Final Report

North Bexar County Water Resources Study

for the

Edwards Underground Water District

September, 1993

Prepared by

W. E. Simpson Company, Inc.

in association with

William F. Guyton Associates, Inc.

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EXECUTIVE SUMMARY

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I. Purpose and Scope

The study area of north Bexar County measures approximately 290 square miles and is bounded on the west, north and east by the county line and by the down-dip limit of the Edwards Aquifer Recharge Zone on the south. It is located in the south central region of Texas as shown in Figure 1. The study area is located within the Balcones fault zone, a region of faulted and fractured limestone. Due to the amount of fractures and faults, most streams in the area are intermittent and flow only during and immediately after rain events. Consequently, water is supplied to the study area population almost exclusively from groundwater by the Edwards and Trinity aquifers.

In 1990, the population of north Bexar County numbered approximately 27,900 with an average historical growth rate since 1960 of approximately 80 percent per decade. With limited water resources in the area, growing demand upon the Trinity aquifer is becoming a concern. This study, developed in response to the increasing demand, consists of two main portions which are presented in separate volumes.

Volume 1 was prepared by William F. Guyton Associates, Inc. It discusses ground-water conditions and the dependability, quality, and quantity of ground water that is being used within the study area for domestic, stock, public supply, industry, and irrigation purposes. A water balance for the Trinity group aquifer is presented and areas favorable for artificial recharge and/or aquifer storage and recovery projects are identified.

Volume 2 was prepared by W.E. Simpson Company, Inc. It compares the growing demand for water in the study area with the limited groundwater supply. Volume 2 estimates future demands, establishes corresponding target supply quantities and investigates alternative water resources and their abilities to provide target supply quantities. Water quantity, quality, and the cost of resource development are considered in the evaluation. Several alternative resources are ranked accordingly and recommendations are made for further study.

The reader should note the preliminary nature of the study. All figures, except for actual test results, are estimates for helping to determine future courses of study and should not be considered as actual designs, costs, or quantities.

II. Conclusions

A. The population count of north Bexar County was approximately 27,900 in 1990 and may increase to approximately 93,900 by the year 2020. The portion of the population in north Bexar County which uses Trinity water numbered approximately 13,600 in 1990 and may increase to approximately 38,500 by the year 2020. Currently, this area is totally dependent on ground water.

B. The principal source of groundwater in northern Bexar County is the Trinity group aquifer, which is comprised of three aquifer units: the upper, middle, and lower Trinity. The most productive of these three units is the middle Trinity aquifer, and it is most heavily used. The best water-bearing strata within the middle Trinity aquifer are the lower member of the Glen Rose Limestone and the Cow Creek Limestone.

C. Pumping rates for private domestic wells usually are less than 20 gpm and pumping rates for the larger public supply and irrigation wells range from about 100 gpm to about 300 gpm. Specific capacities of the wells are generally low. Three-hour specific-capacity values determined from tests made during this study range from 0.1 gpm/ft to about 14 gpm/ft.

D. Water levels were at high levels during the study because of record high rainfall. Water levels measured in the upper Trinity aquifer generally ranged from a few feet to a little more than a hundred feet below land surface. For the middle Trinity aquifer, depths of water ranged from about 20 feet to just over 200 feet, and for the lower Trinity aquifer, they were about 400 feet or more below land surface.

E. Seasonal variations in water levels occur because of the fluctuations in rainfall and pumpage. For the 10 years prior to the heavy rainfall in 1991 and 1992, water levels in the middle and lower Trinity aquifer units in northern Bexar County had declined by 50 to 90 feet. Water levels in the upper Trinity aquifer for the same period reflect no major declines. However, water-level records that are available for one well in the upper Trinity aquifer indicate that a decline of about 60 feet occurred during the 1950's drought.

F. Pumpage from the Trinity group aquifer in 1990 was about 6,350 acre-feet. More than half of the pumpage was for industrial use, slightly more than one-fourth for public supply, slightly less than one-fifth for private domestic use, and slightly more than one-twentieth for irrigation. About 5 percent of the pumpage was from the upper Trinity aquifer, about 85 percent from the middle Trinity aquifer, and about 10 percent from the lower Trinity aquifer.

G. Water from the Trinity group aquifer in the study area of northern Bexar County ranges from fresh to slightly saline and has a hardness ranging from hard to very hard. The best quality water is obtained from the middle Trinity aquifer. Shallow wells completed in the upper Trinity aquifer and deeper wells that do not seal off the upper member of the Glen Rose Limestone often produce water that is high in dissolved solids and sulfate. Elevated dissolved solids due to sodium chloride often are found in water from the lower Trinity aquifer. High fluoride, iron, and manganese also occur in localized areas within the Trinity group aquifer. While fluoride contents above 4 mg/l found in water from some wells in the study area can pose a health risk, constituents such a dissolved solids, iron, and manganese that exceed the Texas Department of Health's recommended maximum secondary constituents generally affect only the overall esthetics of the water.

H. Bacterial analyses of water samples from 21 water wells showed some coliform bacteria in 11 (52 percent) of the samples. While the presence of bacteria is not desirable, and in some cases can lead to illness, it is believed to be rather common for most areas nationwide. Included in the above analyses were four samples (19 percent) that showed high concentrations of coliform bacteria which could reflect severe contamination problems. This type of contamination is usually associated with poorly constructed wells and improper disposal or handling of animal and human wastes. The results from sampling and analyses conducted during the current study indicate that the Trinity group aquifer in northern Bexar County has not been contaminated by pesticides, fuels, or solvents. However, because of their prominent use and nature, their potential as a cause for future problems remains high.

I. The estimated water balance for the Trinity group aquifer in northern Bexar County shows 21,800 acre-feet of water coming into the study area and 22,400 acre-feet going out of it in 1990. About 500 and 100 acre-feet of water are being taken out of storage in the middle and lower Trinity aquifer units, respectively, to make up the difference. Long-term inflow and outflow are about equal for the upper Trinity aquifer.

J. Based on an evaluation of the 1990 water balance for the Trinity group aquifer in northern Bexar County, it is estimated that the long-term practical yield of the aquifer from existing facilities is about 5,000 acre-feet per year. Spreading pumpage out into the more remote areas of the study area will increase the sustainable yield of the aquifer somewhat, but probably by no more than 1,000 to 2,000 acre-feet per year.

K. Exceeding 5,000 acre-feet per year of withdrawals in northern Bexar County is expected to require taking water from storage in the aquifer, which will cause a continuing decline in water levels with increased pumping lifts, reduced pumping rates, and possible deterioration in water quality. Pumping from the aquifer in the area generally north of the study area will intercept some of the water now entering the aquifer in northern Bexar County and add to the declines of water levels caused by pumping within the study area.

L. Overpumpage or reduction in storage of the Trinity aquifer occurred at a rate of approximately 600 acre-feet per year in 1990 and is anticipated to increase to a rate possibly as high as 5,350 acre-feet per year by the year 2020 if alternative resources are not employed.

M. The effective yield of the Trinity aquifer for household use is reduced by poor water quality found especially in the upper and lower Trinity. Complex and expensive water treatment such as reverse osmosis and coagulation may be required to remove excess calcium, sulfates, fluorides, and iron. Fluorides and sulfates are a health concern. Calcium and iron are aesthetic and maintenance concerns.

N. One large surface water source located outside of north Bexar County, Canyon Lake, appears to have the available firm yield to adequately meet its current user demands and to compensate for anticipated shortruns in water in the study area. In order to obtain water from Canyon Lake, it is necessary to obtain a Water Sale Agreement from the current water rights owner or to obtain adjudication from the State.

O. Medina Lake appears to have a firm yield of about one half of the value of the allocation set aside for the Bexar-Medina-Atascosa Water Control and Improvement District. A Water Sale Agreement with the Bexar Metropolitan Water District threatens to reduce availability further.

P. The City of Boerne owns the water rights to virtually all of Lake Boerne's watershed. Therefore, only excess runoff is available at Lake Boerne.

Q. A large portion of north Bexar County's surface water yield is lost to water rights for the Applewhite Reservoir/Leon Diversion Dam project.

R. Three small potential dam sites just north of Bexar County on Balcones, Pleasant Valley and Kelly Creeks may provide an annual firm yield of at least 1,400 acre-feet.

S. A potential dam site on Cibolo Creek, just north Bexar County on Balcones, may intercept a safe yield of 2,650 acre-feet annually and possibly more.

T. The availability of reusable wastewater was only approximately 230 acre-feet in 1990. Presently, reusable wastewater is not available in significant quantities.

III. Recommendations

A. Pursuing alternative surface water resources is recommended in order to prevent detrimental storage loss in the Trinity aquifer. Top priority should be given to the Fair Oaks region where the groundwater cone of depression is creating an urgent condition.

B. Begin further study as soon as possible to see if an Aquifer Storage and Recovery project which supplies water from Lake Boerne to Fair Oaks is feasible. Determine if treated surface water can be stored underground and recovered economically to supply peak summer demands and achieve maximum utilization of the water resources that are available for meeting the current and future needs of the area. Model watershed and reservoir to confirm the adequacy of excess runoff. Initiate discussion with Boerne and Fair Oaks officials.

C. Initiate discussion with the Canyon Lake Water Supply Corporation and the Guadalupe-Blanco River Authority to confirm and to more precisely determine the availability of water from Canyon Lake under its existing certificate of adjudication.

D. Initiate further study at the potential dam site on Cibolo Creek. Formally inquire of the Texas Water Commission about the amount of unallocated water available. Initiate hydrologic modeling to confirm that an adequate firm yield can be provided and to optimize the sizing of the dam. Also include a geologic analysis to determine the suitability of the location as a dam site. Consider foundation and permeability conditions and impacts upon cost.

E. Initiate discussion with the Bexar-Medina-Atascosa Water Control and Improvement District to confirm and to more precisely determine the lack of available water from Medina Lake. If necessary, determine the impact of the Water Sale Agreement with the Bexar Metropolitan Water District upon the availability of water.

F. Initiate further study of potential dam site on Balcones Creek, Kelly Creek, and Pleasant Valley Creek. Formally inquire of the Texas Water Commission about how much unallocated water is available. Include hydrologic modeling to confirm that an adequate firm yield can be provided and to optimize the dam sizes for the appropriate yield. Also include more developed geologic analyses of potential dam sites in order to determine their suitability as dam sites. Consider foundation and permeability conditions and impacts upon cost.

G. Further study of the ranked alternative should include a complete cost analysis, including distribution systems, system life expectancies and costs of operation and maintenance.

H. Although the reusable wastewater is currently of a small quantity, it should be monitored for future applications as the supply grows with the increasing population.

I. Managing and protecting the availability of ground water in northern Bexar County is vital for the welfare of the area. Therefore, present programs in the following areas should be continued and strengthened: promotion of water conservation; proper well construction practices; water-quality and water-level monitoring networks; spacing rules for septic systems in heavily populated rural areas; proper closure and plugging of abandoned wells; and public education programs to address aquifer management and protection strategies.

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Edwards Underground Water District

Volume 1
GROUND WATER

September, 1993

Prepared by

William F. Guyton Associates, Inc.

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I. INTRODUCTION

A. Purpose and Scope

This portion of the joint water-resources investigation was made to determine the occurrence and availability of ground water for the Trinity Group aquifer in northern Bexar County. The following text discusses ground-water conditions and the dependability, quality, and quantity of ground water that is being used within the study area for domestic, stock, public supply, industry, and irrigation purposes.

The work performed during this investigation included the following: (a) collection, compilation, and analysis of data relating to ground water from the Trinity Group aquifer; (b) field inventory of selected water wells to include the measurement of water levels and collection of water samples; (c) performing pumping tests on certain inventoried wells; (d) estimating the amount of ground water being produced from the aquifers; (e) identifying areas favorable for artificial recharge and/or aquifer storage and recovery programs; (f) preparation of a water balance for the Trinity Group aquifer; and (g) preparation of this section of the final report. The collection and compilation of pertinent ground-water data for this study are described in detail in the September 1992 progress report (Simpson and Guyton, 1992) entitled "Summary of Activities Completed During the First Year of the North Bexar

County Water Resource Study," which was submitted to the Edwards Underground Water District.

General information about the geology and hydrology of northern Bexar County was obtained from numerous reports by federal, state and local agencies, universities, and consultants. These reports include, but are not restricted to, the following: Arnow, 1959; Reeves, 1967; Stricklin and others, 1971; Rose, 1972; Ashworth, 1983; and Bluntzer, 1990. The San Antonio Sheet, Geologic Atlas of Texas Series by the University of Texas Bureau of Economic Geology (1983) was utilized in studying the surface geology.

Water-well information was obtained from the files of the following agencies: U. S. Geological Survey, Texas Water Commission, Texas Department of Health, Texas Water Development Board, Edwards Underground Water District, and Bexar Metropolitan Health District. Information from the files of William F. Guyton Associates also was used in the study.

The following paragraphs discuss the results of the study and present conclusions and recommendations. Supporting tables, figures, and appendices follow the text.

B. Location and Extent

The study area has an areal extent of approximately 290 square miles in northern Bexar County as shown on Figure 1. It includes part of the Balcones fault zone that forms the southern edge of the Edwards Plateau, and also includes most of the recharge zone of the Edwards aquifer in Bexar County.

C. Population

Approximately 4,050 people used Trinity aquifer water in the study area in northern Bexar County in 1960, about the time that residential development began to appreciably increase. The population using Trinity aquifer water has progressively increased since then, as is evidenced by the following approximated data, which is derived from northern Bexar County census tract information for the subsequent period of record:

Year	Population Using Trinity Water
1960	4,050
1970	5,520
1980	9,270
1990	13,640

As the population increased, additional domestic, public supply, and irrigation wells were drilled to provide water for potable use and, in more recent years, for watering new golf courses. Based on information from the Texas Water Development Board's water-use files, it appears that about 6,880 people in the study area were supplied by public water systems in 1990. Thus, the remainder of the population, about 6,760 people or about one-half the total, obtained their water from private wells.

Population projections by W. E. Simpson Company indicate northern Bexar County will have a population using Trinity aquifer water of about 20,000 people by the year 2000 and from about 30,000 to 40,000 by the year 2020. These projections are based on the historical period of record for the last four census counts and extrapolations of different projections for Bexar County populations by the Planning Division of the Texas Water Development Board and Texas A&M University. The projections are discussed more fully in the accompanying Volume 2, which was prepared by W. E. Simpson Company.

D. **Well-Numbering System**

A total of 122 water wells were inventoried during the course of this investigation. Information ascertained for these wells during the study is presented in Table 1. The locations of wells are shown on Figure 2, and the wells are identified in accordance with a numbering system based on subdivisions of latitude and longitude as shown by the diagram on Figure 3. The Texas Water Commission, the Texas Water Development Board, and the U. S. Geological Survey use a similar well identification system in Texas with the exception of the last few digits of the well identification which are unique to this study and provide greater location identification within the well number.

The first two letters of the well number (i.e. AY-68-19-9ic7) identify the county in Texas, which in this case are "AY" for Bexar County. Next, each one-degree by one-degree section of the state has been assigned a two-digit number from 01 to 89 and this becomes the first set of numbers in the well identification. Each one-degree section is further divided into sixty-four 7-1/2-minute quadrangles, numbered from 01-64, and this two-digit number becomes the second set of numbers in the well identification. Each 7-1/2-minute quadrangle is divided into 2-1/2-minute blocks, which are numbered from 1 to 9. The 2-1/2-minute block designation is the first digit in the third set of numbers (the fifth number) in the well identification.

The state system and the system used for this study differ in the third set of numbers. The state system assigns numbers sequentially as needed within the 2-1/2-minute sections regardless of location within the section. However, these numbers can only be assigned by the State. Therefore, the numbering system used for this study differs and subdivides each 2-1/2-minute section into smaller sections which form nine smaller quadrangles each time, as shown by the diagram on Figure 3. The first two subdivisions, 50-second and 16-2/3-second quadrangles, use letters "a" through "i" to avoid possible confusion with the state identification system, and the last subdivision, 5-1/2 seconds, is given a number from 1 to 9 to locate the well within an area approximately 500 feet by 500 feet. If wells have to be located closer than this final subdivision, a decimal place is added followed by a sequential number.

As an example, well AY-68-19-9ic7 would be located in Bexar County within the one-degree section 68 and in the sequentially subdivided quadrangles as illustrated in Figure 3. If there were two or more wells within the last subdivided quadrangle, .1 (9ic7.1) would be added to the well identification to represent the first well, .2 (9ic7.2) for the second well, and continued as needed. The entire study area of northern Bexar County is located within the one-degree section 68. Thus, all the well numbers assigned in this report begin with AY-68. In parts of this report only the last six or four digits of the total well identification are used where the 7-1/2-degree quadrangle number is apparent, such as on the map of Figure 2 and subsequent maps.

E. <u>Metric Conversions</u>

The inch-pound units of measurement used in this report may be converted to metric units (International System) by the following factors:

Multiply inch-pound unit	By	To obtain metric units
inch (in)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
gallon (gal)	3.785	liter (l)
acre-foot (ac-ft)	1,233	cubic meter (m^3)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
gallons per minute (gpm)	0.06308	liters per second (l/s)
gallons per minute per foot (gpm/ft)	0.2070	liters per second per meter (l/s/m)
degree Fahrenheit (°F)	5/9 x (°F - 32)	degree Celsius (°C)

II. GEOLOGY

The geologic formations that yield water to wells in northern Bexar County are sedimentary rocks consisting of terrigenous clastics and marine carbonates of the Cretaceous Period. Much older Paleozoic rocks constitute the basement beneath the Cretaceous sedimentary rocks which were deposited in the study area on a prominent topographic high known as the San Marcos platform. The outcrop of Cretaceous rocks in northern Bexar County is shown by the patterned areas on Figure 4.

A. Stratigraphy

Stratigraphic units and their water-bearing properties for the study area are summarized in Table 2. The following paragraph taken from Ashworth (1983) appropriately describes the stratigraphy of the water-bearing strata (parenthetical statements added by William F. Guyton Associates):

"The Trinity Group of Cretaceous age is the most important water-bearing unit in the study region (northern Bexar County). It overlies rocks of Paleozoic age and is overlain in a portion of the study region by younger rocks of the Fredericksburg Group of Cretaceous age. The Trinity Group is divided into the following formations in order from the oldest to youngest: Travis Peak (also known as Pearsall Formation from Stricklin and others, 1971) and Glen Rose. The Travis Peak Formation is subdivided into the following members in order from oldest to youngest: Hosston Sand, Sligo Limestone, Hammett Shale, Cow Creek Limestone, and Bexar Shale and Hensell Sand."

The Hosston Sand was deposited unconformably on top of Paleozoic rocks approximately 130 to 140 million years ago after a gap in deposition through geologic time. The Hosston Sand is the subsurface equivalent of the Sycamore Sand found in outcrop to the north of the study area. The Sligo Limestone is a gradational downdip facies of the Hosston Sand, which gradually changes to limestone from sand (Stricklin and others, 1971).

The Hammett Shale, also sometimes referred to as the Pine Island Shale, lies disconformably on the Sligo Limestone and generally provides a sharp contact between the two units. The Cow Creek Limestone is comprised mostly of shell fragments, and was transitionally deposited on top of the Hammett Shale and thus produces an indistinct contact.

The Hensell Sand and Bexar Shale are part of an alluvial-fan depositional sequence (Stricklin and others, 1971). The Hensell Sand consists of terrigenous sediment washed out from the Llano Uplift. The Bexar Shale, which is the more prevalent facies in northern Bexar County, is a finer grained, gradational marine shale that was deposited at the same time as the Hensell Sand.

The Glen Rose Formation is a shallow-water limestone that forms the uppermost unit of the Trinity Group in south-central Texas. The Glen Rose Formation is divided informally into two members, lower and upper. At the top of the lower member of the Glen Rose Formation is a distinctive and persistent marker bed, which has been named the "Corbula Bed" for the abundant rice-shaped clam fossils that it contains. The upper member of the Glen Rose Formation, when weathered, creates the distinctive Hill Country "stair-step" topography (Stricklin and others, 1971).

Contact between the Glen Rose Formation and the overlying Edwards Group is generally disconformable (Rose, 1972). The limestone of the Edwards Group was deposited in a shoaling, lagoonal environment during the Fredericksburg and Washita Ages of the Lower Cretaceous, more than 100 million years ago.

The limestone that composes the Edwards aquifer in the San Marcos platform is divided stratigraphically into three formations, the Kainer, Person, and Georgetown Formations. These formations are further subdivided into members which correspond to eight aquifer subdivisions (Rose, 1972; Maclay and Small, 1984).

B. Structure

Cretaceous sedimentary rocks in Bexar County strike northeast and dip to the southeast toward the Gulf of Mexico. The dip of the rocks in northern Bexar County is between 10 and 15 feet per mile to the southeast in the downdip direction (Arnow, 1959).

The study area occupies the northern part of the Balcones fault zone in Bexar County. This fault zone is the dominant structure that forms the Balcones Escarpment at the edge of the Edwards Plateau which is generally depicted on Figure 1. All faults in northern Bexar County are located within the Balcones fault zone. The last major episode of movement in the Balcones fault zone occurred during the late Early Miocene, approximately 15 million years ago (Young, 1972).

Although most of the faults in the area trend northeast, a smaller set of cross-faults trend northwest. Most of the faults are nearly vertical, normal faults. Generally, the faults are en echelon, with the down-dropped blocks toward the southeast. Many faults are not a single sharp break as suggested by a line drawn on a geologic map, but are usually a narrow zone of shattered rocks. Because rocks on both sides of a fault are sometimes equally resistant to weathering, some faults in northern Bexar County do not result in sharp topographic relief.

Figure 5 illustrates the geologic structural trends in northern Bexar County. A geologic cross section (Figure 6), which generally parallels Interstate Highway 10, illustrates both the structural and stratigraphic relationships with regard to the Cretaceous rocks in northern Bexar County. The geologic control which was used to develop Figures 5 and 6 is given in Table 3. It should be noted that some of the well numbers used on Figures 5 and 6 and in Table 3 are not consistent with the well-numbering system used elsewhere in the report. The reason for the inconsistency is that the wells were not field inventoried by William F. Guyton Associates and are used only for supplemental geophysical data. However, most of the logs are on file with the Edwards Underground Water District/Edwards Aquifer Authority and the numbers correspond to those previously used by the District.

