection or that have a total capacity of at least 1,000 gpm and the ability to meet peak hourly demands with the largest pump out of service, whichever is less, at each pump station or pressure plane. For systems which provide an elevated storage capacity of 200 gallons per connection, two service pumps with a minimum combined capacity of 0.6 gpm per connection are required at each pump station or pressure plane. If only wells and elevated storage are provided, service pumps are not required;

(iv) an elevated storage capacity of 100 gallons per connection or a pressure tank capacity of 20 gallons per connection. If pressure tanks are used, a maximum capacity of 30,000 gallons is sufficient for up to 2,500 connections. An elevated storage capacity of 100 gallons per connection is required for systems with more than 2,500 connections. Alternate methods of pressure maintenance may be proposed and will be approved if the criteria contained in subsection (g)(5) of this section are met; and

(v) emergency power for systems which serve more than 250 connections and do not meet the elevated storage requirement. Sufficient emergency power must be provided to deliver a minimum of 0.35 gpm per connection to the distribution system in the event of the loss of normal power supply. Alternately, an emergency interconnection can be provided with another public water system that has emergency power and is able to supply at least 0.35 gpm for each connection in the combined system. Emergency power facilities in systems serving 1,000 connections or greater must be serviced and maintained in accordance with level 2 maintenance requirements contained in the current National Fire Protection Association (NFPA) 110 standards. Although not required, compliance with NFPA 110 standards is highly recommended for systems serving less than 1,000 connections. Logs of all emergency power use and maintenance must be maintained and kept on file for a period of not less than three years. These records must be made available, upon request, for executive director review.

(E) Mobile home parks with a density of eight or more units per acre and apartment complexes which supply fewer than 100 connections without ground storage must meet the following requirements:

(i) a well capacity of 1.0 gpm per connection; and

(ii) a pressure tank capacity of 50 gallons per connection with a maximum of 2,500 gallons required.

(F) Mobile home parks and apartment complexes which supply 100 connections or greater, or fewer than 100 connections and utilize ground storage must meet the following requirements:

(i) a well capacity of 0.6 gpm per connection. Systems with 250 or more connections must have either two wells or an approved interconnection which is capable of supplying at least 0.35 gpm for each connection in the combined system;

(ii) a total storage of 200 gallons per connection;

(iii) at least two service pumps with a total capacity of 2.0 gpm per connection; and

(iv) a pressure tank capacity of 20 gallons per connection.

(2) Surface water supplies must meet the following requirements:

(A) a raw water pump capacity of 0.6 gpm per connection with the largest pump out of service;

(B) a treatment plant capacity of 0.6 gpm per connection under normal rated design flow;

(C) transfer pumps (where applicable) with a capacity of 0.6 gpm per connection with the largest pump out of service;

(D) a covered clearwell storage capacity at the treatment plant of 50 gallons per connection or, for systems serving more than 250 connections, 5.0% of daily plant capacity;

(E) a total storage capacity of 200 gallons per connection;

(F) a service pump capacity that provides each pump station or pressure plane with two or more pumps that have a total capacity of 2.0 gpm per connection or that have a total capacity of at least 1,000

gpm and the ability to meet peak hourly demands with the largest pump out of service, whichever is less. For systems which provide an elevated storage capacity of 200 gallons per connection, two service pumps with a minimum combined capacity of 0.6 gpm per connection are required at each pump station or pressure plane;

(G) an elevated storage capacity of 100 gallons per connection or a pressure tank capacity of 20 gallons per connection. If pressure tanks are used, a maximum capacity of 30,000 gallons is sufficient for systems of up to 2,500 connections. An elevated storage capacity of 100 gallons per connection is required for systems with more than 2,500 connections. Alternate methods of pressure maintenance may be proposed and will be approved if the criteria contained in subsection (g)(5) of this section are met; and

(H) emergency power for systems which serve more than 250 connections and do not meet the elevated storage requirement. Sufficient emergency power must be provided to deliver a minimum of 0.35 gpm per connection to the distribution system in the event of the loss of normal power supply. Alternately, an emergency interconnection can be provided with another public water system that has emergency power and is able to supply at least 0.35 gpm for each connection in the combined system. Emergency power facilities in systems serving 1,000 connections or greater must be serviced and maintained in accordance with level 2 maintenance requirements contained in the current NFPA 110 standards. Although not required, compliance with NFPA 110 standards is highly recommended for systems serving less than 1,000 connections. Logs of all emergency power use and maintenance must be maintained and kept on file for a period of not less than three years. These records must be made available, upon request, for executive director review.

(c) Noncommunity water systems serving transient accommodation units. The following water capacity requirements apply to noncommunity water systems serving accommodation units such as hotel rooms, motel rooms, travel trailer spaces, campsites, and similar accommodations.

(1) Groundwater supplies must meet the following requirements.

(A) If fewer than 100 accommodation units without ground storage, the system must meet the following requirements:

(i) a well capacity of 1.0 gpm per unit; and

(ii) a pressure tank capacity of ten gallons per unit with a minimum of 220 gallons.

(B) For systems serving fewer than 100 accommodation units with ground storage or serving 100 or more accommodation units, the system must meet the following requirements:

(i) a well capacity of 0.6 gpm per unit;

(ii) a ground storage capacity of 35 gpm;

(iii) two or more service pumps which have a total capacity of 1.0 gpm per unit; and

(iv) a pressure tank capacity of ten gallons per unit.

(2) Surface water supplies, regardless of size, must meet the following requirements:

(A) a raw water pump capacity of 0.6 gpm per unit with the largest pump out of service;

(B) a treatment plant capacity of 0.6 gpm per unit;

(C) a transfer pump capacity (where applicable) of 0.6 gpm per unit with the largest pump out of service;

(D) a ground storage capacity of 35 gallons per unit with a minimum of 1,000 gallons as clearwell capacity;

(E) two or more service pumps with a total capacity of 1.0 gpm per unit; and

(F) a pressure tank capacity of ten gallons per unit with a minimum requirement of 220 gallons.

(d) Noncommunity water systems serving other than transient accommodation units.

(1) The following table is applicable to paragraphs (2) and (3) of this subsection and shall be used to determine the maximum daily demand for the various types of facilities listed.

Attached Graphic

(2) Groundwater supplies must meet the following requirements.

(A) Subject to the requirements of subparagraph (B) of this paragraph, if fewer than 300 persons per day are served, the system must meet the following requirements:

(i) a well capacity which meets or exceeds the maximum daily demand of the system during the hours of operation; and

(ii) a minimum pressure tank capacity of 220 gallons with additional capacity, if necessary, based on a sanitary survey conducted by the executive director.

(B) Systems which serve 300 or more persons per day or serve fewer than 300 persons per day and provide ground storage must meet the following requirements:

(i) a well capacity which meets or exceeds the maximum daily demand;

(ii) a ground storage capacity which is equal to 50% of the maximum daily demand;

(iii) if the maximum daily demand is less than 15 gpm, at least one service pump with a capacity of three times the maximum daily demand;

(iv) if the maximum daily demand is 15 gpm or more, at least two service pumps with a total capacity of three times the maximum daily demand; and

Cont'd...

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TITLE 30	ENVIRONMENTAL QUALITY
PART 1	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CHAPTER 290	PUBLIC DRINKING WATER
SUBCHAPTER D	RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS
RULE §290.45	**Minimum Water System Capacity Requirements**

(v) a minimum pressure tank capacity of 220 gallons with additional capacity, if necessary, based on a sanitary survey conducted by the executive director.

(3) Each surface water supply or groundwater supply that is under the direct influence of surface water, regardless of size, must meet the following requirements:

(A) a raw water pump capacity which meets or exceeds the maximum daily demand of the system with the largest pump out of service;

(B) a treatment plant capacity which meets or exceeds the system's maximum daily demand;

(C) a transfer pump capacity (where applicable) sufficient to meet the maximum daily demand with the largest pump out of service;

(D) a clearwell capacity which is equal to 50% of the maximum daily demand;

(E) two or more service pumps with a total capacity of three times the maximum daily demand; and

(F) a minimum pressure tank capacity of 220 gallons with additional capacity, if necessary, based on a sanitary survey conducted by the executive director.

(e) Water wholesalers. The following additional requirements apply to systems which supply wholesale treated water to other public water supplies.

(1) All wholesalers must provide enough production, treatment, and service pumping capacity to meet or exceed the combined maximum daily commitments specified in their various contractual obligations.

(2) For wholesale water suppliers, minimum water system capacity requirements shall be determined by calculating the requirements based upon the number of retail customer service connections of that wholesale water supplier, if any, and adding that amount to the maximum amount of water obligated or pledged under all wholesale contracts.

(3) Emergency power is required for each portion of the system which supplies more than 250 connections under direct pressure and does not provide an elevated storage capacity of at least 100 gallons per connection. If emergency power is required, it must be sufficient to deliver 20% of the minimum required service pump capacity in the event of the loss of normal power supply. When the wholesaler provides water through an air gap into the purchaser's storage facilities it will be the purchaser's responsibility to meet all minimum water system capacity requirements including emergency power.

(f) Purchased water systems. The following requirements apply only to systems which purchase treated water to meet all or part of their production, storage, service pump, or pressure maintenance capacity requirements.

(1) The water purchase contract must be available to the executive director in order that production, storage, service pump, or pressure maintenance capacity may be properly evaluated. For purposes of this section, a contract may be defined as a signed written document of specific terms agreeable to the water purchaser and the water wholesaler, or in its absence, a memorandum or letter of understanding between the water purchaser and the water wholesaler.

(2) The contract shall authorize the purchase of enough water to meet the monthly or annual needs of the purchaser.

(3) The contract shall also establish the maximum rate at which water may be drafted on a daily and hourly basis. In the absence of specific maximum daily or maximum hourly rates in the contract, a uniform purchase rate for the contract period will be used.