III. AQUIFER SYSTEMS

The following paragraph taken from Ashworth (1983) appropriately describes the organization of the Trinity Group aquifer (parenthetical statements added by William F. Guyton Associates):

"Based on their hydrologic relationships, the water-bearing rocks of the Trinity Group are organized into the following aquifer units: (a) the lower Trinity aquifer consisting of the Hosston Sand and Sligo Limestone Members of the Travis Peak Formation; (b) the middle Trinity aquifer consisting of the lower member of the Glen Rose Limestone, and the Hensell Sand (Bexar Shale) and Cow Creek Limestone (and Hammett Shale) Members of the Travis Peak Formation; and (c) the upper Trinity aquifer consisting of the upper Glen Rose Limestone. Collectively these are referred to as the Trinity Group aquifer."

The Hammett Shale is relatively impermeable and acts as a confining bed which divides the producing units of the lower and middle Trinity aquifer. The upper and middle Trinity aquifer units are divided because of water-quality differences. The upper member of the Glen Rose Limestone, which forms the upper Trinity aquifer, contains water with relatively high concentrations of sulfate. The high sulfate is caused by the dissolving of evaporite minerals such as gypsum and anhydrite. Ground-water flow and circulation in the upper member of the Glen Rose Limestone is poor, and therefore the aquifer usually yields only small amounts of highly mineralized water to wells. The lower member of the Glen Rose Limestone contains massive reefal limestones with good permeability near its base. The lower member has much better water quality than the upper member of the Glen Rose Limestone, and in some localities, the lower member appears capable of providing large quantities of water to wells.

Throughout northern Bexar County, the upper, middle, and lower Trinity aquifer units are in hydraulic communication and collectively should be considered a leaky aquifer system even though the Hammett Shale, Bexar Shale, and upper member of the Glen Rose Limestone generally are considered to be confining beds. Where thin and remnant basal rocks of the Edwards aquifer overlie the Trinity Group aquifer in the study area, these portions of the Edwards become part of the above system. In some areas where the Edwards has been downfaulted and there is hydrologic continuity between the Trinity Group and Edwards aquifers, ground water may move into the Edwards across the fault.

IV. OCCURRENCE OF GROUND WATER IN THE TRINITY GROUP AQUIFER

A. Recharge, Movement, and Discharge

The primary source of recharge to the Trinity Group aquifer in Bexar County is from the following: (a) rainfall on the outcrop of the Glen Rose Limestone; (b) seepage from Cibolo Creek and other streams and lakes; and (c) vertical downward leakage from overlying strata. Additionally, there is some recharge from water percolating from irrigation of lawns and golf courses on the outcrop.

Ashworth (1983) estimates that recharge to the Trinity Group aquifer from rainfall is approximately 4 percent of the mean or average annual rainfall. This estimate is based on the base-flow gain in the Guadalupe River between the Comfort and Spring Branch gaging stations. The base-flow gain is shown to result from discharge of ground water from the aquifer into the Guadalupe River, and this discharge approximately equals the amount of recharge when the amount of water in storage in the aquifer does not change.

A large proportion of the water that flows in Cibolo Creek enters the subsurface along the bed of the creek between Boerne and Bulverde where the Cibolo traverses the outcrop of the lower member of the Glen Rose Limestone (Guyton & Associates, 1958). However, it has been postulated that this ground water moves near-surface and parallel to Cibolo Creek below the streambed in a localized area of highly porous Glen Rose Limestone, and it then enters the Edwards aquifer where it is downfaulted against the Glen Rose Limestone (Guyton & Associates, 1958). Thus, much of the water entering the subsurface as recharge from Cibolo Creek does not appear to reach the main part of the Trinity Group aquifer in Bexar County.

The lower water-bearing units (Cow Creek, Sligo, and Hosston) of the Trinity Group aquifer do not crop out in Bexar County but receive small amounts of water as leakage from the overlying Glen Rose Limestone. This downward leakage occurs through the relatively impermeable Bexar Shale to enter the Cow Creek Limestone and through the relatively impermeable Hammett Shale to enter the Sligo Limestone and Hosston Sand. Some downward leakage may occur along faults within the study area.

Generally, ground water in the Trinity Group aquifer moves downdip to the south and southeast into and through the study area in northern Bexar County. The horizontal component of flow into and out of the study area is influenced, for the most part, by the transmissivities of the aquifer at the study boundaries. In areas of concentrated pumping, local cones of water-level depression cause ground water to move toward the points of withdrawal from all directions.

Figures 7, 8, 9, and 10 are water-level maps for the Edwards aquifer and the lower, middle, and upper Trinity aquifers. The water levels shown on the maps generally illustrate the potentiometric surface, or height to which water levels will rise in wells constructed in the aquifers. The direction of ground-water flow is generally at right angles to the water-level contours and in the direction of decreasing altitude. Inspection of the above maps indicates that the water-level gradient generally ranges from 30 to 100 feet per mile, and that the vertical hydraulic gradient is on the order of 0.20 foot per foot. While detailed water-level control is limited, a small cone of impression is shown on Figure 8 and two prominent cones of depression are shown on Figure 9 by closed-loop contour lines. The cone of impression in the upper Trinity aquifer reflects water entering the upper Trinity in the area of the Dominion golf course, probably from local irrigation, and the cones of depression in the middle Trinity aquifer reflect relatively large local withdrawals of water from the middle Trinity aquifer.

The water-level measurements shown on the above maps are generally reflective of the hydrostatic head of the aquifers at the time of the measurement. However, these measurements may be influenced to some degree by prior pumping from the well for which a water level is shown or current or prior pumping from wells which may be close by, the depth at which the well is completed in the hydrologic unit, and the method of completion, which in many cases allows a well to draw water from more than one water-bearing unit. Therefore, the conditions indicated by these measurements should be considered approximate, and minor inconsistencies between adjacent data points should be evaluated only in terms of how they apply on a regional basis.

Ground-water discharge from the Trinity Group aquifer in Bexar County occurs primarily by pumpage from wells. However, some ground water is discharged naturally from the outcrop of the Glen Rose Limestone by small springs, seeps, and evapotranspiration. As discussed earlier, discharge also occurs in the form of interformational leakage to adjacent hydrologic units, along fault planes, and through lateral movement into the Edwards.

B. Hydraulic Characteristics

Various hydrologic parameters are required for making a quantitative evaluation of the Trinity Group aquifer. The primary parameters are the coefficients of transmissivity (an index of the aquifer's ability to transmit water) and storage (an index of the amount of water released from or taken into storage as water levels change). One of the basic assumptions in determining these parameters from pumping-test data is that flow takes place through a homogeneous medium having the same properties in all directions. Inspection of the water-bearing strata of the Trinity Group aquifer in Bexar County reveals joints, fractures, and preferentially dissolved rock that result in these limestones and calcareous-cemented sandstones being heterogeneous in nature. This heterogeneity deviates from the above assumptions, and may cause the data from pumping tests to reflect recharge or discharge boundaries that must be taken into consideration in evaluating the data to arrive at reasonable hydrologic parameters.

Although the basic assumptions have not been met precisely, the results from aquifer pumping tests are still applicable in a general way. In properly applying the results, however, one must be mindful of their limitations and take into consideration the physical characteristics of the aquifer.

The results of 10 Trinity Group aquifer pumping tests are shown in Table 4. These aquifer tests were conducted by personnel of William F. Guyton Associates in Bexar County during the current study. Data from the tests were analyzed by using the Theis nonequilibrium formula, as modified by Cooper and Jacob (1946), and described in detail in a number of hydrology textbooks, including Freeze and Cherry (1979).

Some of the pumping-test data are skewed and thus the results of analysis may not be completely representative of the respective producing unit. Well AY-68-21-2hi9 produces from the lower and upper members of the Glen Rose Limestone, and the pumping test results indicate a low transmissivity of from 25 to 37 gallons per day per foot (gpd/ft). However, the well does not penetrate the full thickness of the lower member of the Glen Rose Limestone, which has its best producing interval near the bottom of the member. Therefore, the range of transmissivity may be more indicative of the upper member of the Glen Rose Limestone. Well AY-68-27-1ac4 is completed in the upper member of the Glen Rose Limestone. The high transmissivity values of 19,171 and 24,400 gpd/ft determined from this test are believed to reflect the presence of a recharge boundary because of water leakage from a stream that was flowing about 100 feet from the well prior to and during the test. Thus, the high transmissivity is not considered representative of the upper member of the Glen Rose Limestone.

Based on the results of the pumping tests, and taking into consideration the general physical characteristics of the aquifers, it appears the following short-term coefficients of transmissivity are reasonable: (a) on the order of 300 to 1,000 gpd/ft for the lower Trinity aquifer (Sligo and Hosston) in Bexar County; (b) on the order of 1,000 to 10,000 gpd/ft for the middle Trinity aquifer regionally with values possibly ranging up to 35,000 gpd/ft or more locally; and (c) from less than 100 to about 3,000 gpd/ft for the upper Trinity aquifer. The values for the upper Trinity aquifer commonly are low because it is relatively impermeable in most areas. Regionally, these values can be expected to be substantially lower than those for the middle Trinity aquifer.

The confining beds of the Trinity aquifer (Hammett Shale, Bexar Shale, and the clays and marls of the upper member of the Glen Rose Limestone) are relatively impermeable. Based on the character of these materials and a comparison with similar materials elsewhere, it appears that a vertical permeability on the order of 0.001 to 0.02 gallons per day per square foot (gpd/ft^2) is appropriate for vertical leakage. This estimate is in general agreement with estimates made by others (Morris and Johnson, 1966; Ashworth, 1983).

The coefficient of storage is a measurement of an aquifer's ability to store or release ground water from storage. In order to accurately determine storage coefficients from pumping tests, measurements of water levels in one or more observation wells during the tests are required. However, the two tests that were arranged with observation wells during the current study produced unacceptable results (Simpson and Guyton, 1992). In one test, the owner's measuring equipment on the observation well malfunctioned during the testing. During the testing of another well, the observation well did not show interference effects possibly because of a local restriction in the aquifer between the wells. It was not possible to arrange for observation wells during the other pumping tests.

Artesian aquifers generally have storage coefficients ranging from about 0.00001 to 0.001 and water-table aquifers from about 0.01 to 0.25. Some variation in storage coefficients is to be expected with regard to the Trinity aquifer in Bexar County, but, for the purposes of this study values of 0.0001 and 0.03 seem reasonable for the artesian and water-table portions of the Trinity Group aquifer, respectively.

Coefficients of transmissivity and storage may be used to estimate the future drawdown of water levels caused by pumping. Figure 11 shows the relationship of the decline in water levels with time of pumping and distance from the pumped well for a range of aquifer coefficients for the Trinity Group aquifer. The graphs are based on a well pumping 100 gallons per minute (gpm) from 1 to 50 years from a homogeneous and infinitely extensive aquifer with transmissivities ranging from 1,000 to 40,000 gpd/ft, and an artesian storage coefficient of 0.0001. For example, if the coefficients of transmissivity and storage are 10,000 gpd/ft and 0.0001, respectively, the drawdown would be about 5.5 feet at a distance of 10,000 feet from a well pumping 100 gpm continuously for one year.

In general, drawdowns associated with water-table conditions are less than those in the artesian portions of the aquifer if the following conditions prevail: (a) the pumping rate is the same; (b) the aquifer is not significantly dewatered as water levels are lowered due to pumping; (c) there are no discharge boundaries present; and (d) transmissivities are equal. Under the above conditions, the only major difference is the storage coefficient which is on the order of 300 times greater for water-table conditions. Because of the relative lack of high pumping rates for wells in the water-table portions of the aquifer that are required to cause significant drawdowns, water-table drawdown graphs were not prepared for inclusion on Figure 11.

C. Water Levels

Both long-term and seasonal changes in water levels in wells completed in the Trinity Group aquifer in Bexar County are illustrated by the hydrographs shown on Figure 12. Both long-term and seasonal declines result from cones of depression that are formed by pumping. When a water well is pumped, the water levels in the vicinity are drawn down to form the shape of an inverted cone with its apex located at the well as water is withdrawn from storage and hydraulic gradients are formed to cause water to move to the well. This cone of depression in the water-level surface is shown by the upper illustration on Figure 13.

Seasonal changes in water levels are usually the result of seasonal changes in recharge and pumpage which affect the amount of ground water in storage. During dry periods natural recharge is reduced and the rate of pumping generally increases to meet increased demands. Thus, some of the water discharged from the aquifer through wells is taken from storage in the aquifer locally, and water levels decline accordingly. During periods of more plentiful rainfall, recharge increases and less pumpage is needed to meet demands. Thus, much if not all of the volume of water taken from storage during the dry period is replaced and water levels rise accordingly. Available information indicates seasonal changes in static water levels of up to 40 feet or more occur depending on distance from the center of pumping.

Long-term declines occur as long as the rate of pumping continues and the cone of depression continues to expand without intercepting a source of replenishment that supplies sufficient water to satisfy the pumping demand. This source of replenishment could either be intercepted natural discharge or induced natural recharge. If the quantity of water received from these sources is sufficient to offset the amount of water pumped, the growth of the cone ceases and a new water balance is established at a lower but generally stable areal water level.

Because of heavy rains in 1991 and 1992, water levels in the area were high at the time of the study. Water-level trends shown in Figure 12 indicate that water levels in the upper Trinity aquifer have remained relatively constant during recent years. However, during the drought of the 1950's, water levels are shown to have declined about 60 feet. Water levels in the middle and lower Trinity aquifer units experienced declines on the order of 50 to 90 feet in the 10 years prior to the recent highs of 1991 and 1992.

When more than one well is pumped, each well superimposes its cone of water-level depression on the cone created by the pumping of neighboring wells. When the cone of one well overlaps the cone of another, interference occurs, and the lowering of water levels is additive because both wells compete for water by expanding their individual cones of depression. Figure 13 is presented to illustrate the effects of interference between pumping wells. The amount of interference depends on the rate of pumping from each well, the spacing between wells, and the hydraulic characteristics of the aquifer. In areas where recharge and intercepted natural discharge are less than the amount of water pumped by wells, water is removed from storage in the aquifer to supply the difference and water levels continue to decline.

V. UTILIZATION AND DEVELOPMENT OF GROUND WATER

Prior to the 1950's, there was little development of ground water from the Trinity Group aquifer in Bexar County and total pumpage probably was less than 1,000 acre-feet per year. After the 1950's, more wells were drilled and pumpage from the aquifer increased as economic conditions changed and the suburban population increased. This increase in pumpage is illustrated by the information presented in Table 5.

Presently, public water supply and domestic wells are most densely located in numerous small subdivisions in northern Bexar County. Most of the industrial wells are located along IH 10. Large irrigation wells are used mainly to supply water for golf courses, which often are located along the flood plains of creeks in northern Bexar County.

A. Existing Wells

It is estimated that there are more than 2,300 Trinity aquifer water wells in northern Bexar County. Of this number, it is estimated that there are about 2,200 or more domestic wells, about 80 public supply wells, about 30 industrial wells, and about 20 large irrigation wells. Records of wells inventoried during this study, which are believed to be generally representative of wells in the area, are given in Table 1.

Most domestic wells yield less than 20 gpm, and most of the industrial, public water supply, and large irrigation wells yield from just less than 100 gpm to about 300 gpm. As a means for reducing costs, many domestic wells are sized for small pumps and have a minimal amount of casing installed, often with limited sealing of overlying strata. This practice can lead to poorly constructed wells, and in some instances, to poor water quality.

Field observations and review of existing well records show that the two most common types of wells constructed in northern Bexar County are small-diameter drilled wells and large-diameter shallow dug wells. However, dug wells are rarely completed in the study area anymore because of low yields and potential sanitary hazards. Most of the wells that are drilled and completed in the Trinity Group aquifer range in depth from less than 100 feet to 800 feet or more, and commonly have casing diameters ranging from 4 to 12 inches. Many of these wells are completed "open hole" with only 10 to 20 feet of casing at the top.

The specific capacities (gallons per minute of produced water per foot of drawdown in the pumped well after a stated time of pumping) of most wells producing from the Trinity Group aquifer are generally low. This results in large water-level drawdowns in pumped wells, even with small well yields. As an example, with a specific capacity of 10 gpm/ft, a well pumping 100 gpm would have a drawdown of 10 feet, whereas a well with a specific capacity of 1.0 gpm/ft pumping 100 gpm would have a drawdown of 100 feet.

Three-hour specific capacities for wells in the Trinity Group aquifer determined from tests performed during this study range from 0.1 gpm/ft to near 14 gpm/ft as shown by Table 4. Wells in the upper and lower Trinity aquifer units generally have the lowest specific capacities. Two Trinity Group aquifer wells tested during this study, wells AY-68-27-1ac4 and AY-68-20-4ed9.1, had specific capacities of 12.5 and 13.5 gpm/ft, respectively. The relatively high values may have been influenced by recharge from nearby usually dry streams which were flowing at the time of the test as a result of recent rains. Well AY-68-28-2hf8, which is completed mostly in the Edwards aquifer, had the highest 3-hour specific capacity of 59.25 gpm/ft.

Properly constructed wells can be completed open hole in the middle and lower Trinity aquifer units. However, the upper member of the Glen Rose Limestone contains mineralized water that is associated with two main evaporite beds. Thus, casing needs to be set through these evaporite beds and properly cemented to prevent any mineralized water that may be encountered in the overlying upper member of the Glen Rose

Limestone from entering the well. Also, because of possible caving of the Hammett Shale, it is recommended that for wells completed in the lower Trinity aquifer, casing should be set into the top of the Sligo Limestone.

B. Ground-Water Pumpage

In 1990, the total amount of ground water pumped from the Trinity Group aquifer in northern Bexar County was about 6,350 acre-feet. As shown in Table 5, about 3,260 acre-feet of the water was used for industrial purposes, about 1,700 acre-feet for public water supplies, about 400 acre-feet for large-scale irrigation, and about 990 acre-feet for private domestic use. Public, irrigation, and industrial pumpage estimates are based on an evaluation and compilation of information reported to the Texas Water Commission and Texas Water Development Board by ground-water users. The domestic pumpage was estimated by taking the census-year population in northern Bexar County not on public supply as discussed earlier in this report and multiplying it by 130 gallons per day per person. This 130 gallons per day per person compares to from 153 to 225 gallons per day per person for the city of San Antonio (San Antonio City Water Board, 1992). It should be noted, however, that this larger number for public supply in San Antonio includes water used for landscapes, golf course irrigation, and other purposes, and therefore is higher than what is used in northern Bexar County. Estimates of domestic pumpage between census years (i.e. 1960, 1970, etc.) shown in Table 5 basically assume that changes in pumpage between census years occur at an even rate. For example, domestic pumpage in 1965 is estimated to be the average of that shown for 1960 and 1970.

Since the 1960's, industrial use of ground water has been approximately one-half or greater of the total amount of water produced from the aquifer. Pumpage from private wells for domestic use increased slightly from 1960 to 1980 and then dropped off by 1990. The increase in total population within the area has been accommodated for the most part by public water supply systems, especially in recent years. The amount of ground water pumped from the aquifer by use category for selected years from 1960 through 1990 is given in Table 5, and total pumpage is shown by a graph on Figure 12.

Because the best water quality and transmissivity occur in the lower Glen Rose and Cow Creek Limestones, the middle Trinity aquifer is the most widely used ground-water source in northern Bexar County. In 1990, the middle Trinity aquifer provided approximately 80 percent of the total water pumped from the Trinity Group aquifer.

VI. GROUND-WATER QUALITY

All ground water contains minerals which are dissolved and transported in solution. The type and concentration of the minerals depend upon the history of the water, its source, movement, and environment. Specifically, the dissolved solids depend upon the solubility of the minerals present in the rocks through which the water moves, the length of time the water is in contact with the rocks, and the chemical activity of the water. In general, the concentration of dissolved minerals in ground water increases with depth. This is especially the case where circulation in the deeper sediments is restricted by low permeability. Restricted circulation retards the flushing action of water moving through the aquifer and causes the water to become more stagnant and highly mineralized.

In general, for water to be considered acceptable for public supply or domestic consumption, the concentrations of certain constituents should not exceed Texas Department of Health recommendations. The Health Department's recommendations (effective January 1, 1991) for maximum concentrations of common inorganic constituents, which were sampled and analyzed in this study, are as follows:

Primary Standards:

Constituent	Milligrams per liter
Fluoride	4
Nitrate (as N)	10

Secondary Standards:

Constituent	Milligrams per liter
Chloride	300
Fluoride	2
Iron	0.3
Manganese	0.05
Sulfate	300
Dissolved Solids	1,000

As noted above, fluoride is included in both the Primary and Secondary Standards.

Often, water with concentrations higher than the Secondary Standards is consumed, especially where that is the only water available. Generally, water that contains more than 2,000 milligrams per liter (mg/l) dissolved solids is not used for human consumption. However, stock and many irrigated crops can tolerate levels much higher than the recommended drinking water standards (Hem, 1985).

A. Chemical and Bacteriological Quality

The Trinity Group aquifer in northern Bexar County generally yields water that ranges from fresh (less than 1,000 mg/l dissolved solids) to slightly saline (1,000 to 3,000 mg/l dissolved solids). This water is suitable for most domestic and livestock consumption. However, the water has limited use for some industrial purposes because of its hardness, which is often much greater than 180 mg/l as calcium bicarbonate. The best quality water in the Trinity Group aquifer is generally obtained from the middle Trinity aquifer.

The results from chemical analyses of 21 samples of ground water collected by William F. Guyton Associates during this study are listed in Table 6 and selected chemical constituents are shown on Figure 14. The laboratory reports are given in Appendices 1 through 4. Four of the wells, AY-68-19-3fe1, AY-68-21-2hi9, AY-68-28-2ab6, and AY-68-28-3fb5, produced water containing more than 1,000 mg/l dissolved solids, with the water from the first three wells containing more than 2,000 mg/l dissolved solids. Samples from four wells, AY-68-21-5de8, AY-68-27-1ac4, AY-68-27-5be7, and AY-68-28-3fh5, exceed the secondary standard for fluoride at 2 mg/l. Only the water from well AY-68-28-3fh5, which contains 4.6 mg/l of fluoride, exceeds the primary standard of 4 mg/l. However, the water from this well is used only for irrigation and not for consumption.

Bacteriological samples were taken from 21 wells in the study area. The results are given in Table 6 and the laboratory reports are included in Appendix 2. Laboratory results for 11 of the samples indicate the presence of bacteria. Of these 11 samples, those from wells AY-68-20-4ed9.1, AY-68-20-7bd6, AY-68-21-5de8, and AY-68-28-2hf8 are shown to have relatively higher numbers of cultured bacterial colonies that may reflect serious contamination. Quality assurance samples indicate that no sample contamination occurred after sampling.