(4) The maximum authorized daily purchase rate specified in the contract, or a uniform purchase rate in the absence of a specified daily purchase rate, plus the actual production capacity of the system must be at least 0.6 gpm per connection.

(5) For systems which purchase water under direct pressure, the maximum hourly purchase authorized by the contract plus the actual service pump capacity of the system must be at least 2.0 gpm per connection or provide at least 1,000 gpm and be able to meet peak hourly demands, whichever is less.

(6) The purchaser is responsible for meeting all production requirements. If additional capacity to meet increased demands cannot be attained from the wholesaler through a new or amended contract, additional capacity must be obtained from water purchase contracts with other entities, new wells, or surface water treatment facilities. However, if the water purchase contract prohibits the purchaser from securing water from sources other than the wholesaler, the wholesaler is responsible for meeting all production requirements.

(7) All other minimum capacity requirements specified in this section shall apply.

(g) Alternative capacity requirements. Public water systems may request approval to meet alternative capacity requirements in lieu of the minimum capacity requirements specified in this section. Any water system requesting to use an alternative capacity requirement must demonstrate to the satisfaction of the executive director that approving the request will not compromise the public health or result in a degradation of service or water quality. Alternative capacity requirements are unavailable for groundwater systems serving fewer than 50 connections without total storage as specified in subsection (b)(1) of this section or for noncommunity water systems as specified in subsections (c) and (d) of this section.

(1) Alternative capacity requirements for public water systems may be granted upon request to and approval by the executive director. The request to use an alternative capacity requirement must include:

(A) a detailed inventory of the major production, pressurization, and storage facilities utilized by the system;

(B) records kept by the water system that document the daily production of the system. The period

reviewed shall not be less than three years. The applicant may not use a calculated peak daily demand;

(C) data acquired during the last drought period in the region, if required by the executive director;

(D) the actual number of active connections for each month during the three years of production data;

(E) description of any unusual demands on the system such as fire flows or major main breaks that will invalidate unusual peak demands experienced in the study period;

(F) any other relevant data needed to determine that the proposed alternative capacity requirement will provide at least 35 psi in the public water system except during line repair or during fire fighting when it cannot be less than 20 psi; and

(G) a copy of all data relied upon for making the proposed determination.

(2) Alternative capacity requirements for existing public water systems must be based upon the maximum daily demand for the system, unless the request is submitted by a licensed professional engineer in accordance with the requirements of paragraph (3) of this subsection. The maximum daily demand must be determined based upon the daily usage data contained in monthly operating reports for the system during a 36 consecutive month period. The 36 consecutive month period must end within 90 days of the date of submission to ensure the data is as current as possible.

(A) Maximum daily demand is the greatest number of gallons, including groundwater, surface water, and purchased water delivered by the system during any single day during the review period. Maximum daily demand excludes unusual demands on the system such as fire flows or major main breaks.

(B) For the purpose of calculating alternative capacity requirements, an equivalency ratio must be established. This equivalency ratio must be calculated by multiplying the maximum daily demand, expressed in gpm per connection, by a fixed safety factor and dividing the result by 0.6 gpm per connection. The safety factor shall be 1.15 unless it is documented that the existing system capacity is adequate for the next five years. In this case, the safety factor may be reduced to 1.05. The conditions in §291.93(3) of this title (relating to Adequacy of Water Utility Service) concerning the 85% rule shall continue to apply to public water systems that are also retail public utilities.

(C) To calculate the alternative capacity requirements, the equivalency ratio must be multiplied by the appropriate minimum capacity requirements specified in subsection (b) of this section. Standard rounding methods are used to round calculated alternative production capacity requirement values to the nearest one-hundredth.

(3) Alternative capacity requirements which are proposed and submitted by licensed professional engineers for review are subject to the following additional requirements.

(A) A signed and sealed statement by the licensed professional engineer must be provided which certifies that the proposed alternative capacity requirements have been determined in accordance with the requirements of this subsection.

(B) If the system is new or at least 36 consecutive months of data is not available, maximum daily demand may be based upon at least 36 consecutive months of data from a comparable public water system. A licensed professional engineer must certify that the data from another public water system is

comparable based on consideration of the following factors: prevailing land use patterns (rural versus urban); number of connections; density of service populations; fire flow obligations; and socio-economic, climatic, geographic, and topographic considerations as well as other factors as may be relevant. The comparable public water system shall not exhibit any of the conditions listed in paragraph (6)(A) of this subsection.

(4) The executive director shall consider requests for alternative capacity requirements in accordance with the following requirements.

(A) For those requests submitted under the seal of a licensed professional engineer, the executive director must mail written acceptance or denial of the proposed alternative capacity requirements to the public water system within 90 days from the date of submission. If the executive director fails to mail written notification within 90 days, the alternative capacity requirements submitted by a licensed professional engineer automatically become the alternative capacity requirements for the public water system.

(B) If the executive director denies the request:

(i) the executive director shall mail written notice to the public water system identifying the specific reason or reasons for denial and allow 45 days for the public water system to respond to the reason(s) for denial;

(ii) the denial is final if no response from the public water system is received within 45 days of the written notice being mailed; and

(iii) the executive director must mail a final written approval or denial within 60 days from the receipt of any response timely submitted by the public water system.

(5) Although elevated storage is the preferred method of pressure maintenance for systems of over 2,500 connections, it is recognized that local conditions may dictate the use of alternate methods utilizing hydropneumatic tanks and on-site emergency power equipment. Alternative capacity requirements to the elevated storage requirements may be obtained based on request to and approval by the executive director. Special conditions apply to systems qualifying for an elevated storage alternative capacity requirement.

(A) The system must submit documentation sufficient to assure that the alternate method of pressure maintenance is capable of providing a safe and uninterrupted supply of water under pressure to the distribution system during all demand conditions.

(i) A signed and sealed statement by a licensed professional engineer must be provided which certifies that the pressure maintenance facilities are sized, designed, and capable of providing a minimum pressure of at least 35 psi at all points within the distribution network at flow rates of 1.5 gpm per connection or greater. In addition, the engineer must certify that the emergency power facilities are capable of providing the greater of the average daily demand or 0.35 gpm per connection while maintaining distribution pressures of at least 35 psi, and that emergency power facilities powering production and treatment facilities are capable of supplying at least 0.35 gpm per connection to storage.

(ii) The system's licensed professional engineer must conduct a hydraulic analysis of the system under peak conditions. This must include an analysis of the time lag between the loss of the normal

power supply and the commencement of emergency power as well as the minimum pressure that will be maintained within the distribution system during this time lag. In no case shall this minimum pressure within the distribution system be less than 20 psi. The results of this analysis must be submitted to the executive director for review.

(iii) For existing systems, the system's licensed professional engineer must provide continuous pressure chart recordings of distribution pressures maintained during past power failures, if available. The period reviewed shall not be less than three years.

(B) Emergency power facilities must be maintained and provided with necessary appurtenances to assure immediate and dependable operation in case of normal power interruption.

(i) The facilities must be serviced and maintained in accordance with level 2 maintenance requirements contained in the current NFPA 110 standards and the manufacturers' recommendations.

(ii) The switching gear must be capable of bringing the emergency power generating equipment on-line during a power interruption such that the pressure in the distribution network does not fall below 20 psi at any time.

Cont'd...

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RESPONSE TO REQUEST NO. 21, 22

file with Wells Branch MUD
Water Pressure Problem #2

City of Austin

Founded by Congress, Republic of Texas, 1839
Municipal Building, Eighth at Colorado, P.O. Box 1088, Austin, Texas 78767 Telephone 512/499-2000

May 1, 1996

Ms. Sharlene N. Collins
North Austin Municipal Utility District
600 Congress Avenue #2600
Austin, Texas 78701-3288

Subject: City Water Service to North Austin Municipal Utility District No. 1

Dear Ms. Collins:

A copy of your letter dated April 19, 1996 to City Manager Jesus Garza, concerning a developing water pressure problem in the District has been forwarded to my office for a response.

In regard to the concern that the Martin Hill Reservoir would have its operating level lowered to 980 feet which in turn would lower water pressure to North Austin Municipal Utility District (MUD), that information is not correct. Reservoir and Pumping operations are under the direction of Mr. George Greene, P.E., Water and Wastewater Utility, and he has confirmed that no one from the District's Management Company or the District's Engineering firm had contacted him for information on the operating ranges for Martin Hill Reservoir.

In order to share information with the MUD Engineer on reservoir operations and for the Utility to learn what problems are occurring inside the MUD boundary, a meeting was held April 30, 1996. This meeting resulted in an agreement that both sides needed additional information, which will be obtained by the MUD Engineer on the water pressure problems that are occurring inside the District, when they started, what is the pressure drop, and how does that correspond to Utility Reservoir levels. The Utility will be sharing information with the District Engineer regarding a major engineering study of the Northwest "A" water pressure zone by the firm of Espey Huston and Associates. This study which is just beginning will assist the Utility in determining what are the needs of this water service area and how service levels can be maintained or improved as the area continues to grow. The District Engineer and the Utility staff will continue to work on identifying the specifics of the problem and solutions for both the District and City customers in this area.

The results of this study which will provide the answers to long term water pressure and service issues will be shared with the North Austin MUD and the other districts in this water service zone as the study is completed. We will

continue to work with your District Engineer in the meantime to ensure that the Utility is meeting the provisions of the Consent Agreement and providing a quality level of water service for North Austin MUD. If you have further questions, please call Mr. Mike Erdmann at 322-2876.