According to the San Antonio Metropolitan Health Department Laboratory, the presence of coliform or streptococcal bacteria in water generally indicates that the water is probably unsafe to drink. These bacteria are easily cultured and identified and their presence in excessive numbers is considered suggestive of the presence of other potential pathogenic bacteria. Often, high concentrations of bacteria in ground water are considered to be a localized problem within the well itself or nearby, and thus not indicative of widespread contamination of the aquifer. Since nitrate is often associated with contamination from waste waters or areally applied fertilizer, the generally low nitrate concentrations of the sampled water support the opinion that the elevated bacteria probably reflect localized conditions.

Water samples from five wells, well and sample numbers 19-6eb6, 20-7hd6, 27-3bd8, 28-3fh5, and 20-7aa8, were analyzed for semivolatile organic pesticides, and samples from two wells, well and sample numbers 19-6eb6 (rerun) and 21-5de8, were analyzed for volatile organics. The laboratory reports for pesticide analyses are given in Appendix 3, and the laboratory reports for volatile organics are given in Appendix 4. Even though these wells were selected because conditions in the vicinity of the wells provided the greatest potential for the produced water to exhibit aquifer contamination of the suspect compounds, none of the target compounds were detected by the analyses.

While it is possible that these organic analyses of water from the selected wells may not conclusively represent conditions in the entire study area, it appears that water in the Trinity Group aquifer in northern Bexar County is relatively pristine with respect to these organic contaminants at this time. However, because of the high degree of surface usage and nature of organic compounds, the potential exists for future water-quality degradation by pesticides, fuels, and solvents.

The availability of earlier water-quality data for the Trinity Group aquifer in northern Bexar County is inadequate to evaluate historic changes. Analyses by the Texas Department of Health are not applicable for determining long-term changes in the aquifer because the samples usually are taken from distribution lines that contain water from multiple wells. Older analyses are available for water samples collected from wells within the study area by the Texas Water Commission, mostly during the early 1970's. However, only one well, AY-68-27-5be7, corresponds to a well sampled during the current study. The results of analyses made as part of the current study are generally similar to the earlier analysis for well AY-68-27-5be7 and others reported by Ashworth (1983). In order to establish long-term trends in water quality for the Trinity Group aquifer, samples from individual wells need to be taken periodically through time. In addition, information such as well construction, production interval, and pumpage from the well need to be evaluated in determining whether any water-quality changes that occur pose a potential threat to the future potability of water from the Trinity Group aquifer.

B. Hydrochemical Facies

The trilinear Piper diagram shown on Figure 15 was generated from results of the inorganic water analyses in order to visually demonstrate major groupings or trends in water chemistry within the Trinity Group aquifer. The composition of most natural waters can be approximated in terms of three cations (calcium, magnesium, and sodium) and three anions (bicarbonate plus carbonate, sulfate, and chloride) expressed in percentage of total milliequivalents. The proportions are plotted as points in separate triangles of cation and anion constituents. These points are then projected into a central diamond shape field to identify general composition in terms of water types (Hem, 1985; Freeze and Cherry, 1979).

Most of the samples are a calcium-bicarbonate type water. Some of the samples, especially those from the upper Trinity aquifer and the most downgradient portion of the middle Trinity aquifer are calcium-sulfate type water. Water from the lower Trinity aquifer exhibits elevated sodium chloride.

Data on Figures 12 and 15 illustrate that water-chemistry differences exist in the middle Trinity aquifer between upgradient and downgradient areas within northern Bexar County. The elevated sulfate concentration in downgradient wells may be related to the total quantity of vertical leakage which enters the middle Trinity aquifer from the upper Trinity aquifer. This change in chemistry reflects the effect of less flushing and circulation, and the accumulation of the poorer quality water that leaks into the middle Trinity aquifer from above as the water moves downgradient. The straight line correlation shown by the trilinear diagram on Figure 15 illustrates the potential for such mixing.

The best-illustrated evidence of mixing of water between the lower Trinity aquifer and the other Trinity aquifer units is shown by the relative position of sample number 2 on Figure 15, as compared to the clustering of plotted points for the upper and middle Trinity aquifer data. The above correlations are believed to provide chemical evidence of a leaky aquifer system for the Trinity Group aquifer.

Sample number 3 is anomalous and plots separate from the other data points on Figure 15. There were no other wells in the lower Trinity aquifer within the study area that were available to be sampled at the time of the study. Therefore, it is not certain if this is typical chemistry for water of the lower Trinity aquifer or whether this is something peculiar to this sample. The well from which sample number 3 was collected was pumped dry three times during the sampling process, and the water level was allowed to recover each time before the sample was collected during the fourth pumping period. The well had not been used in some time, and the person looking after this well said the well had not gone dry previously. It is not known why this occurred, or what effect it had on the chemistry of the sample.

C. Water-Quality Problems and Treatment

The upper member of the Glen Rose Limestone (upper Trinity aquifer) contains anhydrite and gypsum deposits which result in water high in sulfate. Thus, wells completed in the upper Trinity aquifer, or those completed in the lower units which do not have the upper Trinity cased off, may produce water high in sulfate. Ground water that moves slowly and is in contact with highly soluble rocks results in high mineralization. This is a common problem for the lower Trinity aquifer. In addition some wells in northern Bexar County are reported to produce water containing excessive concentrations of hydrogen sulfide gas, fluoride, iron, manganese, and bacteria.

Bluntzer (1990) reported that serious to moderate concentrations of nitrate with respect to health risks have been detected in the upper and middle Trinity aquifers in the Hill Country area of central Texas. High nitrate concentrations often indicate fecal or fertilizer contamination. These high concentrations seem to be limited to scattered localized areas in the Hill Country. Because of the relative lack of farmed acreage in the northern Bexar County study area, the reported high nitrate concentrations are believed to be associated with localized improper disposal of human and/or animal wastes.

Some of the problems that are manifested due to excessive concentrations of certain chemical constituents are as follows: (a) sulfates may act as a laxative on people and animals not accustomed to it; (b) hydrogen sulfide gas causes the water to have a mild to strong odor of rotten eggs and may irritate eyes; (c) fluoride may cause mottled tooth enamel, brittle bones, or hardening of ligaments; (d) iron and manganese cause stains to form on porcelain fixtures and laundry; (e) biological contaminants may cause disease; (f) nitrates may cause methemoglobinemia ("blue babies") when such water with high nitrate content is ingested by children or used in the preparation of infant feeding formulas; and (g) hardness may be disadvantageous because soap may not clean efficiently and an insoluble residue may be left on bathtubs, sinks, clothing, and skin. A brief overview of water treatment that can correct or mitigate these problems is presented in the following paragraphs.

Water quality can be enhanced through treatment by filtration, activated carbon, dealkalization, deionization, or reverse osmosis. Some treatment procedures are relatively costly, but are available for those who can afford them. Excessive sulfate can be removed by dealkalization, deionization, or reverse osmosis. Reverse osmosis will also remove certain metals (iron, lead, etc.), organic chemicals, and nitrates. Activated carbon filters are also good for removing a number of constituents. Adequate ventilation and aeration normally can remove objectionable gas, such as hydrogen sulfide. Some commonly employed iron-removal methods are iron filtration or aeration and settling.

Hardness is caused by calcium and magnesium in ground water. Water softeners are based on the ion exchange process whereby sodium ions are traded for calcium and magnesium ions. This ion exchange process will also help remove iron and manganese.

Biological contaminants, such as bacteria and viruses, are most often effectively eliminated through chlorine disinfection. It should be noted, however, that man-made chlorinated hydrocarbons produced during chlorination could pose an added water-quality problem for some water systems. Water may also be disinfected with heat by bringing the water to a boiling temperature for 15 to 20 minutes.

VII. GROUND-WATER AVAILABILITY

The amount of ground water that can be pumped from the Trinity Group aquifer in northern Bexar County on a long-term basis is limited by the ability of pumping to induce additional recharge and/or intercept water moving through the aquifer to points of natural discharge. A basic step in arriving at an estimate of the amount of water that can be produced on a long-term basis involves the development of the aquifer's water balance, sometimes referred to as the aquifer's water budget. Evaluation of how changes in pumping quantitatively affect the water balance provides a means for estimating the long-term availability of water from the aquifer.

In addition to the availability of ground water under natural conditions as described above, there also is a possibility that the aquifer might be used as a storage reservoir to receive artificial recharge from an outside source for an aquifer storage and recovery (ASR) project. Such a project, if successful, allows the total water resources of an area to be more fully utilized in meeting water needs.

These aspects of ground-water availability are discussed in the following paragraphs.

A. Water Balance

The water balance is in essence the hydrologic equation for the Trinity Group aquifer and may be stated as inflow equals outflow plus or minus change in ground-water storage. Inflow, for the purposes of this investigation, includes natural recharge to the aquifer from precipitation, interformational leakage of ground water to the middle and lower Trinity aquifer units, and lateral underflow of ground water into the study area. Outflow from the study area includes ground-water pumpage, interformational leakage of ground water into the middle and lower Trinity aquifer units, lateral underflow out of the study area, and natural discharge from springs, seeps, etc. Each of these items as they apply to the water budget for the upper, middle, and lower Trinity aquifer units and the Trinity Group aquifer as a whole are discussed below and summarized in Table 7.

1. **Recharge from Rainfall.** Natural recharge occurs from rainfall over the outcrop area that enters the aquifer either by direct infiltration or by leakage from streams. Natural recharge was estimated by applying a percentage to the amount of rainfall that falls on the outcrop area, which in the study area includes only the lower and upper members of the Glen Rose Limestone.

The percentage of rainfall that has been accepted for use in estimating recharge for these sediments in other parts of the Hill Country area is 4 percent (Ashworth, 1983). Because of the generally tight nature of the upper member of the Glen Rose Limestone, 3 percent of rainfall was used for the upper Trinity aquifer in the study area. Four percent of rainfall was used for the middle Trinity aquifer recharge. The annual rainfall to which these percentages were applied was 32.82 inches, which is the 88-year average at Boerne, Texas to the year 1990 (U. S. Dept. of Commerce). The percentages were applied to average annual rainfall, rather than 1990 rainfall, to help compensate for time delays the recharge may experience in reaching the aquifer. Also, the percentages applied to rainfall are long-term averages themselves and actually fluctuate with the amount of yearly rainfall.

The area of outcrop for the upper and lower members of the Glen Rose Limestone (upper and middle Trinity aquifer units in this report) that receives recharge from precipitation was measured by utilizing a geologic map of the area. The results show an outcrop area of about 167 square miles for the upper member of the Glen Rose Limestone (upper Trinity aquifer) and 12.5 square miles for the lower member of the Glen Rose Limestone (middle Trinity aquifer) in the study area of northern Bexar County. Thus, the recharge received in 1990 is estimated to be about 8,800 acre-feet and 900 acre-feet, respectively, as shown in Table 7.

2. **Interformational Leakage.** Interformational leakage is water that moves vertically from one unit of the Trinity Group aquifer to another, or in the case of the lower Trinity aquifer, into the underlying Paleozoic rocks. It is estimated from the area and permeability of the layers that separate the upper, middle, and lower Trinity aquifer water-bearing sections and the hydraulic gradient that exists between sections. Applicable permeabilities were estimated from the character and nature of the materials through which the water moves and generally accepted values for the respective sediments. Hydraulic gradients were estimated from analysis of how water levels varied with the depths of wells completed in the aquifer.

The area of the layer through which leakage between the upper and middle Trinity aquifer units in the study area occurs is estimated to be about 277 square miles, and the average vertical water-level gradient is 0.2. An average permeability of 0.002 gpd/ft^2 (clay permeability from Morris and Johnson, 1966) appears reasonable for the separating sediments when they are considered as a unit. Thus, by using these values of area, water-level gradient, and permeability, it is calculated that 3,500 acre-feet of water leaked from the upper Trinity aquifer and entered the middle Trinity aquifer in 1990.

In the case of leakage between the middle and lower Trinity aquifer, it is estimated that the area through which leakage occurred is 290 square miles, the vertical water-level gradient is 0.2, and the effective vertical permeability for the affected sediments is 0.00126 gpd/ft^2 (Ashworth, 1983). Using these factors, it is calculated that leakage of water from the middle Trinity aquifer into the lower Trinity aquifer was about 2,200 acre-feet in 1990.

It is estimated that about two-thirds of the water entering the lower Trinity aquifer as interformational leakage or about 1,600 acre-feet of water, leaked into the underlying Paleozoic rocks in 1990. It should be noted that with the exception of the 1,600 acre-feet leaving the lower Trinity aquifer, all the interformational leakage was between units of the Trinity Group aquifer, and as a result, none of this leakage resulted in a gain of water to the Trinity Group aquifer.

3. **Lateral Underflow Entering Aquifer.** Water moves laterally in a downgradient direction within the Trinity Group aquifer and enters the portion of the aquifer that is present within the study area in northern Bexar County. The amount in transit is estimated from the length of the section through which water enters this portion of the aquifer in the northern part of the study area, the hydraulic gradient across the line

of entry, and the effective transmissivity for the respective section of aquifer along this line.

In the case of the upper Trinity aquifer, the length of inflow section is relatively small because the lower member of the Glen Rose Formation outcrops in Cibolo Creek along the north part of the study area. The length of the section of inflow is estimated to be about 8 miles. The average hydraulic gradient is about 50 feet per mile along this length of section based on water-level contours, and the effective transmissivity is estimated to be about 500 gpd/ft. Using these factors and best professional judgment, the amount of underflow entering the upper Trinity aquifer is estimated to be about 200 acre-feet in 1990.

For the middle Trinity aquifer, the respective factors are a length of inflow section of 26 miles, an average hydraulic gradient of about 46 feet per mile, and an estimated effective transmissivity of about 8,700 gpd/ft. Thus, the estimated underflow into the middle Trinity aquifer was about 11,600 acre-feet for 1990. The larger underflow is due mostly to a larger effective transmissivity and, to a somewhat lesser degree, to a longer section of inflow.

The estimated effective transmissivity for the lower Trinity aquifer is small, being about 500 gpd/ft. Using this transmissivity with a relatively short length of inflow section of 15 miles, due to the configuration of water-level contours (Figure 10), and an average hydraulic gradient of 35 feet per mile, the amount of underflow into the lower Trinity aquifer within the study area in northern Bexar County in 1990 is estimated to be about 300 acre-feet.

4. **Lateral Underflow Leaving Aquifer.** Lateral underflow leaving the aquifer is water that moves downdip across the lower limit of the study area to other points of discharge outside the study area. The amounts are estimated the same way as underflow into the aquifer, but the values that are used for calculations are applicable to conditions along the downdip limit of the study area.

Applicable values for calculating underflow leaving the upper Trinity aquifer are estimated to be a length of outflow section of 25.5 miles, an average hydraulic gradient of about 48 feet per mile, and an effective transmissivity of 2,500 gpd/ft. This transmissivity is appreciably higher than the transmissivity along the northern boundary of the study area because of much greater saturated thickness at the southern boundary. Calculations and judgments using these values show about 3,400 acre-feet of underflow left the upper Trinity aquifer in 1990.

The length of outflow section for the middle Trinity aquifer is about 28 miles taken generally along the downdip limit of the study area, and the average hydraulic gradient is about 48 feet per mile. The effective transmissivity of the middle Trinity aquifer along the downdip limit is estimated to be about 6,000 gpd/ft. This estimate is lower than the 8,700 gpd/ft that is estimated to apply along the northern boundary because it is believed the aquifer media become tighter and less permeable downdip. Calculations and judgments based on these numbers show that 9,000 acre-feet of underflow left the middle Trinity aquifer in the study area in 1990.

Values estimated to be applicable for calculating underflow leaving the lower Trinity aquifer are a length of section of 25.5 miles, an average hydraulic gradient of about 27 feet per mile, and an effective transmissivity of 400 gpd/ft. Using best professional judgment and these values, the underflow leaving the lower Trinity aquifer in 1990 is estimated to be 300 acre-feet.

5. Natural Discharge from Springs and Seeps. Some ground water is discharged through springs, seeps, and evapotranspiration. Most of this discharge occurs from the shallow upper Trinity aquifer, and is the result of plants intercepting the water and returning it to the atmosphere before it penetrates the aquifer to depths below the reach of roots. Discharge also results from recharge encountering essentially impermeable layers which deflect some of the water laterally to springs and seeps at topographically lower points before it has time to enter the deeper portions of the aquifer. An assessment of hydrogeologic and topographic conditions related

to the prevalence of spring and seep areas indicates that on the order of 2.5 cubic feet per second (about 1,800 acre-feet per year) is discharged from the Trinity Group aquifer in this manner on a long-term average basis. Because this water being discharged naturally is above the water table in the main part of the aquifer most of the time, lowering water levels in the aquifer will cause very little, if any, of the water to move into the aquifer as recharge.

6. **Pumpage.** Pumpage from the aquifer by type of use is discussed in an earlier section of this report and is shown in Table 5. It is estimated that total pumpage in 1990 amounted to about 6,400 acre-feet. Of this amount, about 300 acre-feet was produced from the upper Trinity aquifer, about 5,300 acre-feet from the middle Trinity aquifer, and about 700 acre-feet from the lower Trinity aquifer. Upper Trinity aquifer pumpage was estimated to be 30 percent of the estimated domestic pumpage for the total Trinity Group aquifer. Total estimated pumpage from the middle Trinity aquifer included 80 percent of the reported industrial pumpage for the Trinity Group aquifer plus 70 percent of the estimated domestic pumpage. Pumpage from the lower Trinity aquifer was estimated by assuming it was 20 percent of the reported industrial pumpage for the total Trinity Group aquifer.

7. **Water Removed from Storage.** Water removed from storage in the Trinity Group aquifer is the difference between the

amount of water that enters the aquifer and the amount that leaves the aquifer. In 1990, the amount of water entering the aquifer within the study area in northern Bexar County is estimated to be on the order of 21,800 acre-feet, while the amount of water leaving the aquifer within the study area is estimated to be about 22,400 acre-feet (Table 7). Thus, the middle and lower Trinity aquifer units had about 500 and 100 acre-feet, respectively, more water removed than was received in 1990.

Pumpage from wells accounts for a little more than a quarter of the amount of water discharged from the aquifer. Because of the low transmissivity of the aquifer, pumpage from wells cannot intercept all of the annual recharge in transit to points of natural discharge. Thus, if pumpage continues at the present rate, or at an increased rate, the aquifer will continue to experience loss of water from storage and water levels will continue to decline.

B. Availability of Ground Water

The amount of ground water that is available from the Trinity Group aquifer in northern Bexar County on a sustained yield basis is estimated to be about 5,000 acre-feet per year. This estimate is based on the water balance discussed above and summarized in Table 7, a review of the water-level hydrographs shown on Figure 12, current water levels, and a review of pumping and well-spacing practices utilized by the area's ground-water users. This amount of pumpage represents about one-quarter of the average annual inflow the aquifer is estimated to receive in northern Bexar County.

It would seem that much more than about 5,000 acre-feet of ground water could be pumped by wells in the study area, especially when the estimated average annual inflow to the aquifer is 21,800 acre-feet. However, it will not be possible to intercept all this inflow since most of it leaves the aquifer in northern Bexar County by underflow to downdip areas. Based on the current rate of annual pumpage (approximately 6,300 acre-feet in 1990), water-level declines generally reflect a continuing widespread gradual withdrawal of water from storage from the middle and lower Trinity aquifer units. Local cones of depression are superimposed on these areal water-level declines and, in areas where pumpage is concentrated, pumping lifts are already relatively large. The continued gradual depletion or mining of water from aquifer storage will cause pumping levels to deepen, and pumping rates with existing pumps will decrease. Also, a potential exists for poor quality water in the upper Trinity aquifer to migrate downward into the middle Trinity aquifer and degrade water quality. A greater lowering of water levels as a result of increased pumping would increase the hydraulic gradient between the upper and middle aquifer units, which would make migration of this poor quality water a greater and more imminent threat.

In order to develop more than about 5,000 acre-feet of ground water, withdrawals from the aquifer will need to be spread out into some of the more remote areas of northern Bexar County that are at considerable distances from the current centers of pumpage in an attempt to intercept more of the underflow leaving the study area. However, it is doubtful that this somewhat radical approach of spreading out the pumpage could increase the sustainable yield from the aquifer by more than 1,000 to 2,000 acre-feet per year. Even so, ground-water users should use prudent ground-water exploration and drilling techniques, proper well construction and development techniques, and proper well spacing in the development and utilization of this resource to insure maximum well efficiencies and water-quality protection.

C. <u>Artificial Recharge</u>

Two types of recharge projects appear applicable to the Trinity Group aquifer in the study area. One is conventional recharge, and the other, which is more localized in application and for specific supplies, is aquifer storage and recovery (ASR). Conventional recharge projects utilize a variety of techniques to intercept surface runoff, which otherwise leaves the area, and induce it to enter the aquifer as additional recharge. The means for accomplishing this include use of recharge wells, dams and levees, excavations in permeable soils, and systems to convey floodwaters to recharge points. Geologically, a number of karst features such as caves and sinkholes exist in the lower member of the Glen Rose Limestone within the Cibolo Creek floodplain, and these may be adapted for this type of project to provide some additional recharge to the Trinity Group aquifer.

ASR systems generally treat surplus surface water to drinking water standards, and inject and store the treated water underground in an aquifer for later use. Water is usually injected during wet months and recovered from the subsurface in dry months by pumping when water supplies diminish and demands exceed the capacity of water-treatment facilities. In an ASR system, the water that is injected is intended to be recovered on site. Thus, these projects typically are local in their impact on an aquifer, and they are not intended to increase ground-water recharge over a wide region.

It appears that an ASR program may be feasible in the Fair Oaks area of northern Bexar County because of the following indicators: (a) seasonal variation in water demand from the middle Trinity aquifer, summer demands being about 1.6 times greater than average demands; (b) sizable storage space is available in the aquifer for the recharge water, possibly in the range from 2,000 to 6,000 acre-feet; and (c) storage of recharge water during the wet months to meet peak water demands during the "dry" months probably would not need to exceed 600 to 700 acre-feet of water in a single operational cycle during the reasonably foreseeable future.

A more detailed analysis of the ASR option in the Fair Oaks area needs to be conducted with respect to the availability of recharge water, hydrogeology, ground-water quality, operating and construction costs, water rights, permitting, monitoring options, and legislation and local ordinances which can be put in place to maintain the operator's right to the recharged water. If successful, this ASR project would allow more economical and efficient use of current and future water-treatment facilities. At the same time, it would physically enhance the public water supply for northern Bexar County and provide for more complete utilization of the area's available water resources.

VIII. CONCLUSIONS AND RECOMMENDATIONS

1. The population using Trinity aquifer water in the study area in northern Bexar County in 1990 was about 13,640. The population is projected to grow to about 20,000 by the year 2000 and from about 30,000 to 40,000 by the year 2020. Currently, this area is totally dependent on ground water.