Sincerely,

Randy J. Goss, P.E., Director
Water and Wastewater Utility

RJG:me

xc: Jesus Garza, City Manager
Jim Smith, Assistant City Manager
Mike Erdmann, Wholesale Services Manager
John Tresnicky, Assistant City Attorney
George Greene, P.E., Pumping Division Manager

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TITLE 30 ENVIRONMENTAL QUALITY

PART 1 TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

CHAPTER 290 PUBLIC DRINKING WATER

SUBCHAPTER D RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS

RULE §290.44 **Water Distribution**

(a) Design and standards. All potable water distribution systems including pump stations, mains, and both ground and elevated storage tanks, shall be designed, installed, and constructed in accordance with current American Water Works Association (AWWA) standards with reference to materials to be used and construction procedures to be followed. In the absence of AWWA standards, commission review may be based upon the standards of the American Society for Testing and Materials (ASTM), commercial, and other recognized standards utilized by licensed professional engineers.

(1) All newly installed pipes and related products must conform to American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 61 and must be certified by an organization accredited by ANSI.

(2) All plastic pipe for use in public water systems must also bear the National Sanitation Foundation Seal of Approval (NSF-pw) and have an ASTM design pressure rating of at least 150 psi or a standard dimension ratio of 26 or less.

(3) No pipe which has been used for any purpose other than the conveyance of drinking water shall be accepted or relocated for use in any public drinking water supply.

(4) Water transmission and distribution lines must be installed in accordance with the manufacturer's instructions. However, the top of the waterline must be located below the frost line and in no case shall the top of the waterline be less than 24 inches below ground surface.

(5) The hydrostatic leakage rate shall not exceed the amount allowed or recommended by AWWA formulas.

(b) Lead ban. The following provisions apply to the use of lead in plumbing.

(1) The use of pipes and pipe fittings that contain more than 8.0% lead or solders and flux that contains more than 0.2% lead is prohibited in the following circumstances:

(A) for installation or repair of any public water supply; and

(B) for installation or repair of any plumbing in a residential or nonresidential facility providing water for human consumption and connected to a public drinking water supply system.

(2) This requirement will be waived for lead joints that are necessary for repairs to cast iron pipe.

(c) Minimum waterline sizes. The minimum waterline sizes are for domestic flows only and do not consider fire flows. Larger pipe sizes shall be used when the licensed professional engineer deems it

necessary. It should be noted that the required sizes are based strictly on the number of customers to be served and not on the distances between connections or differences in elevation or the type of pipe. No new waterline under two inches in diameter will be allowed to be installed in a public water system distribution system. These minimum line sizes do not apply to individual customer service lines.

Attached Graphic

(d) Minimum pressure requirement. The system must be designed to maintain a minimum pressure of 35 psi at all points within the distribution network at flow rates of at least 1.5 gallons per minute per connection. When the system is intended to provide fire fighting capability, it must also be designed to maintain a minimum pressure of 20 psi under combined fire and drinking water flow conditions.

(1) Air release devices shall be installed in the distribution system at all points where topography or other factors may create air locks in the lines. Air release devices shall be installed in such a manner as to preclude the possibility of submergence or possible entrance of contaminants. In this respect, all openings to the atmosphere shall be covered with 16-mesh or finer, corrosion-resistant screening material or an acceptable equivalent.

(2) When service is to be provided to more than one pressure plane or when distribution system conditions and demands are such that low pressures develop, the method of providing increased pressure shall be by means of booster pumps taking suction from storage tanks. If an exception to this requirement is desired, the designing engineer must furnish for the executive director's review all planning material for booster pumps taking suction from other than a storage tank. The planning material must contain a full description of the supply to the point of suction, maximum demands on this part of the system, location of pressure recorders, safety controls, and other pertinent information. Where booster pumps are installed to take suction directly from the distribution system, a minimum residual pressure of 20 psi must be maintained on the suction line at all times. Such installations must be equipped with automatic pressure cut-off devices so that the pumping units become inoperative at a suction pressure of less than 20 psi. In addition, a continuous pressure recording device may be required at a predetermined suspected critical pressure point on the suction line in order to record the hydraulic conditions in the line at all times. If such a record indicates critical minimum pressures (less than 20 psi), adequate storage facilities must be installed with the booster pumps taking suction from the storage facility. Fire pumps used to maintain pressure on automatic sprinkler systems only for fire protection purposes are not considered as in-line booster pumps.

(3) Service connections that require booster pumps taking suction from the public water system lines must be equipped with automatic pressure cut-off devices so that the pumping units become inoperative at a suction pressure of less than 20 psi. Where these types of installations are necessary, the preferred method of pressure maintenance consists of an air gapped connection with a storage tank and subsequent repressurization facilities.

(4) Each community public water system shall provide accurate metering devices at each residential, commercial, or industrial service connection for the accumulation of water usage data. A water system that furnishes the services or commodity only to itself or its employees when that service or commodity is not resold to or used by others is exempt from this requirement.

(5) The system shall be provided with sufficient valves and blowoffs so that necessary repairs can be made without undue interruption of service over any considerable area and for flushing the system when required. The engineering report shall establish criteria for this design.

MEC

Murfee Engineering Company

September 7, 2004

North Austin MUD No. 1
c/o Armbrust & Brown, LLP
100 Congress Ave. – Suite 1300
Austin, Texas 78701
Attn: Alan McNeil, President
& Board of Directors

Dear Mr. McNeil and Board of Directors:

Utility customers within the North Austin MUD No. 1 (District) service area derive water service from either the City of Austin's northwest A or (1015 feet MSL) or Northwest B (1140 feet MSL) pressure zone water supply facilities. The majority of the District's customers including all of the residential customers are served exclusively by the Northwest A pressure zone system. The District actually obtains water service from the City of Austin through wholesale water supply agreements and transmits this water to its customers on a retail basis. As the District does not maintain or operate any water pressure booster systems or water treatment facilities, the District relies exclusively on the City of Austin for adequate water capacity at this time. All of the District's subdivisions were designed and subsequently approved by the City of Austin based partially on the available capacity represented by the City.

Over the past year, the District's manager, Eco Resources, Inc., has received numerous complaints from District customers with respect to domestic water pressure. Subsequent spot field measurements by the District manager indicate that distribution domestic water pressures fall below the State standard of 35 psig on occasion over a limited period. Follow up conversations with the City of Austin utility operations staff reveals that these low observed pressures are a result of a change in operations by the City. More specifically, the City operations staff deliberately operates the Northwest A pressure zone elevated storage tank at lower than design levels in an effort to maintain water quality, i.e., sufficient chlorine residual. The results of District water distribution system model simulations confirms that the City's operations are responsible for the District's occasional low domestic pressure water service. In addition the results of the model simulations strongly suggests that the observed and measured low domestic pressure is a result of insufficient capacity at the wholesale supply point rather than internally within the District.

In an effort to resolve the problem, the District in concert with the City staff initiated an investigation of alternatives to increase wholesale domestic water pressure to the District. These alternatives included recomissioning an abandoned water main on McNeil Drive to

B

deliver an intermediate water pressure to the District and adjacent City customers, installing rechlorination facilities at the City of Austin Martin Hill Reservoir to restore full capacity operation of City facilities, and extending a new 5500 linear foot intermediate pressure water supply main to a connection with the District. The first two alternatives were determined by the City of Austin staff to be unfeasible for a number of technical as we all as terrorist and safety related reasons. The third alternative to extend a dedicated interim pressure main was determined to be economically unfeasible by the District with an estimated cost of over $1,600,000. It is understood that this cost exceeds the District's available financial resources at this time.

A fourth apparently technically and economically feasible alternative is the design and installation of two strategically located interim variable speed booster stations inside the District. The District engineer recommends that the District Board consider employing its District Manager to construct these facilities as quickly as possible due to the apparent emergency nature of the problem. It is understood that the District currently has sufficient funds to support this alternative. The District would operate these facilities at the District's expense for a temporary period until the City of Austin can resolve its current water pressure delivery problem and restore its operations to full design capacity in this geographic area.

As it is the District's obligation to provide sufficient water capacity service to its customers, it is important that this occasional low domestic pressure problem be resolved as quickly as possible. Such response will require cooperation and support by City of Austin staff to quickly restore adequate pressure throughout the District to avoid any future health or safety concerns.

Sincerely,

David Malish, P.E.
District Engineer

cc: Sharlene Collins, Armbrust & Brown LLP
Gary Spoonts, Eco Resources Inc.

Mecfiles/malish/wordfile/namud/water pressure

MONTHLY ENGINEERING REPORT
NORTH AUSTIN MUNICIPAL UTILITY DISTRICT NO. 1

Prepared on Wednesday, September 15, 2004
For Meeting on Wednesday, September 22, 2004

By David Malish P.E., District Engineer

District Water Pressure

Following a somewhat exhaustive and time consuming alternative development and assessment for improving domestic water pressure within the District, the District Board at its August meeting selected to pursue the design and construction of two temporary internal water pressure booster systems strategically located on sites currently controlled/owned by the District. These sites include the "fire station" site on Dallas Drive and the District's lot on the northwest corner of Parmer and Tamayo. The selected lot on Dallas is currently unplatted while the lot on Parmer/Tamayo is platted. The unplatted lot will probably need to be platted but the District should seek the advice of its attorney. The cost of platting this lot through the short form process is estimated to approximate $8000.

The District engineer recently (August 21st) completed a fire flow test near the intersection of Parmer and Anderson Mill Road in support of a request from representatives of the Milwood Village development. A residual domestic water pressure of 37 psig was observed. This low pressure at this location indicated that the District, at that time, was experiencing water pressures in more critical locations of the District below the State minimum standard of 35psig. The observed water pressure measurement is perhaps the lowest pressure ever measured by the District's engineer within the District and confirms the City of Austin's intended practice to continue lowering northwest pressure zone A water pressure.