2. The principal source of ground water in northern Bexar County is the Trinity Group aquifer, which is comprised of three aquifer units, the upper, middle, and lower Trinity. The most productive of these three units is the middle Trinity aquifer, and it is most heavily used. The best water-bearing strata within the middle Trinity aquifer are the lower member of the Glen Rose Limestone and the Cow Creek Limestone.

3. Pumping rates for private domestic wells usually are less than 20 gpm and pumping rates for the larger public supply and irrigation wells range from about 100 gpm to about 300 gpm. Specific capacities of the wells are generally low. Three-hour specific-capacity values

determined from tests made during this study range from 0.1 gpm/ft to about 14 gpm/ft.

4. Water levels were at high levels during the study because of record high rainfall. Water levels measured in the upper Trinity aquifer generally ranged from a few feet to a little more than a hundred feet below land surface. For the middle Trinity aquifer, depths to water ranged from about 20 feet to just over 200 feet, and for the lower Trinity aquifer, they were about 400 feet or more below land surface.

5. Seasonal variations in water levels occur because of the fluctuations in rainfall and pumpage. For the 10 years prior to the heavy rainfall in 1991 and 1992, water levels in the middle and lower Trinity aquifer units in northern Bexar County had declined by 50 to 90 feet. Water levels in the upper Trinity aquifer for the same period reflect no major declines. However, water-level records that are available for one well in the upper Trinity aquifer indicate that a decline of about 60 feet occurred during the 1950's drought.

6. Pumpage from the Trinity Group aquifer in 1990 was about 6,350 acre-feet. More than half of the pumpage was for

industrial use, slightly more than one-fourth for public supply, slightly less than one-fifth for private domestic use, and slightly more than one-twentieth for irrigation. About 5 percent of the pumpage was from the upper Trinity aquifer, about 85 percent from the middle Trinity aquifer, and about 10 percent from the lower Trinity aquifer.

7. Water from the Trinity Group aquifer in the study area of northern Bexar County ranges from fresh to slightly saline and has a hardness ranging from hard to very hard. The best quality water is obtained from the middle Trinity aquifer. Shallow wells completed in the upper Trinity aquifer and deeper wells that do not seal off the upper member of the Glen Rose Limestone often produce water that is high in dissolved solids and sulfate. Elevated dissolved solids due to sodium chloride often are found in water from the lower Trinity aquifer. High fluoride, iron, and manganese also occur in localized areas within the Trinity Group aquifer. While fluoride contents above 4 mg/l found in water from some wells in the study area can pose a health risk, constituents such as dissolved solids, iron, and manganese that exceed the Texas Department of Health's recommended maximum secondary constituents generally affect only the overall esthetics of the water.

8. Bacterial analyses of water samples from 21 water wells showed some coliform bacteria in 11 (52 percent) of the samples. While the presence of bacteria is not desirable, and in some cases can lead to illness, it is believed to be rather common for most areas nationwide. Included in the above analyses were four samples (19 percent) that showed high concentrations of coliform bacteria which could reflect severe contamination problems. This type of contamination is usually associated with poorly constructed wells and improper disposal or handling of animal and human wastes. The results from sampling and analyses conducted during the current study indicate that the Trinity Group aquifer in northern Bexar County has not been contaminated by pesticides, fuels, or solvents. However, because of their prominent use and nature, their potential as a cause for future problems remains high.

9. The estimated water balance for the Trinity Group aquifer in northern Bexar County shows 21,800 acre-feet of water coming into the study area and 22,400 acre-feet going out of it in 1990. About 500 and 100 acre-feet of water are being taken out of storage in the middle and lower Trinity aquifer units, respectively, to make up the

difference. Long-term inflow and outflow are about equal for the upper Trinity aquifer.

10. Based on an evaluation of the 1990 water balance for the Trinity Group aquifer in northern Bexar County, it is estimated that the long-term practical yield of the aquifer from existing facilities is about 5,000 acre-feet per year. Spreading pumpage out into the more remote areas of the study area will increase the sustainable yield of the aquifer somewhat, but probably by no more than 1,000 to 2,000 acre-feet per year.

11. Exceeding 5,000 acre-feet per year of withdrawals in northern Bexar County is expected to require taking water from storage in the aquifer, which will cause a continuing decline in water levels with increased pumping lifts, reduced pumping rates, and possible deterioration in water quality. Pumping from the aquifer in the area generally north of the study area will intercept some of the water now entering the aquifer in northern Bexar County and add to the declines of water levels caused by pumping within the study area.

12. Consideration should be given to establishing an aquifer storage and recovery (ASR) project in the Boerne-Fair Oaks area. A preliminary study should be conducted to

determine if treated surface water can be stored underground and recovered economically to supply peak summer demands and achieve maximum utilization of the water resources that are available for meeting the current and future needs of the area.

13. Managing and protecting the availability of ground water in northern Bexar County is vital for the welfare of the area. Therefore, present programs in the following areas should be continued and strengthened: (a) promotion of water conservation; (b) proper well construction practices; (c) water-quality and water-level monitoring networks; (d) spacing rules for septic systems in heavily populated rural areas; (e) proper closure and plugging of abandoned wells; and (f) public education programs to address aquifer management and protection strategies.

IX. SELECTED REFERENCES

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P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Chemical Analysis   Date Received: 6/5/92
PCS Sample # 23952   Date Reported: 6/10/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #28-2HF8
Date Sampled:6/5/92
Time Sampled:
Date Analyzed:6/8/92

Parameter	Concentration		
pH	7.3 S.U.	Nitrate N	1.12 mg/l
Sp.Cond.	410 umhos/cm	Sodium	10 mg/l
TDS	340 mg/l	Iron	0.4 mg/l
T.Hardness	280 mg/l	Manganese	<0.01 mg/l
Calcium	93 mg/l	Magnesium	12 mg/l
Chloride	22 mg/l		
Sulfate	16 mg/l		
T.Alkalinity	242 mg/l		
Fluoride	0.13 mg/l		
Bicarbonate	295 mg/l		

Approved By:
Chuck Wallgren

Chuck Wallgren
Owner

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 23952

Enter cation results in mg/l

mg/l Iron:	0.40	me/l Iron:	0.0143
mg/l Ca :	93.00	me/l Ca :	4.6407
mg/l Mg :	12.00	me/l Mg :	0.9864
mg/l Na :	10.00	me/l Na :	0.4350
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.01	me/l Mn :	0.0004
		Sum Cations(me/l):	6.0768

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	295.00	me/l HCO3:	4.8380
mg/l SO4 :	16.00	me/l SO4 :	0.3328
mg/l Cl- :	22.00	me/l Cl- :	0.6204
mg/l Fl- :	0.13	me/l Fl- :	0.0068
mg/l NO3 :	1.12	me/l NO3N:	0.0180
		Sum Anions (me/l):	5.8160

%ERROR = : 2.1929

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Chemical Analysis
PCS Sample # 23552

Date Received: 5/13/92
Date Reported: 5/18/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, TX. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #28-3FH5
Date Sampled:5/13/92
Time Sampled:
Date Analyzed:5/15/92

Parameter	Concentration		
pH	7.4 S.U.	Nitrate N	0.14 mg/l
Sp.Cond.	1400 umhos/cm	Sodium	22 mg/l
TDS	1344 mg/l	Iron	5.0 mg/l
T.Hardness	980 mg/l	Manganese	0.02 mg/l
Calcium	160 mg/l	Magnesium	142 mg/l
Chloride	18 mg/l		
Sulfate	663 mg/l		
T.Alkalinity	288 mg/l		
Fluoride	4.6 mg/l		
Bicarbonate	351 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

#28-3FHS

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 23552

Enter cation results in mg/l

mg/l Iron:	5.00	me/l Iron:	0.1790
mg/l Ca :	160.00	me/l Ca :	7.9840
mg/l Mg :	142.00	me/l Mg :	11.6724
mg/l Na :	22.00	me/l Na :	0.9570
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.02	me/l Mn :	0.0007
		Sum Cations(me/l):	20.7931

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	305.00	me/l HCO3:	5.0020
mg/l SO4 :	663.00	me/l SO4 :	13.7904
mg/l Cl- :	18.00	me/l Cl- :	0.5076
mg/l Fl- :	4.60	me/l Fl- :	0.2420
mg/l NO3 :	0.14	me/l NO3N:	0.0023
		Sum Anions (me/l):	19.5443

%ERROR = : 3.0959

TABLE 1. RECORDS OF INVENTORIED WELLS

Well Number	Well Owner	Other Well Identification	Driller	Year Completed	Land-Surface Altitude (feet MSL)	Latitude	Longitude	Producing Unit(s) 1/	Well Depth (feet)	Casing Data		Pump Depth (feet)	Static Water-Level Data	
										Diameter (inches)	Depth (feet)		Depth (feet)	Date Measured
AY-68-12-9gh7	Camp Bullis	CB-1	-	-	1,152	294503	983211	Kgrl	-	6	-	n/p	-	-
AY-68-18-6ig4	White Ranch	Upper-Upper	-	-	1,530	294008	984549	Kgru	220	-	-	213	136.28	5- 7-92
AY-68-18-9ce5	White Ranch	AY-68-18-901	J. R. Johnson	1952	1,440	293833	984526	Ks,ho	1,241	-	-	-	417.03	5- 7-92
AY-68-18-9ce7.1	White Ranch	Main House (new)	Bergman & Sons	1989	1,435	293928	984530	Kgrl	560	6-5/8	437	527	395.73	5- 7-92
AY-68-18-9ce7.2	White Ranch	Main House (old)	-	-	1,435	293928	984530	Kgru	66	5	20	63	14.79	5- 7-92
AY-68-18-9eh8	White Ranch	Big Barn	Braendle	1981	1,330	293823	984613	Kgrl, Kgru	550	-	-	483	47.72	5- 7-92
AY-68-18-9eh9	White Ranch	abandon Big Barn	-	-	1,325	293823	984607	Kgru	42	-	-	-	34.73	5- 7-92
AY-68-18-9ha6	White Ranch	Lorenzo House	-	-	1,320	293813	984624	Kgrl, Kgru	-	6	-	-	22.92	5- 7-92
AY-68-18-9ie1	White Ranch	High Hill	Braendle	1981	1,560	293800	984529	Kgrl, Kgru	620	-	-	588	291.63	5- 7-92
AY-68-19-21c3	TWC	AY-68-19-208	TDWR	1977	1,405	294318	984001	Ks,ho	893	6	545	n/p	451.55 451.01	3-10-92 4-24-92
AY-68-19-3ce9	Fair Oaks	No. 18, AY-68-19-312	Bergman & Sons	1973	1,248	294431	983751	Kcc, Kgrl	401	8-5/8	218	357	83.44	5- 1-92
AY-68-19-3fe1	Fair Oaks	No. 3	Bergman & Sons	1976	1,437	294348	983803	Ks,ho	1,070	8-5/8	772	962	546.94	6-10-92
AY-68-19-3fe4	Fair Oaks	No. 4, AY-68-19-308	Bergman & Sons	-	1,435	294347	983803	Kcc, Kgrl	615	8-5/8	403	567	262.84	4-29-92
AY-68-19-3ff5	Fair Oaks	No. 2, AY-68-19-303	Bergman & Sons	-	1,342	294348	983738	Kcc, Kgrl	553	8-5/8	282	504	184.77	4-29-92
AY-68-19-3fg9	Fair Oaks	No. 6, AY-68-19-307	Bergman & Sons	1978	1,445	294323	983808	Kcc, Kgrl	626	8-5/8	420	588	262.76 274.23	3-18-92 4-29-92
AY-68-19-3hd5	Fair Oaks	No. 16, AY-68-19-310	Bergman & Sons	1982	1,315	294254	983903	Kcc, Kgrl	505	8-5/8	300	462	129.85	3-18-92
AY-68-19-3he3	Fair Oaks	No. 15, AY-68-19-309	Bergman & Sons	1981	1,445	294303	983840	Kcc, Kgrl	630	8-5/8	428	546	293.36	4-30-92
AY-68-19-3hf6	Fair Oaks	No. 13, AY-68-19-311	Bergman & Sons	1978	1,424	294255	983820	Kcc, Kgrl	650	8-5/8	430	588	238.72	3-18-92
AY-68-19-3ib5	Fair Oaks	No. 5, AY-68-19-306	Bergman & Sons	1978	1,323	294308	983755	Kcc, Kgrl	526	8-5/8	323	483	157.31	4-30-92
AY-68-19-3if6	Fair Oaks	No. 22	Bergman & Sons	-	1,304	294254	983734	Kcc, Kgrl	505	8-5/8	306	-	108.92 138.36	3-18-92 4-29-92
AY-68-19-4gh1	White Ranch	Burnt House	-	-	1,522	294016	984442	Kgru	60	-	-	-	21.82	5- 7-92
AY-68-19-5fe8	-	-	Johnson Drilling	1952	1,220	294110	984027	Ks,ho	950	8-5/8	780	530	311.50	5-14-92
AY-68-19-5f13.1	Concept Therapy	No. 1	-	-	1,280	294103	984003	Kgrl	-	7	-	464	141.59	4- 2-92
AY-68-19-5f13.2	Concept Therapy	No. 2	Haskin Pump Serv.	1983	1,280	294103	984004	Kgrl, Kcc	550	7	260	441	143.55	4- 2-92
AY-68-19-6ci4	Camp Stanley	No. 11, AY-68-19-604	-	-	1,325	294151	983746	Kgrl, Kcc	550	10	-	530	153.31	4-23-92
AY-68-19-6ci5	Camp Stanley	No. 10, AY-68-19-603	-	-	1,328	294148	983740	Kgrl, Kcc	590	10	390	528	140.94 158.76	2-27-92 4-23-92
AY-68-19-6eb6	Fair Oaks	No. 17, AY-68-19-617	Bergman & Sons	1983	1,215	294130	983838	Kgrl, Kcc	441	8-5/8	240	378	28.18 50.26	3-18-92 4-29-92
AY-68-19-6fc1	Camp Stanley	No. 9, AY-68-19-602	-	-	1,320	294141	983745	Kgrl, Kcc	601	8	-	483	149.69	4-24-92
AY-68-19-6gf6	EUWD	AY-68-19-618	M. B. Doyle	1990	1,170	294023	983913	Kgrl	302	8-5/8	177	n/p	21.44 35.70	3-10-92 4-24-92
AY-68-19-6ib7	Leon Spr. Mobile	AY-68-19-607	Haskin Pump Serv.	1970	1,160	294035	983759	Kgrl, Kcc	404	7	312	-	-	-
AY-68-19-6ib8	Leon Spr. Mobile	AY-68-19-606	Haskin Pump Serv.	1967	1,170	294037	983755	Kgrl, Kcc	415	7	348	-	-	-
AY-68-19-6ic9	Leon Spr. Mobile	AY-68-20-402	Haskin Pump Serv.	-	1,190	294038	983731	Kgrl	425	-	-	-	-	-
AY-68-19-6ie9	Leon Spr. Mobile	AY-68-19-608	Haskin Pump Serv.	1971	1,145	294017	983748	Kgrl, Kcc	505	7	205	-	-	-
AY-68-19-7da7	White Ranch	East Pasture	Braendle	1981	1,550	293859	984458	Kgru, Kgrl	250	-	-	210	161.62	5- 7-92
AY-68-19-8he6	EUWD ,	AY-68-19-806	M.B. Doyle	1990	1,230	293755	984109	Kgrl	710	8-5/8	403	n/p	197.99 196.50	4- 1-92 4-24-92
AY-68-19-9fi6.1	SA Parks (Friedrich)	AY-68-19-901	Hill Country Water	1976	1,150	293827	983732	Kgrl	500	8-5/8	304	-	143.88 141.53	3-20-92 4-24-92
AY-68-19-9fi6.2	SA Parks (Friedrich)	-	-	-	1,155	293829	983731	Kgrl, kgru	325	6	-	-	96.18 68.05	3-20-92 4-24-92
AY-68-20-1ad8	Fair Oaks	No. 12	-	-	1,254	294431	983724	Kgrl, Kcc	438	8-5/8	224	378	49.84	3-18-92
AY-68-20-1ag2	Fair Oaks	No. 14	Layne Texas	1980	1,272	294423	983724	Ks,ho	877	8-5/8	690	357	69.58 130.84	3-18-92 4-29-92

Well Number	Well Owner	Other Well Identification	Driller	Year Completed	Land-Surface Altitude (feet MSL)	Latitude	Longitude	Producing Unit(s) 1/	Well Depth (feet)	Casing Data: Diameter (inches)	Casing Data: Depth (feet)	Pump Depth (feet)	Static Water-Level Data: Depth (feet)	Static Water-Level Data: Date Measured
AY-68-20-1bi8	Camp Bullis	CB-8	-	-	1,267	294413	983600	Kgrl	325	7	-	300	96.02	4-15-92
AY-68-20-1da1	Fair Oaks	No. 9	-	-	1,316	294417	983724	Kgrl, Kcc	477	8-5/8	290	420	123.33 201.52	3-18-92 5- 1-92
AY-68-20-1dd1	Fair Oaks	No. 20	-	-	1,330	294353	983724	Kcc	435	8-5/8	553	n/p	147.77 178.77	3-18-92 4-29-92
AY-68-20-1eb4	Camp Bullis	CB-7	-	-	1,330	294401	983621	Kgru, Kgrl	-	6	20	n/p	41.04	4-15-92
AY-68-20-1gi4	Camp Stanley	No. 16, AY-68-19-101	-	1917	1,240	294240	983652	Kgrl	425	10	-	417	68.05	4-23-92
AY-68-20-2ai5	Camp Bullis	CB-10	Thompson Drilling	1966	1,250	294421	983419	Kgrl	331	6	40	-	79.22	4-16-92
AY-68-20-2ef9	Camp Bullis	CB-16	-	-	1,270	294341	983324	Kgrl, Kgru	-	7	-	294	124.70	4-21-92
AY-68-20-2hg4	Camp Bullis	CB-25	-	-	1,370	294239	983406	Kgrl, Kgru	-	6	-	462	228.60	4-21-92
AY-68-20-3ab7	Camp Bullis	CB-4	-	-	1,155	294445	983206	Kgrl	240	5	-	189	32.26	4-16-92
AY-68-20-3dg9	Camp Bullis	CB-17	Haskin Pump Serv.	1973	1,265	294325	983218	Kgrl	400	7	45	-	-	-
AY-68-20-3ee7	Camp Bullis	CB-19	Haskin Pump Serv.	1973	1,180	294337	983118	Kgrl, Kgru	403	7	43	-	73.82	4-21-92
AY-68-20-3hf7	Camp Bullis	CB-26	-	-	1,178	294247	983104	Kgrl, Kgru	-	-	-	252	100.21	4-21-92
AY-68-20-3ig4	County Park (Bullis)	-	Hill Country Water	1985	1,212	294239	983048	Kgrl, Kcc	525	7	150	504	142.42	5- 1-92
AY-68-20-4ed9.1	Camp Stanley	No. 1, AY-68-20-401	-	1918	1,165	294107	983626	Kgrl	451	12	310	420	7.62 25.85	2-27-92 4-23-92
AY-68-20-4ed9.2	Camp Bullis	CB-32	-	1918	1,168	294107	983624	Kgr	2,500?	14	-	n/p	-	-
AY-68-20-4fc6	Camp Bullis	CB-27	Haskin Pump Serv.	1973	1,315	294135	983504	Kgrl, Kgru	377	7	40	-	180.15	4-16-92
AY-68-20-5bi8	Camp Bullis	CB-28	Thompson Drilling	1966	1,338	294142	983327	Kgrl, Kgru	300	6	40	-	243.67	4-20-92
AY-68-20-5di7	Camp Bullis	-	-	-	1,201	294050	983425	Kgru	98	7	-	-	38.27	4-20-92
AY-68-20-5gg5	Camp Bullis	CB-44	-	1973	1,180	294011	983454	Kgrl, Kgru	250	6	-	n/p	93.36	4-23-92
AY-68-20-6ed2	Camp Bullis	CB-29	-	-	1,228	294120	983134	Kgru, Kgrl	177	5	-	-	25.97	4-21-92
AY-68-20-6eh8	EUWD	AY-68-20-602	Davenport	1989	1,215	294054	983117	Kgrl, Kgru	640	8	247	n/p	164.86	4- 8-92
AY-68-20-7aa5	Dominion Golf	-	Haskin Pump Serv.	1989	1,120	293954	983723	Kgrl, Kcc	550	10-3/4	312	-	164.84 87.05	4- 8-92 5- 8-92
AY-68-20-7aa8	Dominion Golf	-	Haskin Pump Serv.	-	1,120	293950	983723	Kgrl, Kgru	-	8-5/8	-	-	58.72 89.40	3-27-92 5- 8-92
AY-68-20-7ad2	Dominion Golf	No. 4?	Haskin Pump Serv.	1983	1,125	293938	983720	Kgru	215	7	217	210	59.85 34.69	3-27-92 5- 8-92
AY-68-20-7ad5	Dominion Golf	No. 1?	Haskin Pump Serv.	1983	1,125	293937	983720	Kcc, Ks,ho	1,185	8-5/8	605	567	36.12 97.02	3-27-92 5- 8-92
AY-68-20-7ad6	Dominion Golf	No. 5?	Haskin Pump Serv.	1983	1,127	293933	983718	Kgru	645	7	560	504	64.53 32.98	3-27-92 5- 8-92
AY-68-20-7ag5	Dominion Golf	No. 3?	Haskin Pump Serv.	1983	1,115	293917	983720	Kcc	688	8-5/8	605	-	34.08 60.36	3-27-92 5- 8-92
AY-68-20-7ca4	Camp Bullis	CB-43	-	1971	1,188	293954	983545	Kgru	204	6	78	-	97.34	4-20-92
AY-68-20-7de5	Dominion Golf	No. 2?	Haskin Pump Serv.	1983	1,105	293846	983702	Kgru	606	8-5/8	562	-	13.06	5- 8-92
AY-68-20-7hd4	County Park (R. Russell)	AY-68-20-702	-	-	1,080	293756	983636	Kgru	262	6-1/2	-	-	33.13	3-24-92
AY-68-20-7hd4.2	County Park (R. Russell)	AY-68-20-703	-	-	1,080	293756	983636	Kgru, Kgrl	plugged	6-1/2	-	-	-	-
AY-68-20-7hd6	County Park (R. Russell)	AY-68-20-704	Haskin Pump Serv.	1976	1,080	293757	983626	Kgru	200	8-5/8	90	-	24.09 27.36	3-24-92 4-24-92
AY-68-20-8da4	Camp Bullis	No. 15, AY-68-20-802	Haskin Pump Serv.	1976	1,072	293903	983458	Kgrl	300	8-5/8	220	300	18.93	3-26-92
AY-68-20-8da4.2	Camp Bullis	No. 8, AY-68-20-803	Johnson Drilling		1,074	293903	983458	Kgrl	plugged	8	86	n/p	-	-
AY-68-20-8df1	Camp Bullis	No. 3, AY-68-20-801	-	1929	1,105	293853	983425	Kgrl	260	8	210	-	60.93	3-26-92
AY-68-20-8gf1	Camp Bullis	CB-56	Johnson Drilling	1933	1,092	293759	983425	Kgrl, Kgru	572	10	6	n/p	122.08	4-23-92
AY-68-20-9ba8	Camp Bullis	CB-48	-	-	1,165	293947	983132	Kgrl, Kgru	365	7	8	-	222.99	4-22-92
AY-68-20-9ha4	Camp Bullis	CB-65	Burkett Drilling	1956	1,062	293813	983136	Kgrl, Kcc, Kgru	805	6	-	-	-	-
AY-68-20-9ha5	Camp Bullis	CB-66	-	-	1,060	293814	983131	Kgrl	-	7	-	-	148.14	4-22-92
AY-68-21-2hd4	Kiddie Koop Day Care	-	Hill Country Water	1981	1,090	294256	982638	Kgrl, Kcc	550	6-5/8	103	-	78.28 78.75	3-25-92 4-24-92
AY-68-21-2hi9	Robert Wray	-	Bergman & Sons	1990	1,325	294231	982553	Kgrl, Kgru	565	6-5/8	281	457	336.14	4-14-92
AY-68-21-5ah8	Iron Skillet	-	Ayers Drilling	1988	1,172	294143	982703	Kgrl	380	5	380	336	179.98 179.05	3-25-92 4-24-92