The District engineer has previously represented that this low pressure problem can most readily quickly be resolved with the installation of the two previously referenced booster stations. The District engineer recently met with Mr. Brian Gil of Hydro-Con Systems to discuss equipment availability. It was mutually agreed that the design and construction of skid mounted variable speed split case pumps would offer not only a quick response but also an economical and reliable solution within the current available financial resources of the District. Attached is a preliminary cost estimate provided by HydroCon Systems for the delivery of sled mounted systems. The estimated cost is $150,000 per each delivered to the site. Note that minimal work would be required to install the stations. To further minimize costs, these facilities can be located in open air but shielded on three sides with a decorative landscaped wall and ultimately secured with a rear and ceiling security fence. Backup generators would not be necessary for in the event of a power failure, the system will be automatically removed from service and the District will be served exclusively via City water pressure temporarily until power is restored. In addition for this event, power at both stations must be lost simultaneously. Finally, it is estimated that these systems can be designed and constructed for operations in approximately a six month period.

It is very important to note that while these systems are highly reliable and efficient; this design will not meet City of Austin criteria. The City of Austin consent to creation of the District requires that all water and wastewater utilities constructed within the District be reviewed and approved by the City implying the imposition of City criteria. This imposition will significantly increase the costs beyond the District's current financial resources, and will perhaps double the construction period while it is doubtful that reliability will be enhanced. A major concern of the City staff is that in the event the District is annexed into he corporate limits, the City would be required to operate the facilities. Alternatively, it is reasonable to expect the City of Austin to resolve the area wide geographic low water pressure problem prior to any annexation considerations. The City staff have verbally recognized that other adjacent areas wholly within the City's service area also experience low pressure water problems.

AGENDA ITEM # 13

94002.16

Murfee Engineering Company

June 10, 2005

Chris Lippe, P.E., Director
City of Austin Water and Wastewater Department
625 E. 10th Street, Suite 415
Austin, Texas 78701

Re: ***North Austin MUD No. 1***
Temporary Water Pressure Booster Station

Dear Mr. Lippe,

Enclosed for your review are construction plans for two temporary variable speed booster stations proposed for immediate installation within North Austin MUD No. 1. As you are aware, the District engineer and the City staff, in concert, conducted an exhaustive alternatives analysis to resolve the current low domestic water pressure concerns within the District. Alternatives analyzed included creating an intermediate pressure zone with the use of existing facilities and mains as well as extending new mains, and/or "freshening" the water in the Martin Hill Reservoir with rechlorination. All City of Austin alternatives identified were determined to be unfeasible.

The District currently observes domestic water pressures below the State standard of 35psi approaching near 20psi on occasion in some locations. Such low pressures constitutes a human health and safety concern and the District manager has received several complaints. Adequate pressures were once available in all of the District's subdivisions at the time of construction approval, but domestic pressures have now been lowered as a result of operational changes at Martin Hill Reservoir. It is understood that once city water demands in the geographical area of the Martin Hill Reservoir are substantially increased, full operation of the Martin Hill Reservoir will be restored and the District will again have adequate domestic pressure.

The temporary water pressure booster stations need to be installed as quickly as possible to resolve the current health and safety concerns. It is recognized that this design may not specifically meet current City standards or criteria, but it is doubtful that the City of Austin will ever operate or maintain these temporary facilities. Please note that the booster stations are located wholly within the District serving only geographical areas within the District. In addition, it is estimated that these facilities can be constructed with funds currently available which are in the range of $700,000 to $800,000 total. Any costs for such facilities in excess of this amount will require seeking additional funding sources which will result in a substantial delay.

I will appreciate an expedited review and comment on these plans. If you have any questions please call.

Sincerely,

David Malish, P.E.
District Engineer

Mecfiles/malish/wordfile/namud/lippe-booster stations

1101 Capital of Texas Highway South • Building D, Suite 110 • Austin, Texas 78746 • 512/327-0004

CITY OF AUSTIN'S OBLIGATION / FAILURE TO PROVIDE ADEQUATE WATER SERVICE TO NORTH AUSTIN MUD NO. 1

Agreement for Creation

Significance: As a condition of creation the City of Austin agreed "to sell and deliver to the District all water which may be reasonably required by inhabitants of the District for domestic and commercial purposes"

COPY

AGREEMENT CONCERNING CREATION AND OPERATION
OF
NORTH AUSTIN MUNICIPAL
UTILITY DISTRICT NO. 1

THE STATE OF TEXAS §

COUNTIES OF TRAVIS §
AND WILLIAMSON § KNOW ALL MEN BY THESE PRESENTS:

THIS AGREEMENT is made and entered into by and between the City of Austin, Texas (hereinafter referred to as the "City"), a municipal corporation situated in Travis County, Texas, acting herein by and through its undersigned duly authorized City Manager, as authorized by specific action of its City Council; North Austin Municipal Utility District No. 1 (hereinafter referred to as the "District"), a municipal utility district created on the 15th day of November, 1983, by order of the Texas Water Commission and operating pursuant to Chapter 54 of the Texas Water Code; and Milwood Joint Venture, Robinson Ranch, and Austin White Lime Company (hereinafter collectively referred to as "Milwood"), the holders of legal title to all of the land comprising the District, which consists of approximately 997 acres situated partially within Williamson County, Texas, and partially within Travis County, Texas, a portion of which lies within the City and a portion of which lies within the extraterritorial jurisdiction of the City.