Well Number	Well Owner	Other Well Identification	Driller	Year Completed	Land-Surface Altitude (feet MSL)	Latitude	Longitude	Producing Unit(s) 1/	Well Depth (feet)	Casing Data Diameter (inches)	Casing Data Depth (feet)	Pump Depth (feet)	Static Water-Level Data Depth (feet)	Static Water-Level Data Date Measured
AY-68-21-5de8	Mouse's Smokehouse	-	Hill Country Water	1989	1,190	294108	982707	Kgrl, Kgru	625	6-5/8	200	504	320.75	4-24-92
AY-68-21-5gb2	Shelton's Health School	AY-68-21-501	Glass & Tucker	1972	1,230	294048	982708	Kgru, Kgrl	plugged	6-5/8	232	n/p	-	-
AY-68-21-7ia6	Stone Oak	-	-	-	1,085	293813	982803	Ked, Kgru	-	5-3/4	-	n/p	191.80	4- 8-92
AY-68-21-8da6	Stone Oak	-	-	-	1,205	293905	982717	Ked, Kgru	-	7	-	n/p	283.75	4- 8-92
AY-68-21-8f13	Canyon Lake Forest	AY-68-21-801	Adcock	1964	1,028	293833	982505	Ked, Kgru	plugged	8	404	n/p	-	-
AY-68-21-8gg1	EUWD	AY-68-21-802	Schwope	1976	990	293747	982727	Ked, Kgru	300	6	202	n/p	180.53 195.45	4- 1-92 4-24-92
AY-68-21-9f14	City of San Antonio	AY-68-21-901	-	1978	1,015	293826	982242	Kgru, Ked	560	4	405	n/p	213.44 210.49	3-17-92 4-24-92
AY-68-26-3ca3	White Ranch	Across from Haby	-	1957	1,460	293720	984547	Kgru	-	-	-	n/p	120.99	5- 7-92
AY-68-26-3ca6	White Ranch	Haby	Braendle	1978	1,450	293720	984535	Kgrl, Kgru	632	7	-	483	180.84	5- 7-92
AY-68-27-1ac4	Oak Valley Golf	-	B. Poster	1987	1,263	293720	984423	Kgru	210	-	100	190	28.83	6-16-92
AY-68-27-1ad4	White Ranch	Front Gate	-	-	1,338	293703	984458	Kgru	200	-	-	-	164.23	5- 7-92
AY-68-27-1ic5	EUWD	AY-68-27-101	Schwope & Sons	1976	1,110	293542	984240	Ked, Kgru	100	6-5/8	100	-	16.49 35.09	3-11-92 4-24-92
AY-68-27-2bf1.1	Grey Moss Inn	-	Braendle	-	1,140	293711	984104	Kgru	320	-	-	-	100.06 99.95	3-11-92 4-24-92
AY-68-27-2bf1.2	Grey Moss Inn	-	Braendle	1989	1,140	293711	984103	Kgrl, Kcc, Kgru	725	6-5/8	250	-	105.53	3-11-92
AY-68-27-2bf1.3	Grey Moss Inn	-	Braendle	-	1,140	293712	984103	Kgrl	-	-	-	-	102.06	3-11-92
AY-68-27-3bd8	SA Parks (Cedar Creek)	-	-	1988	1,252	293702	983902	Kgrl	780	10	490	682.50	219.23	4- 2-92
AY-68-27-3bf3	Walter Gerlach	AY-68-27-304	Doyal Drilling	1969	1,133	293712	983821	Kgru	290	7	47	256	93.36	4-14-92
AY-68-27-3ii2	EUWD	AY-68-27-303	Schwope & Sons	1976	1,000	293515	983736	Ked, Kgru	354	6-5/8	230	-	92.55 109.22	3-19-92 4-24-92
AY-68-27-3ii3	EUWD	AY-68-27-305	Schwope & Sons	1976	1,000	293516	983734	Ked	253	6-5/8	203	-	100.36 107.84	3-19-92 4-24-92
AY-68-27-5be4	Helotes BBQ	-	-	-	1,040	293437	984121	Kgru	300	-	-	-	78.51 102.76	3-11-92 4-24-92
AY-68-27-5be7	Helotes Post Office	AY-68-27-516	Rosenkranz	1965	1,040	293430	984122	Kgru	180	6-1/4	28		-	-
AY-68-28-2ab6	SA Parks (Eisenhower)	-	Courtney Drilling	1989	1,175	293724	983427	Kgrl, Kcc	856	6	492	-	210.66 195.81	3-20-92 6- 8-92
AY-68-28-2ab6.2	SA Parks (Eisenhower)	-	Haskin Pump Serv.	1986	1,175	293724	983427	Kgru, Kgrl	plugged	6	250	n/p	-	-
AY-68-28-2ai6	McDonna Properties	AY-68-28-207	Schwope & Sons	1975	1,062	293650	983414	Kgru, Ked	265	6-5/8	200	252	154.18	4-10-92
AY-68-28-2hf8	Shavano Park	No. 5, AY-68-28-203	H. Bowman	1966	980	293518	983326	Ked, Kgru	-	10	270	-	-	-
AY-68-28-2hi5	Shavano Park	No. 6, AY-68-28-205	Haskin Pump Serv.	1971	960	293504	983326	Ked, Kgru	485	10	273	557	-	-
AY-68-28-2id2	Shavano Park	No.1, AY-68-28-204	Johnson Drilling	1946	1,025	293530	983312	Ked, Kgru	656	8	100	n/p	266.52 213.44	2-28-92 6- 5-92
AY-68-28-2ih2	Shavano Park	No. 2, AY-68-28-202	Johnson Drilling	1950	975	293515	983255	Ked	457	8	100	575	-	-
AY-68-28-3ci9.1	Sonterra Country Club	N-1	Haskin Pump Serv.	-	964	293644	983003	Kgr	-	-	-	-	373.28	4- 7-92
AY-68-28-3ci9.2	Sonterra Country Club	N-2	Haskin Pump Serv.	-	958	293642	983005	Kgr	-	-	-	-	-	-
AY-68-28-3ff9	Sonterra Country Club	S-4, 3, AY-68-28-309	Haskin Pump Serv.	1985	952	293611	983003	Kgrl, Kgru	1,260	10-3/4	394	-	294.27	4- 7-92
AY-68-28-3fh5	Sonterra Country Club	S-5, AY-68-28-310	Haskin Pump Serv.	1990	894	293555	983023	Kgrl, Kcc, Kgru	1,235	10-3/4	337	-	234.49	4- 7-92
AY-68-28-3fi5	Sonterra Country Club	S-1, AY-68-28-305	Pence Drilling	1972	944	293555	983005	Ked	335	7	262	330	140.88	4- 3-92
AY-68-28-3fi8	Sonterra Country Club	S-2, AY-68-28-304	Hammet Water Systems	1971	928	293550	983008	Ked	380	8-5/8	103	-	140.37	4- 3-92

Well Number	Well Owner	Other Well Identification	Driller	Year Completed	Land-Surface Altitude (feet MSL)	Latitude	Longitude	Producing Unit(s) 1/	Well Depth (feet)	Casing Data: Diameter (inches)	Casing Data: Depth (feet)	Pump Depth (feet)	Static Water-Level Data: Depth (feet)	Static Water-Level Data: Date Measured
AY-68-28-5cc2	Shavano Park	No. 3, AY-68-28-501	M. Gerfers	1955	948	293458	983236	Ked	469	8	100	-	-	-
AY-68-28-5cf1	Shavano Park	No. 4, AY-68-28-502	-	1955	927	293440	983242	Ked	-	10	270	527	194.14 137.28	2-28-92 6- 5-92
AY-68-28-5fc1	Shavano Park	No. 8, AY-68-28-514	Haskin Pump Serv.	1982	884	293410	983244	Ked	510	16	273	-	143.57	6- 5-92
AY-68-28-5fc2	Shavano Park	No. 7, AY-68-28-513	Haskin Pump Serv.	1982	875	293404	983239	Ked	510	16	270	350	-	-
AY-68-29-1ab7	Sonterra Country Club	No. 4	-	-	990	293715	982938	Kgr	-	-	-	-	249.96	4- 8-92
AY-68-29-1dg1	Sonterra Country Club	S-3, AY-68-29-101	Kutcher	1959	915	293604	982959	Ked	400	10	-	-	133.64	4- 7-92
AY-68-29-1gf9	EUWD	AY-68-29-103	Johnson Drilling	1957	953	293522	982912	Ked, Kgru	547	10	100	n/p	230.60	4- 1-92

FOOTNOTES:

1/ Index to water-bearing units: K = Cretaceous
ed = Edwards limestone
gr(u/l) = Glen Rose Limestone (upper/lower)
cc = Cow Creek Limestone
s,ho = Sligo Limestone and Hosston Sand

TABLE 2. STRATIGRAPHIC UNITS AND THEIR WATER-BEARING PROPERTIES

System	Series	Stage/Group	Stratigraphic Unit	Hydrologic Unit	Approximate Thickness in Northern Bexar County (feet)	Character of Rocks	Water-Bearing Properties
Cretaceous	Comanche	Washita	Georgetown Limestone	Edwards Aquifer	20	Marly limestone.	Yields moderate to large quantities of fresh water in areas where the full section is present.
		Washita; Edwards	Person Formation		170	Hard, massive, cherty limestone; marly clay and shale at bottom.	
		Fredericksburg; Edwards	Kainer Formation		280		
		Trinity	Glen Rose Formation: upper member	Upper Trinity Aquifer Unit (Trinity Group Aquifer)	500	Alternating resistant and non-resistant beds of shale, nodular marl, and impure, fossiliferous limestone. Also contains two distinct evaporite beds.	Yields very small to small quantities of relatively highly mineralized water.
			Glen Rose Formation: lower member	Middle Trinity Aquifer Unit (Trinity Group Aquifer)	300	Massive, fossiliferous limestone grading upward into thin beds of limestone, dolomite, marl, and shale. Numerous caves and reefs occur in this member.	Yields small to large quantities of fresh to slightly saline water.
			Travis Peak Formation: Hensell Sand Member		80	Red to gray clay, silt, sand, conglomerate, and thin limestone beds grading downdip into finer grained material.	
			Travis Peak Formation: Bexar Shale Member			Marl, calcareous shale, and shaley limestone, to silty dolomite.	
			Travis Peak Formation: Cow Creek Limestone Member		90	Massive, fossiliferous, white to gray, argillaceous to dolomitic limestone with local thinly bedded layers of sand, shale, and lignite. Moldic porosity near top.	
			Travis Peak Formation: Hammett Shale Member		50	Dark blue to gray, fossiliferous, calcareous and dolomitic shale with thinly interbedded layers of limestone and sand.	Not known to yield water.
			Travis Peak Formation: Sligo Limestone Member	Lower Trinity Aquifer Unit (Trinity Group Aquifer)	150	Sandy dolomitic limestone.	Yields small to moderate quantities of slightly saline to saline water.
			Travis Peak Formation: Hosston Sand Member		220	Red and white conglomerate, sandstone, claystone, shale, dolomite, and limestone.	
Pre-Cretaceous rocks						Black, red, and green, folded shale, hard massive dolomite, limestone, sandstone, and slate.	Not known to yield water to wells in northern Bexar County.

(Modified from Ashworth, 1983)

TABLE 3. GEOPHYSICAL LOG DATA AND STRATIGRAPHIC INTERPRETATIONS FOR SELECTED WELLS

Well Number	Well Owner	Land-Surface Altitude (feet MSL)	Log Type 1/	Top of Log (feet)	Bottom of Log (feet)	Depth to Top of Stratigraphic Unit 2/ (feet below land surface datum)							
						Kgru	Kgrl	Kbs	Kcc	Khs	Ks	Kho	Paleozoics
RB-68-11-7	City of Boerne	1,420	C,R,G	6	476	-	-	323	393	-	-	-	-
RB-68-11-8	City of Boerne	1,381	C,R,G	6	422	-	-	274	344	-	-	-	-
RB-68-11-8	City of Boerne	1,385	C,R,G	6	390	-	-	237	310	-	-	-	-
AY-68-19-21c3	TWDB	1,405	SP,R,C,G,N	0	894	-	53	318	397	484	526	668	882
AY-68-19-3ff5	Fair Oaks	1,342	G,N	0	552	-	96	356	442	-	-	-	-
AY-68-19-6	Hank Doughtry	1,170	C,G	4	471	-	20	301	384	454	-	-	-
AY-68-19-6c14	Camp Stanley	1,330	SP,R	325	550	-	-	445	537	-	505	-	-
AY-68-19-6fc1	Camp Stanley	1,320	SP,R	310	550	-	-	445	526	-	502	-	-
AY-68-19-8he6	EUWD	1,230	C,R,G	4	693	-	382	-	-	-	-	-	-
AY-68-19-9	Leon Springs Elem.	1,130	C,G	5	672	-	212	498	-	-	-	-	-
AY-68-19-9	Mr. Harle	1,240	C,R,G	6	680	-	274	554	636	-	-	-	-
AY-68-19-9f16.1	SA Parks/Froidrich	1,160	G	3	486	-	323	-	-	-	-	-	-
AY-68-20-5gg5	Camp Bullis	1,180	C,SP,R,G	5	204	-	175	-	-	-	-	-	-
AY-68-20-6eh8	EUWD	1,215	C,G	96	592	-	204	496	582	-	-	-	-
AY-68-20-7	Dominion Bridgewood	1,120	G	0	679	-	180	468	546	-	-	-	-
AY-68-20-7	Dominion Bridgewood	1,125	C,R,G	3	606	-	223	510	594	-	-	-	-
AY-68-20-7	Knaupp	1,120	G	6	697	-	272	564	650	-	-	-	-
AY-68-20-8gf1	Camp Bullis	1,092	C,SP,R,G	0	550	-	371	-	-	-	-	-	-
AY-68-21-1	Oaks North	1,190	G	6	>1,100	-	278	578	658	754	-	-	-
AY-68-21-7	Stone Oak	1,103	C,G	4	310	202	-	-	-	-	-	-	-
AY-68-21-8da6	Stone Oak	1,205	G	4	609	192	-	-	-	-	-	-	-
AY-68-26-6	Gallagher Ranch	1,220	G	3	424	79	-	-	-	-	-	-	-
AY-68-27-1	T.J. Natarajan	1,410	C,SP,R,G	6	850	131	606	-	-	-	-	-	-
AY-68-27-1	S. Talley	1,400	C,G	5	838	-	508	809	-	-	-	-	-
AY-68-27-2	S. Chaney	1,163	C,G	4	292	-	370	-	-	-	-	-	-
AY-68-27-3	Mr. Renthal	1,240	C,SP,R,G	0	748	67	537	-	-	-	-	-	-
AY-68-27-3bd8	SA (Golf Course)	1,252	C,R,G	7	764	22	496	-	-	-	-	-	-
AY-68-28-1	Redland Worth	1,045	C,G	3	698	664	-	-	-	-	-	-	-
AY-68-28-105	Redland Worth	1,050	G,N	6	1,260	105	560	868	951	1,038	1,080	1,188	-
AY-68-28-111	Redland Worth	1,060	SP,R,G	28	1,582	103	547	845	922	1,013	1,060	1,170	-
AY-68-28-2ab6	SA Parks/Eisenhower	1,175	C,R,G	4	856	-	474	784	-	-	-	-	-
AY-68-28-3c19.2	Sonterra	958	C,G	4	1,148	329	806	1,114	-	-	-	-	-
AY-68-28-3fh5	Sonterra	894	C,G	0	1,226	346	853	1,156	-	-	-	-	-
AY-68-28-5	Redland Worth	995	C,SP,R,G	1	702	656	-	-	-	-	-	-	-
AY-68-29-1gf9	EUWD	953	C,R,G	4	527	456	-	-	-	-	-	-	-
AY-68-29-3	City of San Antonio	925	C,G	0	570	558	-	-	-	-	-	-	-

FOOTNOTES:

1/ Index to log types: C = caliper; G = gamma; N = neutron; R = resistivity; SP = spontaneous-potential

2/ Index to stratigraphic units: K = Cretaceous Period; gr(u/l) = Glen Rose Limestone (upper/loer); bs = Bexar Shale; cc = Cow Creek Limestone; hs = Hammett Shale; s = Sligo Limestone; ho = Hosston Sand

TABLE 4. RESULTS OF PUMPING TESTS

Well Number	Producing Unit(s) 1/	Test Date	Average Pumping Rate (gpm)	Total Drawdown (feet)	Pumping Time (min)	3-Hour Specific Capacity (gpm/ft)	Pumping Transmissivity (gpd/ft)	Recovery Transmissivity (gpd/ft)	Remarks
AY-68-19-3fe1	Ks,ho	6-10-92	76	144.94	345	0.60	383	365	-
AY-68-19-6ci5	Kgrl, Kcc	6- 2-92	103	68.22	300	1.66	1,149	1,429	-
AY-68-20-1da1	Kgrl, Kcc	5-27-92	103	36.54	310	3.48	1,207	1,721	Possible boundary.
AY-68-20-3ig4	Kgrl, Kcc	5-18-92	15	8.28	270	1.82	4,500	4,714	-
AY-68-20-4ed9.1	Kgrl	6- 3-92	100	7.51	250	13.48	35,200	-	Insufficient recovery data.
AY-68-20-8da4	Kgrl	6- 4-92	350	33.21	335	2/	-	8,936	Pumping test interrupted.
AY-68-21-2hi9	Kgrl, Kgru	6-17-92	10.70	123.56	260	0.10	37	32	-
AY-68-27-1ac4	Kgru	6-16-92	30.50	2.90	340	12.45	19,171	24,400	Possible boundary.
AY-68-28-2ab6	Kgrl, Kcc	6- 8-92	28.20	5.00	300	5.88	10,340	-	Questionable recovery data.
AY-68-28-2hf8	Ked, Kgru	6- 5-92	330	5.73	320	59.25	96,800	58,865	-

FOOTNOTES:

1/ Index to producing units: K = Cretaceous Period
ed = Edwards limestone
gr(u/l) = Glen Rose Limestone (upper/lower)
cc = Cow Creek Limestone
s,ho = Sligo Limestone and Hosston Sand

2/ 20-minute specific capacity was 13.63 gpm/ft prior to interruption.

TABLE 5. ESTIMATED PUMPAGE FOR THE TRINITY GROUP AQUIFER IN NORTHERN BEXAR COUNTY
(Pumpage expressed in acre-feet)

Year	Public	Irrigation	Industrial	Domestic	Total
1960	110	50	550	590	1,300
1965	150	150	1,290	680	2,270
1970	200	120	2,170	770	3,260
1975	410	240	2,820	920	4,390
1980	720	180	2,630	1,080	4,610
1981	700	170	2,630	1,070	4,570
1982	890	190	2,560	1,060	4,700
1983	920	130	1,840	1,050	3,940
1984	1,110	170	2,550	1,040	4,870
1985	1,120	250	3,330	1,030	5,730
1986	1,540	250	3,210	1,020	6,020
1987	1,600	250	3,320	1,010	6,180
1988	1,860	300	3,290	1,000	6,450
1989	1,960	400	3,280	1,000	6,590
1990	1,700	400	3,260	990	6,350

TABLE 6. RESULTS FROM CHEMICAL AND BACTERIOLOGICAL ANALYSES

(Results in milligrams per liter except temperature, specific conductance, pH, and bacteriological data.
Chemical analyses by Pollution Control Services; temperature and specific conductance by William F. Guyton Associates.
Bacteriological analyses by Pollution Control Services, except those noted with an asterisk (*),
which were analyzed by San Antonio Metropolitan Health District.)

Well Number	Producing Unit(s) 1/	Date of Collection	Pumping Rate (gpm)	Time Pumped (minutes)	Types of Analyses Performed 2/	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Iron (Fe)	Manganese (Mn)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate as N	Total Dissolved Solids	Specific Conductance (µmhos)	Total Hardness as $CaCO_3$	Laboratory pH	Water Temperature (°F)	Bacteriological (colonies/100 ml) Fecal Coliform	Total Coliform	Fecal Streptococcus
AY-68-18-9ie1	Kgr	6-15-92	5	>1,440	I,B	87	15	9	0.55	0.03	286	49	14	0.23	0.84	344	577	274	7.2	69	0	0	2
AY-68-19-3fe1	Ks,ho	6-10-92	80	355	I,B	337	193	200	0.77	0.04	250	1,561	136	2.90	0.17	2,900	3,220	1,630	7.1	76	0	0	0
AY-68-19-5fe8	Ks,ho	5-14-92	150	3 recovers	I,B	37	33	240	0.26	<0.01	325	208	168	1.33	0.04	976	1,530	180	7.7	77	0	0	2
AY-68-19-6ci5	Kgrl,Kcc	6- 2-92	103	270	I,B	75	35	6	<0.01	<0.01	348	30	25	0.88	0.47	412	637	330	7.4	73	0	0	0
AY-68-19-6eb6	Kgrl,Kcc	5-12-92	198	220	I,B,P,V	95	15	8	<0.01	<0.01	342	7	15	0.46	1.50	360	520	298	7.4	72	<2 *	<4 *	<2 *
	Kgrl,Kcc	6-10-92	190	110	I,V	90	13	6	<0.01	<0.01	331	7	12	0.36	1.75	264	563	276	7.2	72	-	-	-
AY-68-20-1da1	Kgrl,Kcc	5-27-92	103	200	I,B	74	21	7	0.01	<0.01	321	6	11	0.32	0.92	312	538	270	7.3	72	0	<2	<2
AY-68-20-3ig4	Kgrl,Kcc	5-18-92	15	200	I,B	92	17	7	0.01	<0.01	344	12	14	0.28	1.10	324	573	300	7.2	71	0	0	0
AY-68-20-4ed9.1	Kgrl	6- 3-92	100	230	I,B	89	11	8	0.09	<0.01	309	21	11	0.22	0.58	300	526	266	7.5	70	89	140	40
AY-68-20-7aa8	Kgr	5-14-92	196	>1,440	I,B,P	56	35	11	0.06	0.01	299	44	12	0.70	<0.01	316	560	280	7.4	75	0	0	25
AY-68-20-7hd6	Kgru	5-13-92	30	150	I,B,P	101	24	16	6.4	0.34	370	92	29	0.42	0.46	492	615	352	7.5	72	<4 *	330 *	1,100 *
AY-68-20-8da4	Kgrl	6- 4-92	350	350	I,B	91	11	6	0.01	<0.01	313	10	9	0.43	0.48	272	525	272	7.4	70	0	0	0
AY-68-21-2hd4	Kgrl,Kcc	6-12-92	10	45	I,B	75	38	16	0.01	0.01	337	66	25	1.62	0.35	312	721	344	7.3	72	0	40	40
AY-68-21-2hi9	Kgr	6-17-92	11	250	I,B	505	160	10	0.06	0.02	295	1,650	19	3.60	0.17	2,436	2,590	1,760	7.2	73	0	0	0
AY-68-21-5de8	Kgr	5-14-92	15	45	I,B,V	112	110	54	0.23	0.01	371	274	77	3.85	<0.01	824	1,250	590	7.3	75	0	0	2,800
	Kgr	6-12-92	15	45	V	-	-	-	-	-	-	-	-	-	-	-	1,180	-	-	75	-	-	-
AY-68-27-1ac4	Kgru	6-16-92	31	305	I,B	212	34	10	<0.01	<0.01	229	464	15	1.23	0.18	964	1,250	666	7.1	73	0	1	0
AY-68-27-3bd8	Kgrl	5-13-92	400	>1,440	I,B,P	88	20	8	0.02	<0.01	335	52	13	0.50	1.10	388	590	304	7.8	72	<2 *	<4 *	<2 *
AY-68-27-5be4	Kgru	6-16-92	10	25	B	-	-	-	-	-	-	-	-	-	-	-	1,060	-	-	73	1	18	0
AY-68-27-5be7	Kgru	5-19-92	10	55	I,B	67	53	17	0.01	0.01	289	108	35	2.46	0.88	312	754	384	7.5	73	0	0	0
AY-68-28-2ab6	Kgrl,Kcc	6- 8-92	30	>120	I,B	561	137	14	1.36	0.03	286	1,707	14	3.80	0.17	2,600	2,670	1,960	7.0	75	0	0	0
AY-68-28-2hf8	Ked,Kgru	6- 5-92	330	240	I,B	93	12	10	0.40	<0.01	295	16	22	0.13	1.12	340	580	280	7.3	73	5	280	18
AY-68-28-3fh5	Kgr,Kcc	5-13-92	200	>1,440	I,B,P	160	142	22	5.0	0.02	351	663	18	4.60	0.14	1,344	1,490	980	7.4	77	<4 *	<4 *	<4 *

FOOTNOTES:

1/ Index to producing units: K = Cretaceous
ed = Edwards limestone
gr(u/l) = Glen Rose Limestone (upper/lower)
cc = Cow Creek Limestone
s,ho = Sligo Limestone and Hosston Sand

2/ Index to types of analyses: I = inorganic, B = bacteriological, P = pesticide, V = volatile organic

TABLE 7. ESTIMATED WATER BUDGET FOR THE TRINITY GROUP AQUIFER IN NORTHERN BEXAR COUNTY, 1990

	Upper Trinity (ac-ft)	Middle Trinity (ac-ft)	Lower Trinity (ac-ft)	Total[1] (ac-ft)
Inflow				
Recharge from Rainfall	8,800	900	0	9,700
Interformational Leakage	0	(3,500)	(2,200)	-
Underflow	200	11,600	300	12,100
Total Inflow	9,000	16,000	2,500	-
Total Aquifer Inflow				21,800
Outflow				
Pumpage (1990)	300	5,300	700	6,300
Interformational Leakage	(3,500)	(2,200)	1,600	1,600
Underflow	3,400	9,000	300	12,700
Natural Discharge (Springs, Seeps, etc.)	1,800	0	0	1,800
Total Outflow	9,000	16,500	2,600	-
Total Aquifer Outflow				22,400
Storage Change	0	-500	-100	-600

[1] Amounts shown within parentheses in the main part of table are the volumes of water that are transferred internally between the various units of the aquifer system and thus are not included in the total shown for water entering or leaving the full Trinity Group aquifer.

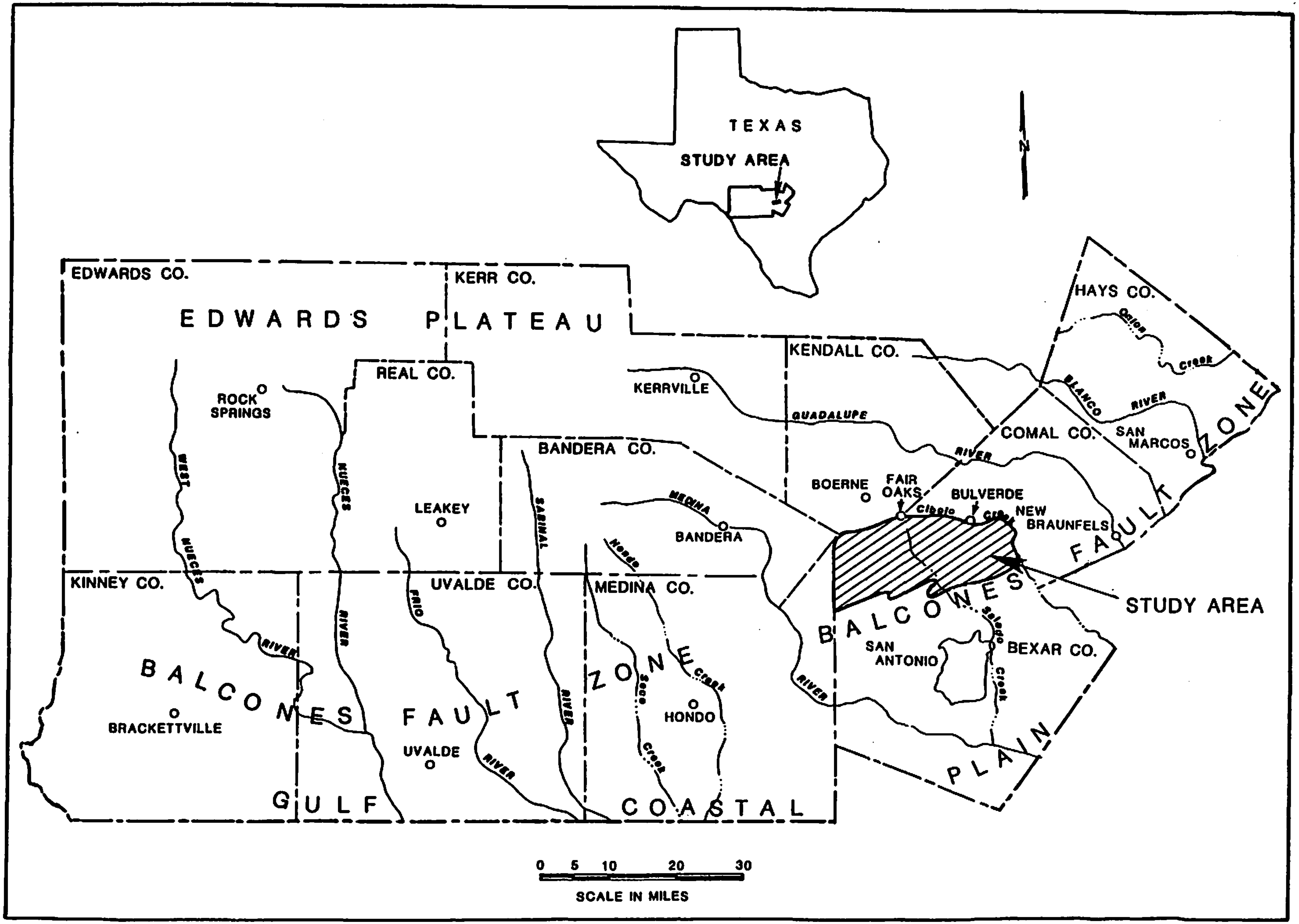
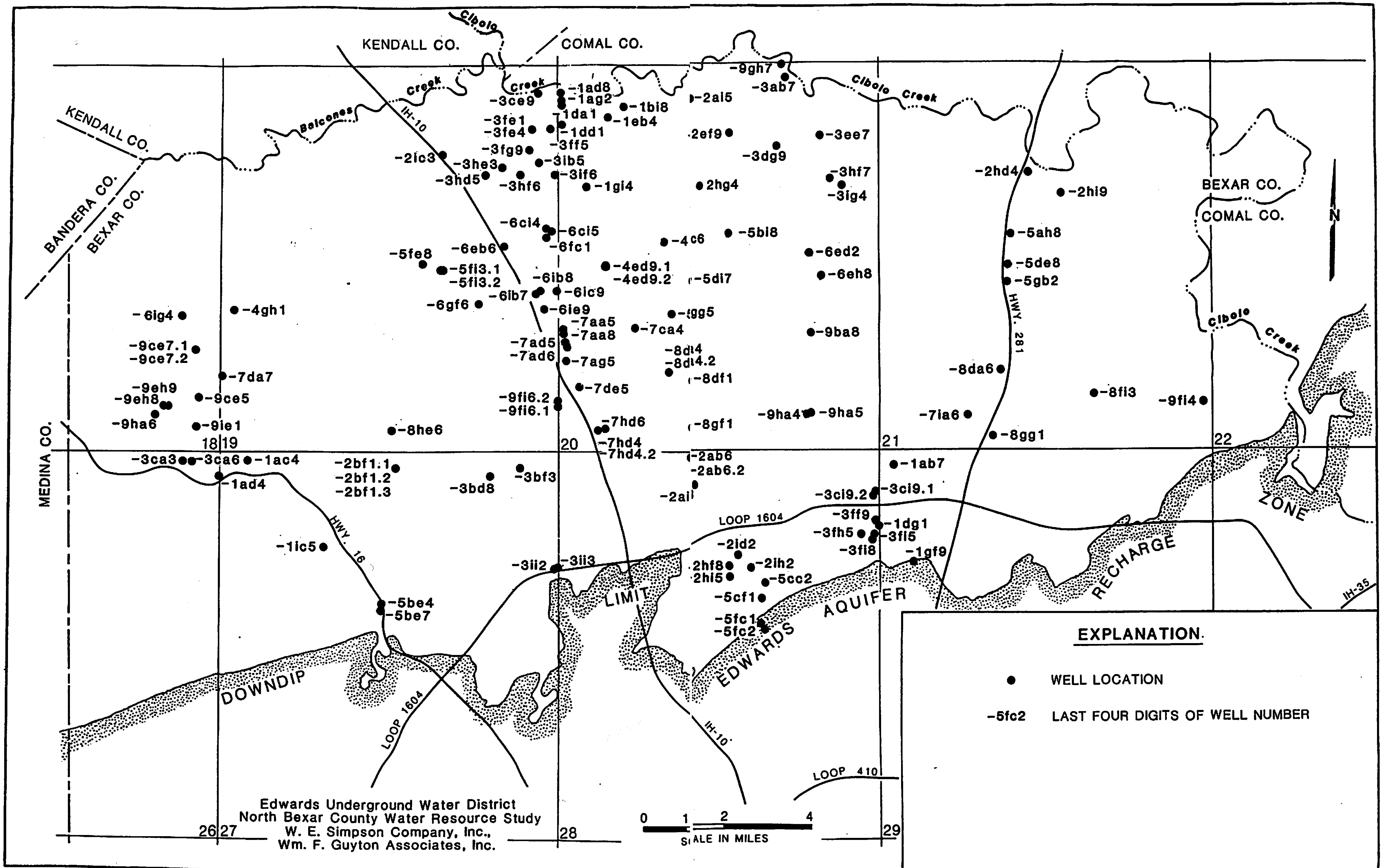


Figure 1

LOCATION OF STUDY AREA



LOCATIONS OF INVENTORIED WELLS

Figure 2

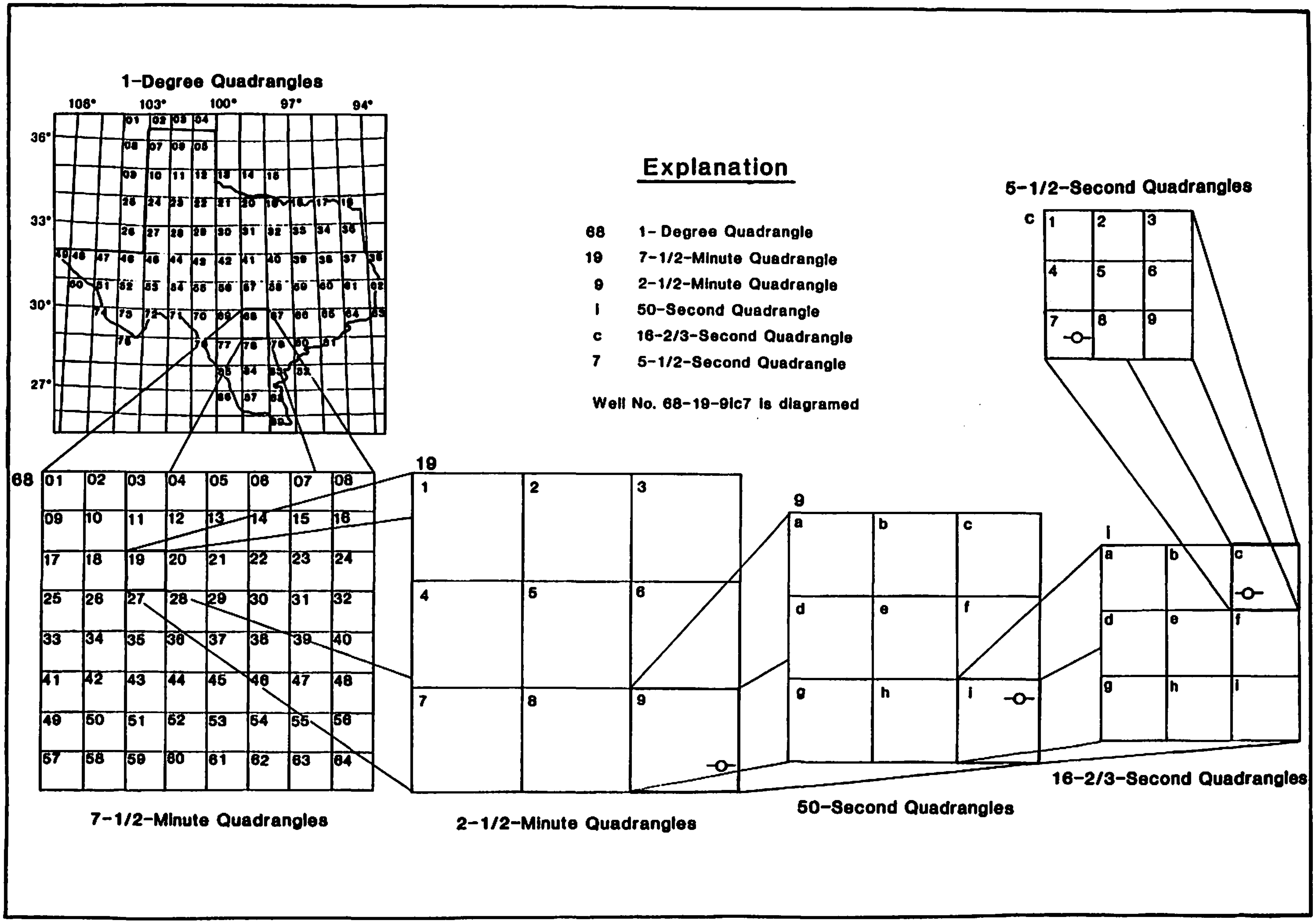
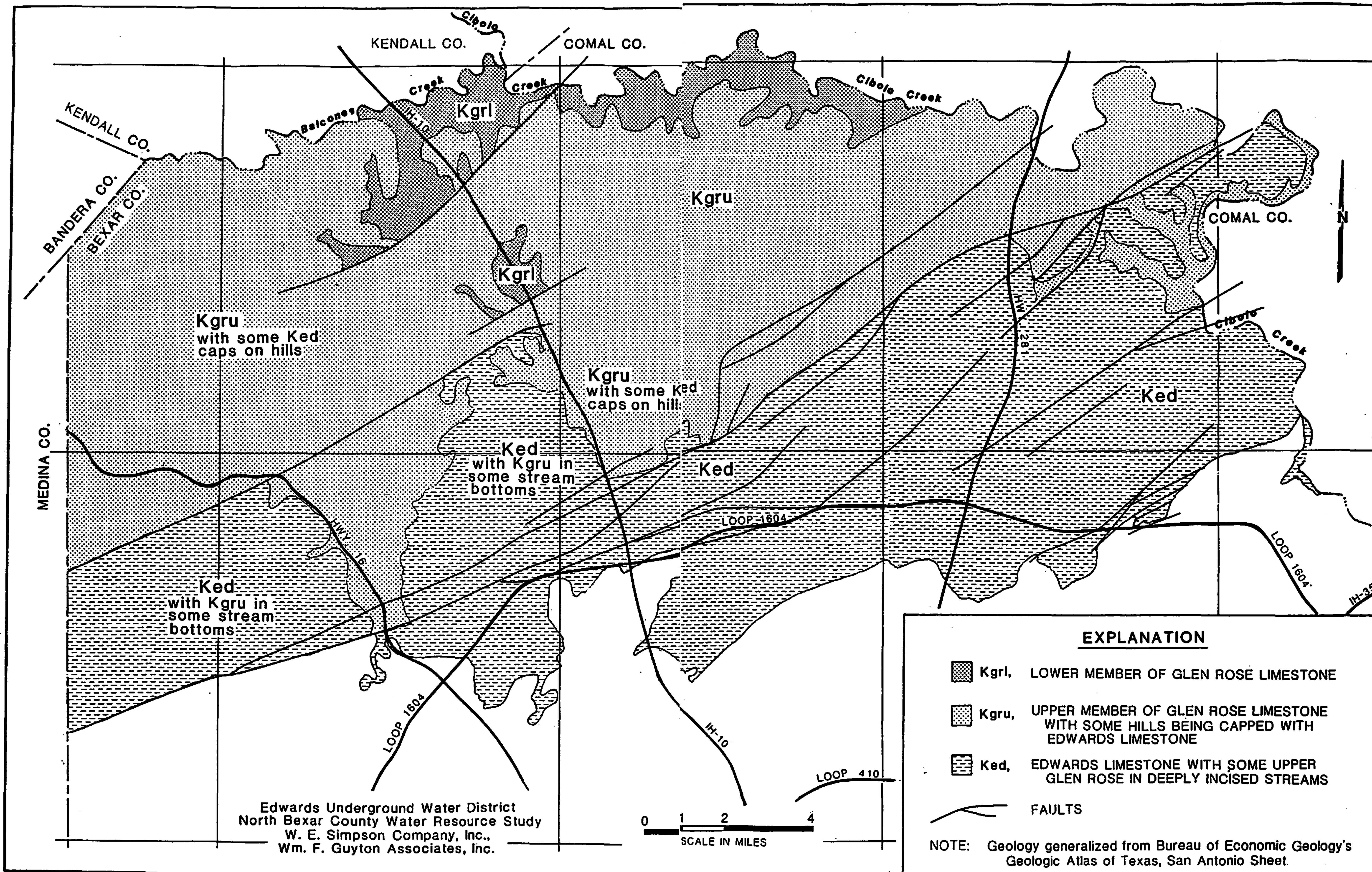