For and in consideration of the premises and the mutual agreements, covenants, and conditions hereinafter set forth, the parties hereto hereby contract and agree as follows, to wit:

ARTICLE I

ISSUANCE OF BONDS BY THE DISTRICT

A. Bonds For District Facilities

1. The City has granted its unconditional consent to the creation of the District in accordance with the Water District Ordinance adopted by the City Council of the City on August 19, 1981, by Ordinance Number 810819-E, a true and correct copy of which is attached hereto as Exhibit "A" and incorporated herein by reference (the "Water District Ordinance"); subject, however, to a variance granting the District the bonding authority provided in the Water District Ordinance for Growth Area III. The terms and conditions of the Water District Ordinance are made a part of this Agreement for all purposes to the extent allowed by law. The District agrees that it shall only issue bonds and notes, including bond anticipation notes, in the manner provided by the Water District Ordinance and the rules and requirements of the Texas Water Commission. All bonds and notes of the District shall be approved by the City Council of the City prior to the

issuance thereof; provided, however, that the authorization granted herein by the City of a principal amount (plus interest) of bonds proposed to be issued by the District shall be deemed to include the approval of bond anticipation notes not to exceed the amount of principal and interest of the bonds so authorized. It is specifically agreed that the District's bonds, when issued, shall be secured by a pledge of the District's taxes and revenues.

2. The parties hereto acknowledge and agree that this Agreement and the Water District Ordinance, as now in effect and hereafter amended, have the effect of restricting the general statutory purposes for which the District may issue bonds and notes. The parties further recognize and agree that neither this Agreement nor the Water District Ordinance otherwise restrict or limit the powers and authority of the District to acquire, own, operate and maintain water or wastewater systems, drainage facilities, recreational facilities, or any other systems, facilities, assets or properties of or serving the District. The District may use funds and assets from any other available, lawful source to provide for such acquisition, ownership, maintenance and operation, as well as to accomplish any purpose or to exercise any function, act, power or right authorized by law. Such funds and assets shall include, without limiting the generality of the foregoing, revenues from any of the systems, facilities, properties and assets of the District not otherwise committed for the payment of indebtedness of the District; maintenance taxes; loans, gifts, grants and donations from public or private sources; and revenues from any other source lawfully available to the District. Bonds and notes of the District may be issued for any purpose not specifically prohibited by this Agreement or the Water District Ordinance, subject to the provisions of the Texas Water Code and the rules and requirements of the Texas Water Commission.

B. Bonds for Special Facilities

1. To enable the City to supply water to the District and to receive and treat wastewater from the District in accordance with the provisions of Articles II and III hereof, the parties hereby acknowledge that major extensions and improvements to the City's existing water and sewer facilities shall be necessary. The parties agree that, subject to the approval of the Texas Water Commission, the necessary improvements and extensions shall be accomplished as more fully described and identified in the Utility Construction Contract (the "Preferred Contract") by and between the District and the City, a copy of which is attached hereto as Exhibit "B" and incorporated herein by reference. The parties further agree that, in the event the

approval of the Texas Water Commission to the oversizing of the facilities described in the Preferred Contract is not obtained, the District shall construct improvements and extensions to the City's system sized only as necessary to provide service to the District, and the District shall purchase capacity from the City's water and wastewater utility system for a purchase price equivalent to the difference between the cost of construction of the oversized facilities, as described in the Preferred Contract, and the cost of facilities sized only to serve the District. The parties hereto acknowledge and agree that the value to the City of the District's oversizing certain utility facilities as provided in the Preferred Contract, is equivalent to the value to the District of the capacity to be allocated to the District by the City from the City's water and sewer utility systems. The Preferred Contract shall be deemed approved by the City Council of the City simultaneously with the City's approval of this Agreement.

2. It is expressly acknowledged and agreed that the approval of the Texas Water Commission of facilities described in the Preferred Contract will be requested at the time a petition for creation of the District is presented to the Texas Department of Water Resources. The parties mutually covenant and agree to cooperate in making such modifications to the Preferred Contract as may be reasonably necessary in order to obtain the approval of the Texas Water Commission thereof. In the event that the Texas Water Commission does not approve the construction of the facilities described in the Preferred Contract, the parties covenant and agree to cooperate with each other in order to develop a utility construction proposal which will satisfy the requirements of the District and the City in order to provide service to the land within the District and which will be acceptable to the Texas Water Commission.

3. The term "Construction Contract", as hereinafter utilized in this Agreement, shall mean and refer to the Preferred Contract or any subsequent utility construction agreement between the City and the District which provides for the construction of the utility facilities and improvements necessary to serve the District, and which is approved by the Texas Water Commission.

4. It is expressly acknowledged that the "Project", as such is defined in the Construction Contract, shall include approach mains necessary to serve the District and that no additional City approval of such approach mains shall be required upon completion of the Project.

5. To finance the cost of acquiring and constructing the Project, the District is hereby authorized to issue bonds and bond anticipation notes, subject to the terms, conditions and