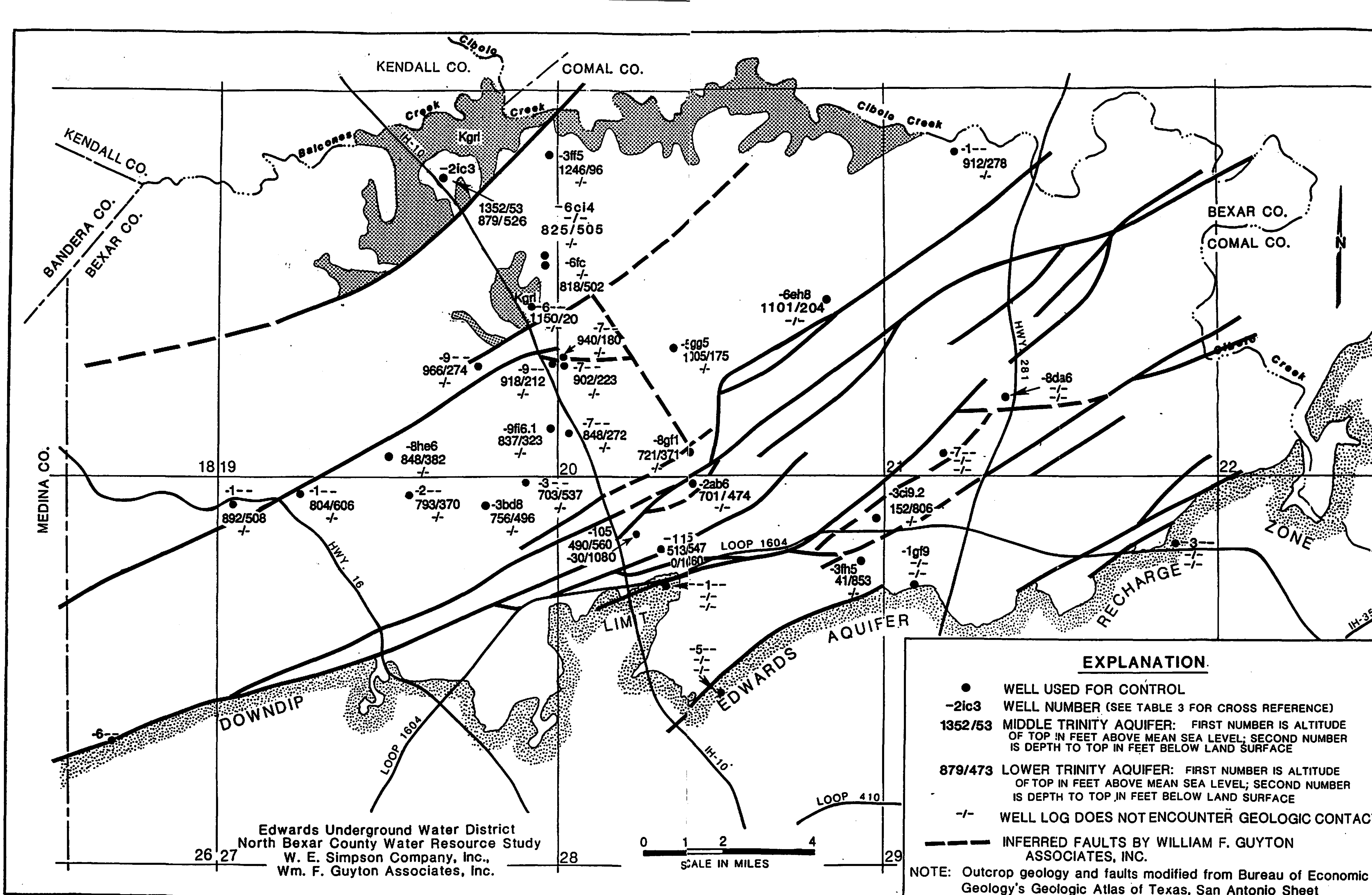
Figure 3

WELL- NUMBERING SYSTEM



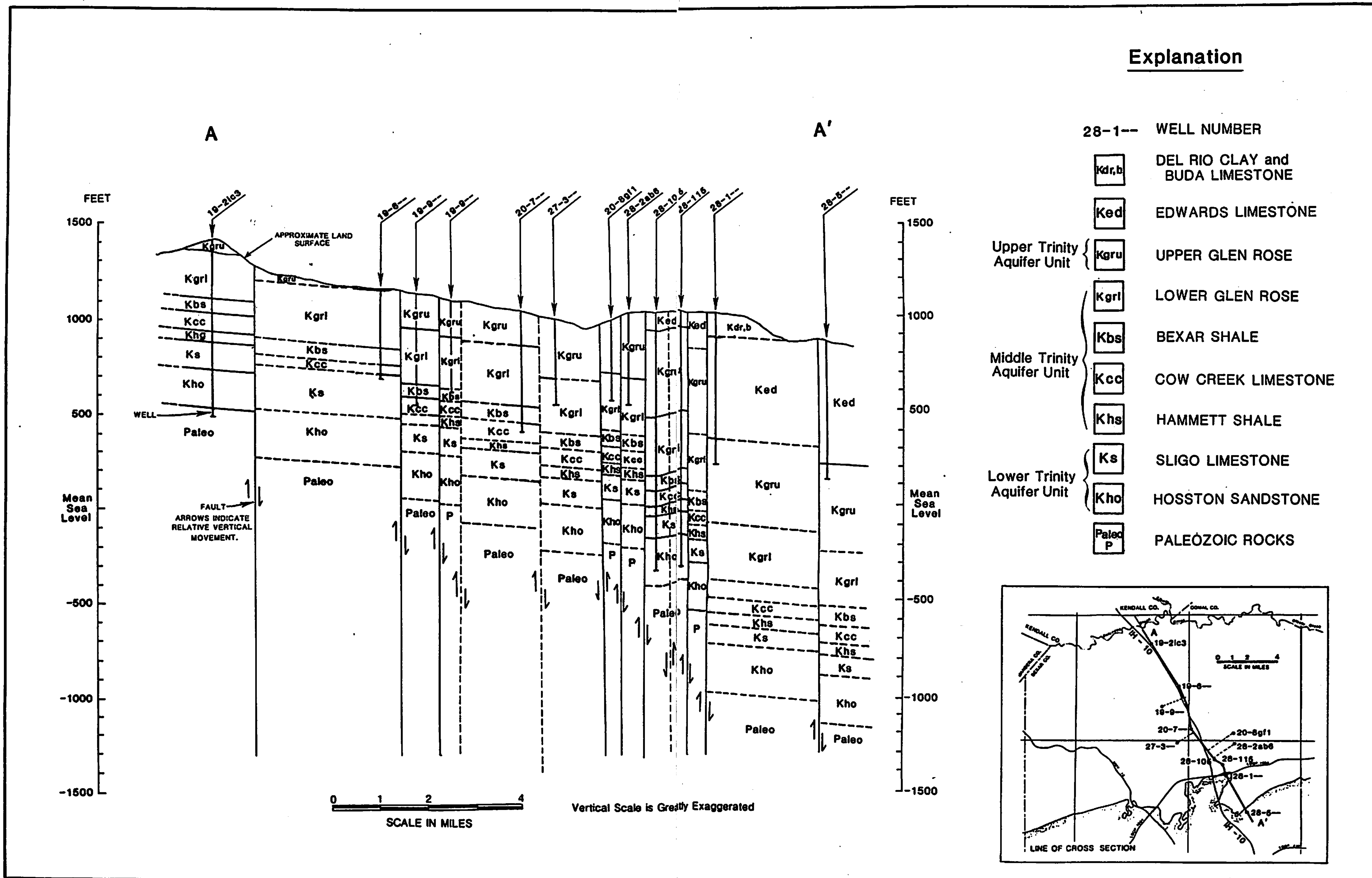
SURFACE GEOLOGY MAP

Figure 4



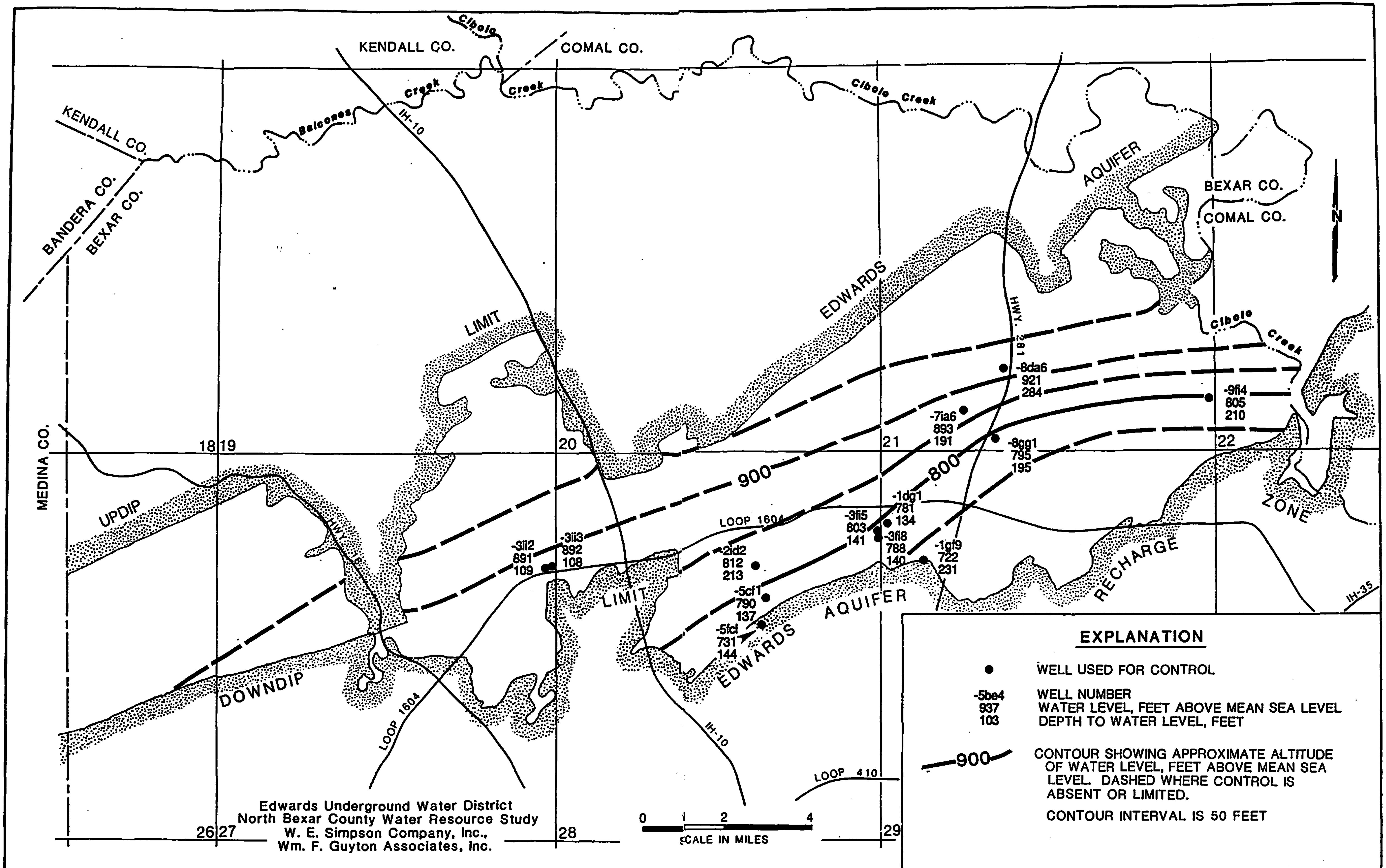
STRUCTURAL TRENDS IN NORTHERN BEXAR COUNTY

Figure 5



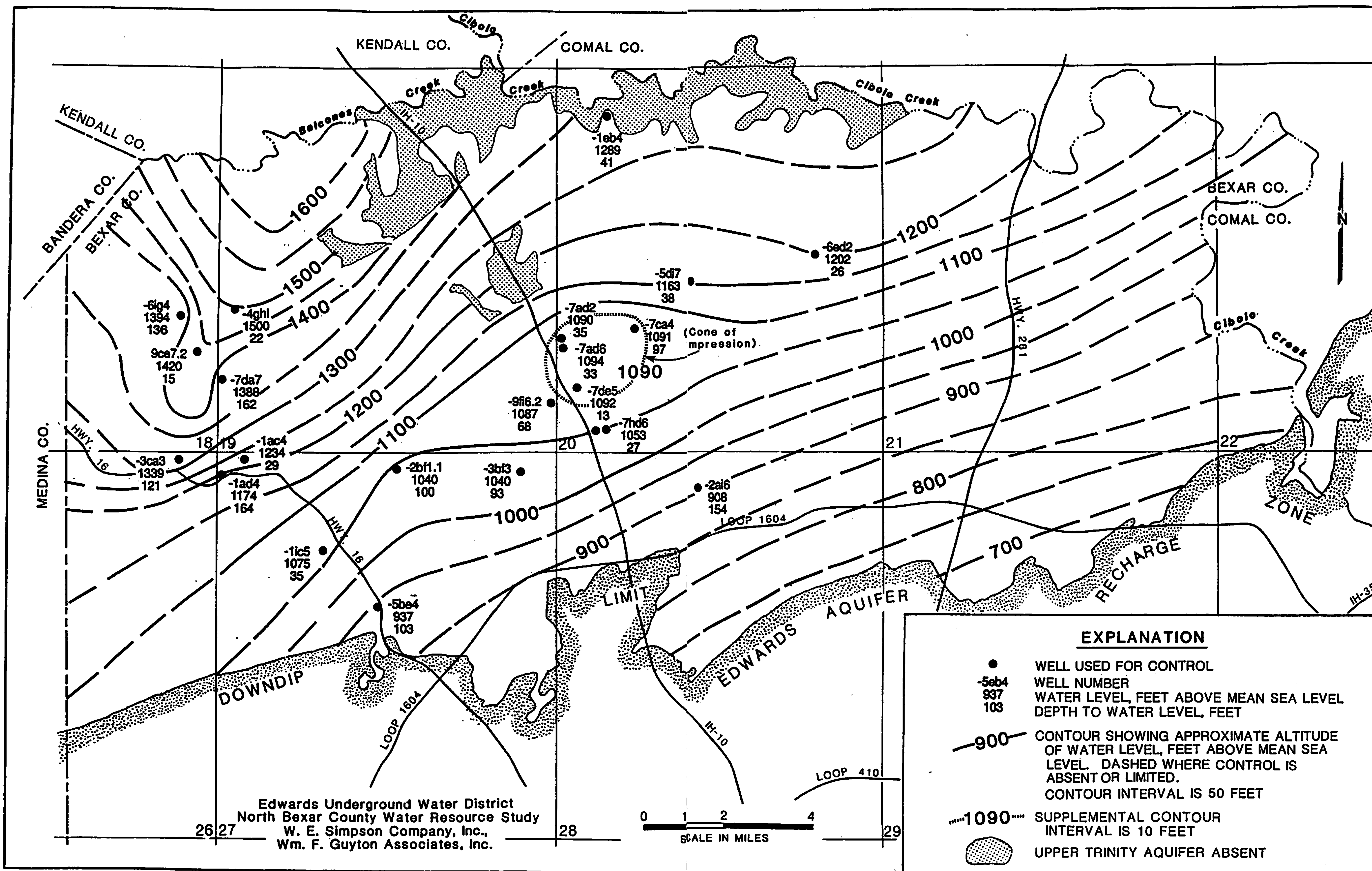
GEOLOGIC CROSS SECTION A - A'

Figure 6



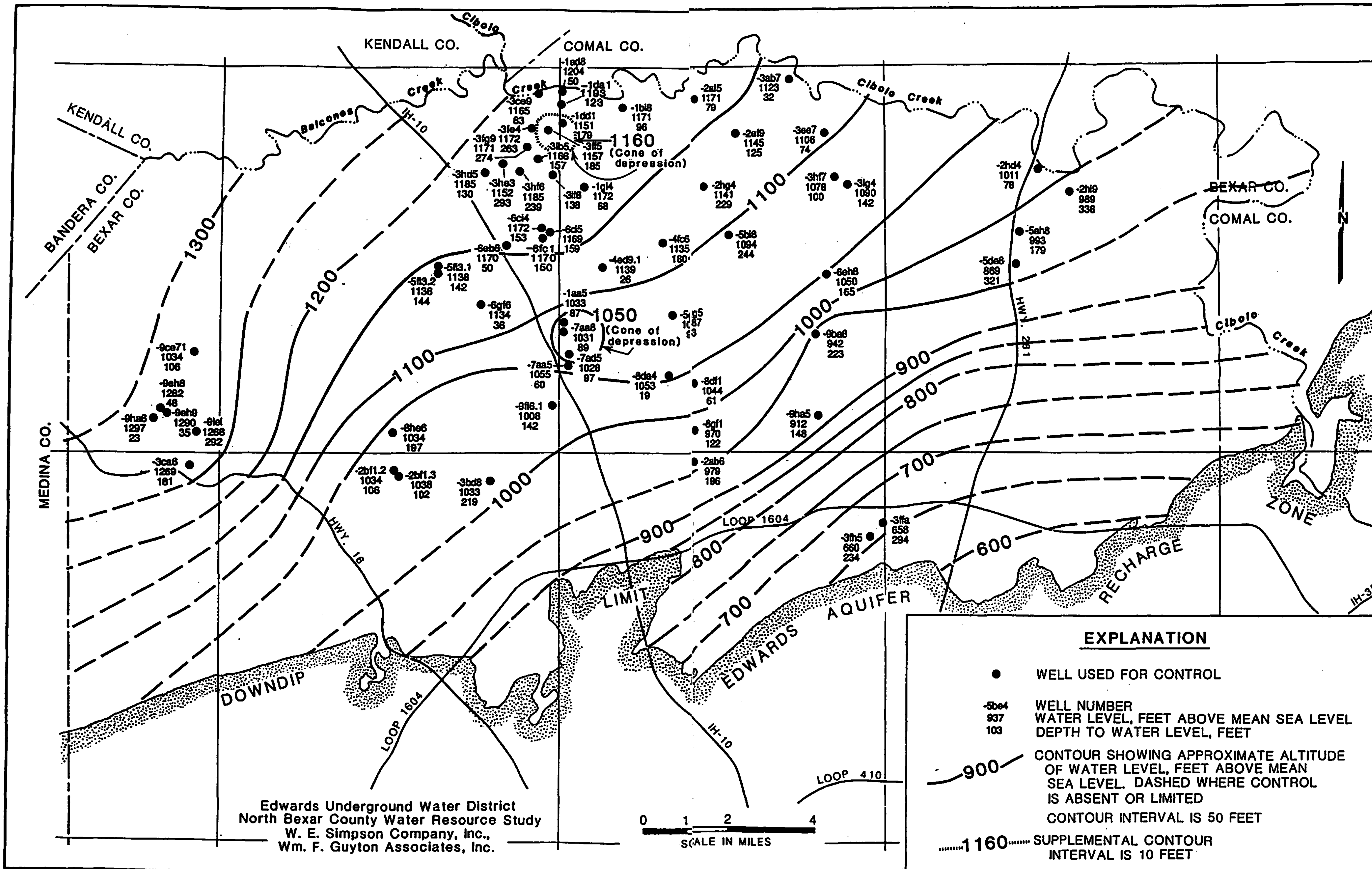
ALTITUDE OF AND DEPTH TO WATER LEVELS IN EDWARDS AQUIFER, SPRING 1992

Figure 7



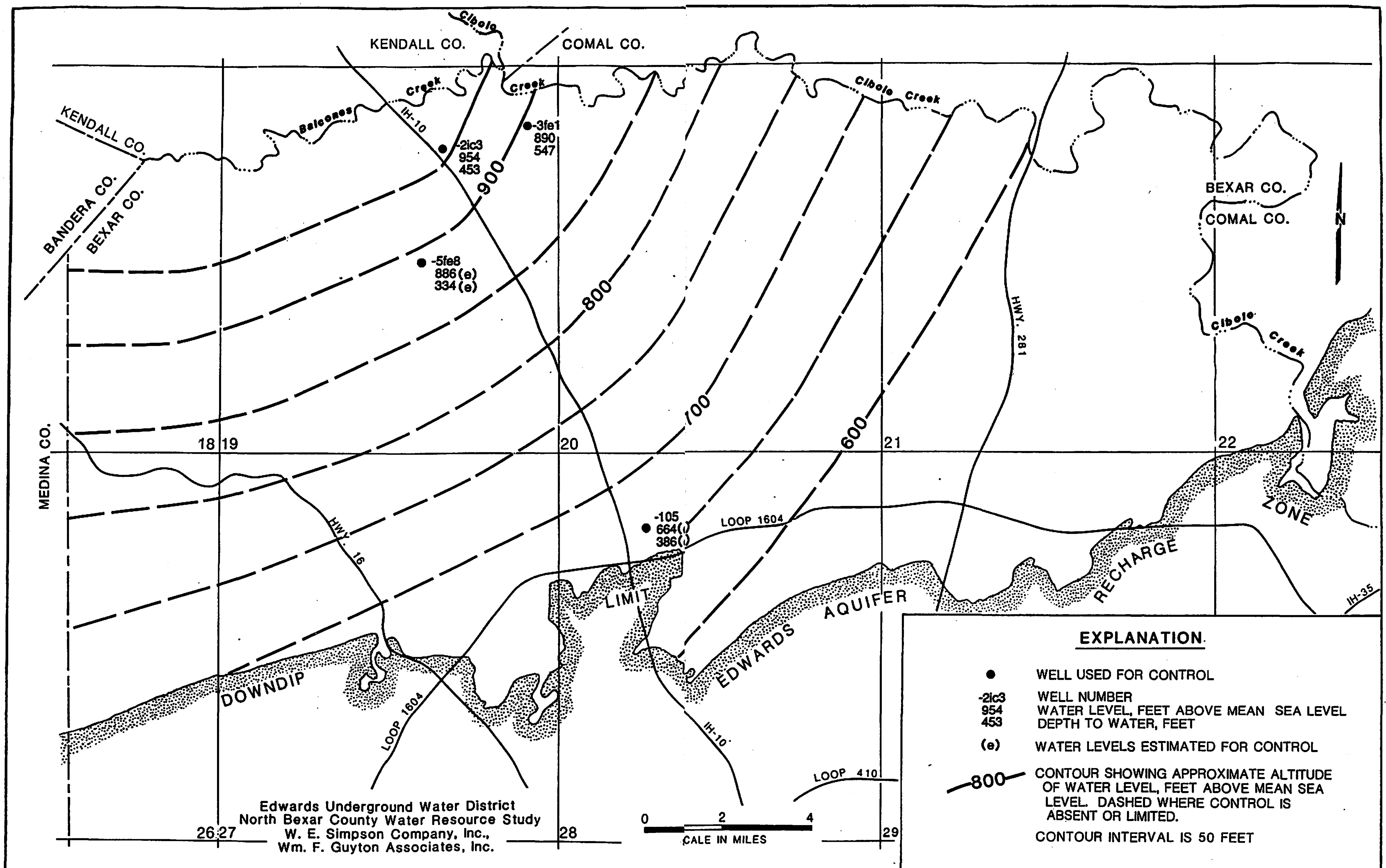
ALTITUDE OF AND DEPTH TO WATER LEVELS IN UPPER TRINITY AQUIFER, SPRING 1992

Figure 8



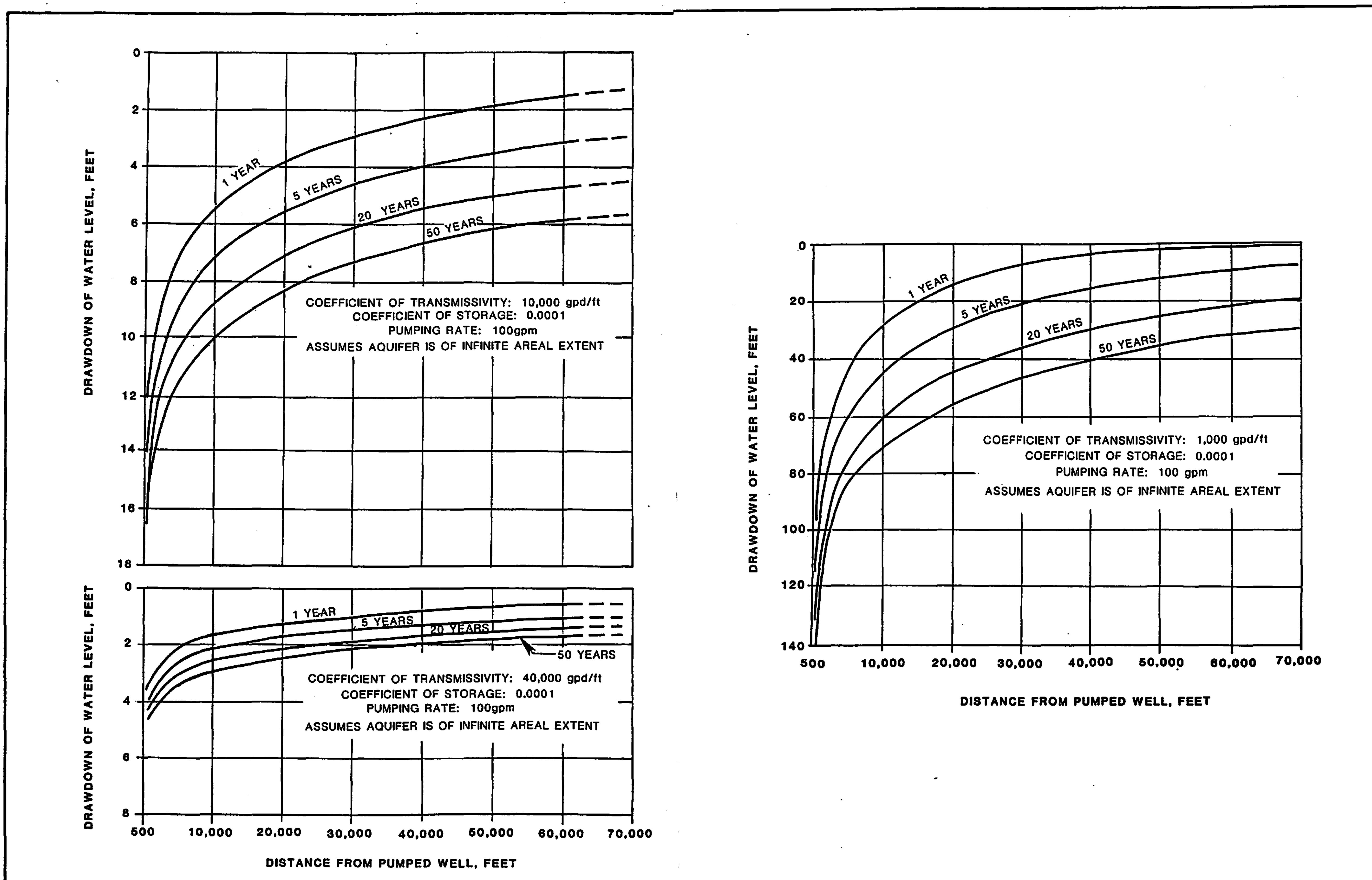
ALTITUDE OF AND DEPTH TO WATER LEVELS IN MIDDLE TRINITY AQUIFER, SPRING 1992

Figure 9



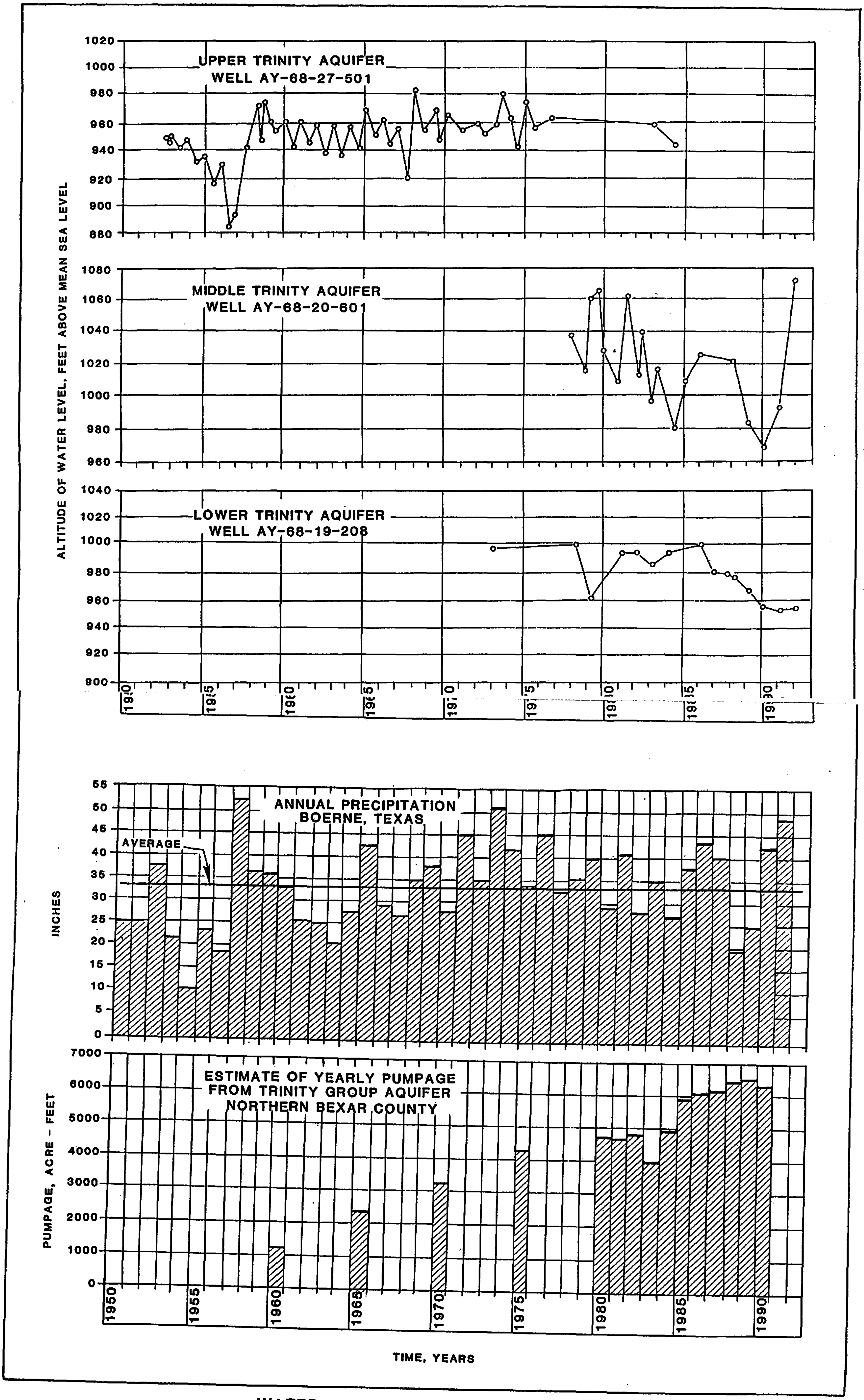
ALTITUDE OF AND DEPTH TO WATER LEVELS IN LOWER TRINITY AQUIFER, SPRING 1992

Figure 10



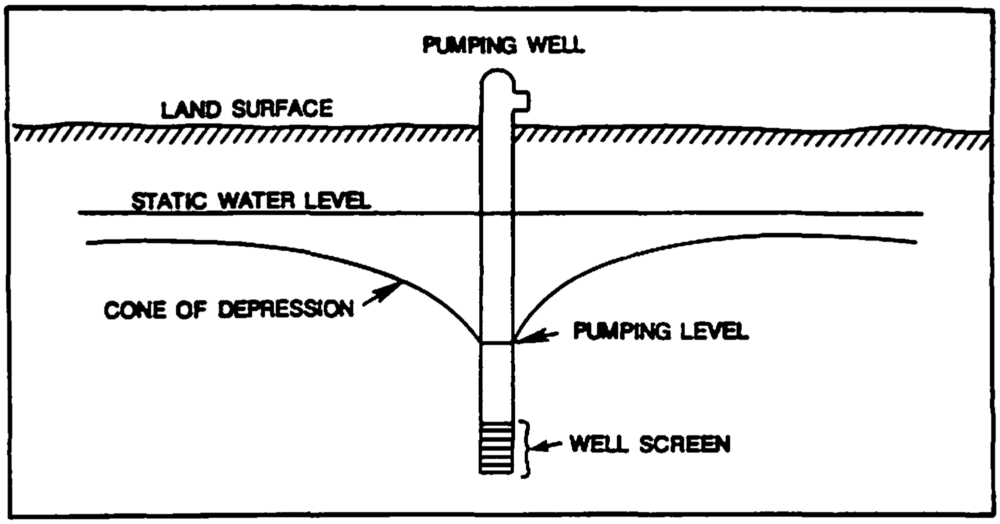
DRAWDOWN OF WATER LEVELS CAUSED BY PUMPING

Figure 11

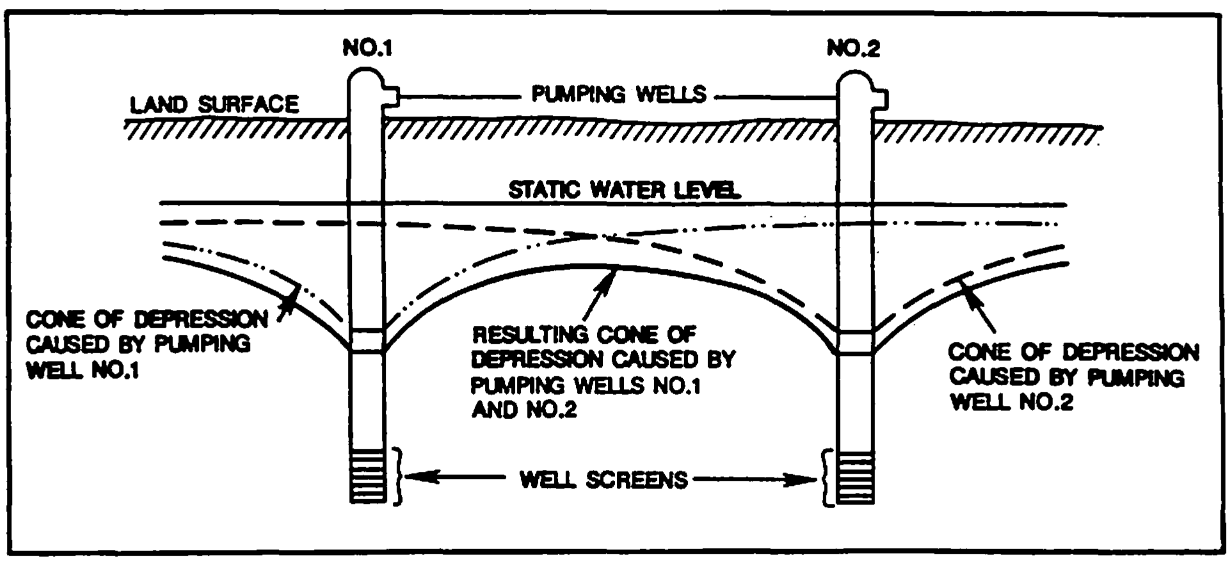


WATER LEVELS, PUMPAGE, AND PRECIPITATION

Figure 12



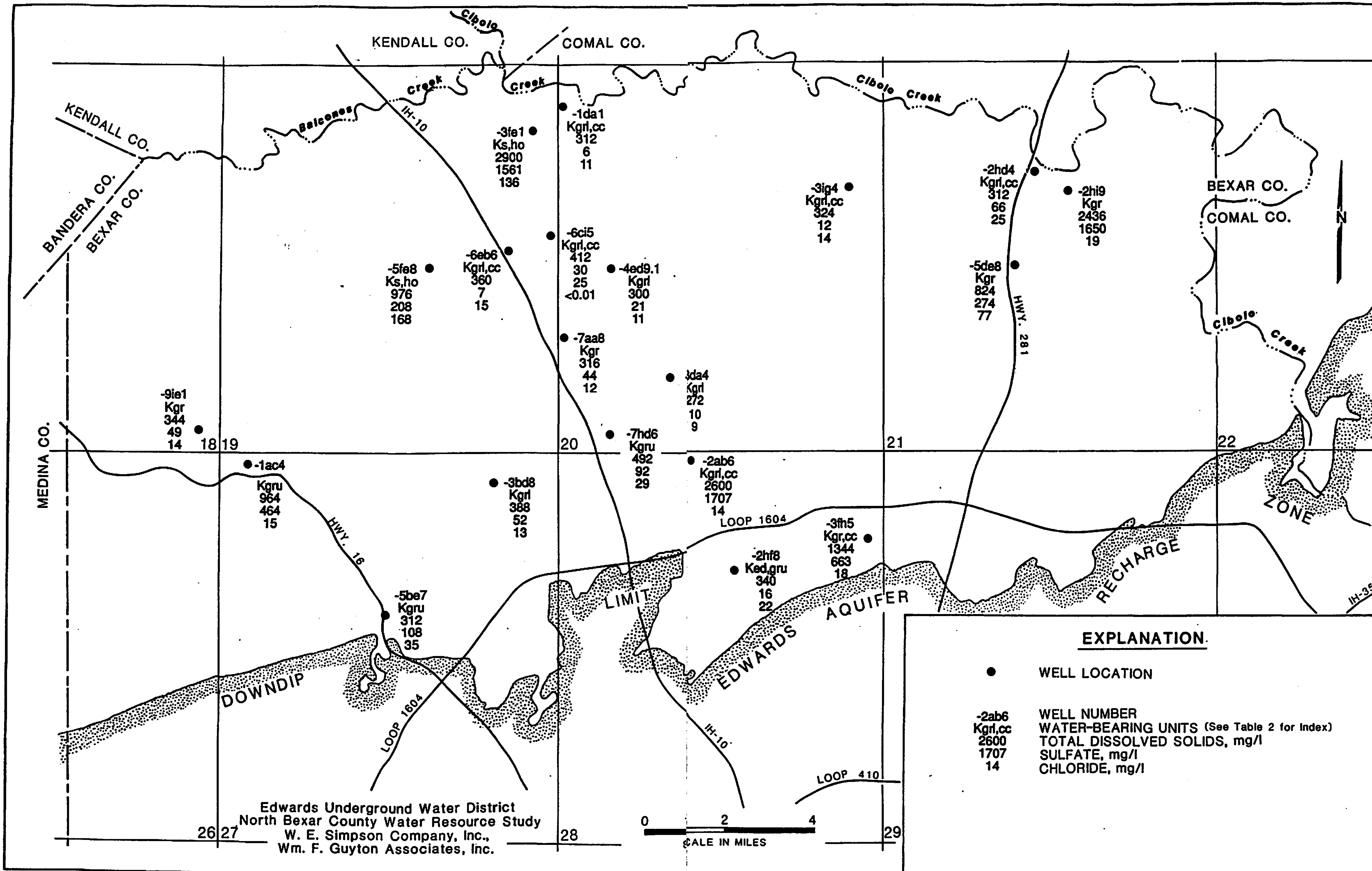
Cone of Depression Caused by Pumping Well



Interference Between Two Pumping Wells

INTERFERENCE EFFECTS CAUSED BY PUMPING

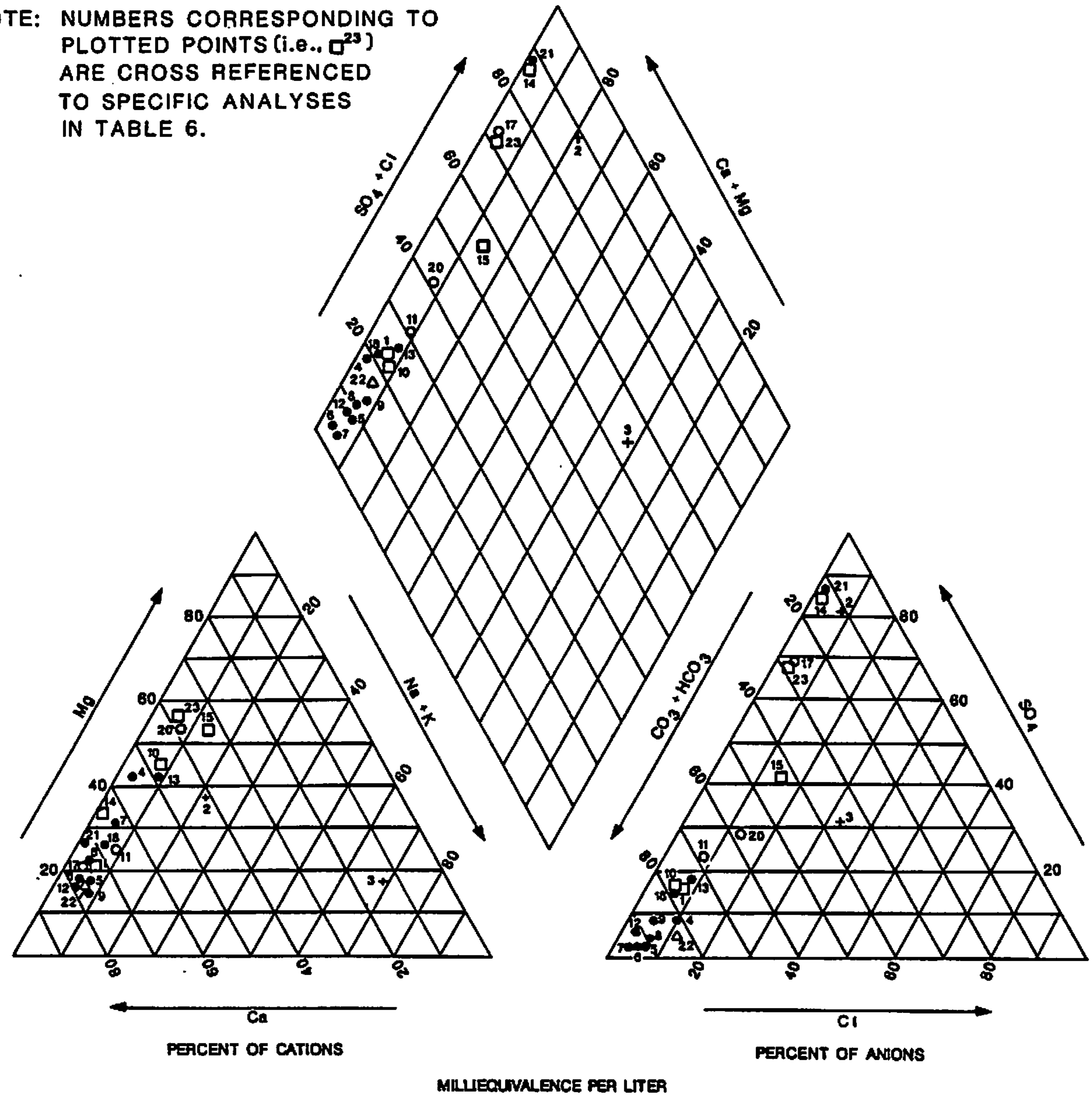
Figure 13



TOTAL DISSOLVED SOLIDS, SULFATE, AND CHLORIDE CONTENT OF WATER FROM SELECTED WELLS

Figure 14

NOTE: NUMBERS CORRESPONDING TO PLOTTED POINTS (i.e., □[23]) ARE CROSS REFERENCED TO SPECIFIC ANALYSES IN TABLE 6.



Explanation

- o UPPER TRINITY AQUIFER
- • MIDDLE TRINITY AQUIFER
- □ COMBINATION–UPPER AND MIDDLE TRINITY AQUIFER
- + LOWER TRINITY AQUIFER
- △ EDWARDS AQUIFER

TRILINEAR DIAGRAM SHOWING INORGANIC ANALYSES FOR SELECTED WELLS

Figure 15

APPENDIX 1

Laboratory Reports of Inorganic Chemical Analyses

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Chemical Analysis
PCS Sample # 24035

Date Received: 6/15/92
Date Reported: 6/22/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #18-9IE1
Date Sampled:6/15/92
Time Sampled:
Date Analyzed:6/15/92

Parameter	Concentration		
pH	7.2 S.U.	Nitrate N	0.84 mg/l
Sp.Cond.	520 umhos/cm	Sodium	9 mg/l
TDS	344 mg/l	Iron	0.55 mg/l
T.Hardness	274 mg/l	Manganese	0.03 mg/l
Calcium	87 mg/l	Magnesium	15 mg/l
Chloride	14 mg/l		
Sulfate	49 mg/l		
T.Alkalinity	235 mg/l		
Fluoride	0.23 mg/l		
Bicarbonate	286 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

#18-9IE1

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 24035

Enter cation results in mg/l

mg/l Iron:	0.55	me/l Iron:	0.0197
mg/l Ca :	87.00	me/l Ca :	4.3413
mg/l Mg :	15.00	me/l Mg :	1.2330
mg/l Na :	9.00	me/l Na :	0.3915
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.03	me/l Mn :	0.0011
		Sum Cations(me/l):	5.9866

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	286.00	me/l HCO3:	4.6904
mg/l SO4 :	49.00	me/l SO4 :	1.0192
mg/l Cl- :	14.00	me/l Cl- :	0.3948
mg/l Fl- :	0.23	me/l Fl- :	0.0121
mg/l NO3 :	0.84	me/l NO3N:	0.0135
		Sum Anions (me/l):	6.1300

%ERROR = : -1.1835

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Chemical Analysis
PCS Sample # 24001

Date Received: 6/10/92
Date Reported: 6/15/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, TX 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #19-3FE1
Date Sampled:6/10/92
Time Sampled:
Date Analyzed:6/10/92

Parameter	Concentration	Parameter	Concentration
pH	7.1 S.U.	Nitrate N	0.17 mg/l
Sp.Cond.	2830 umhos/cm	Sodium	200 mg/l
TDS	2900 mg/l	Iron	0.77 mg/l
T.Hardness	1630 mg/l	Manganese	0.04 mg/l
Calcium	337 mg/l	Magnesium	193 mg/l
Chloride	136 mg/l		
Sulfate	1561 mg/l		
T.Alkalinity	205 mg/l		
Fluoride	2.90 mg/l		
Bicarbonate	250 mg/l		

Approved By:
Chuck Wallgren

Chuck Wallgren
Owner

#19-3FE1

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 24001

Enter cation results in mg/l

mg/l Iron:	0.77	me/l Iron:	0.0276
mg/l Ca :	337.00	me/l Ca :	16.8163
mg/l Mg :	193.00	me/l Mg :	15.8646
mg/l Na :	200.00	me/l Na :	8.7000
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.04	me/l Mn :	0.0015
		Sum Cations(me/l):	41.4100

Enter anion results in mg/l

mg/l CO3 :	0.00	me/l CO3 :	0.0000
mg/l HCO3:	250.00	me/l HCO3:	4.1000
mg/l SO4 :	1561.00	me/l SO4 :	32.4688
mg/l Cl- :	136.00	me/l Cl- :	3.8352
mg/l Fl- :	2.90	me/l Fl- :	0.1525
mg/l NO3 :	0.17	me/l NO3N:	0.0027
		Sum Anions (me/l):	40.5592

%ERROR = : 1.0380

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Chemical Analysis		Date Received:	5/14/92
PCS Sample # 23574		Date Reported:	5/20/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, TX. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #19-5FE8
Date Sampled:5/14/92
Time Sampled:
Date Analyzed:5/17/92

Parameter	Concentration		
pH	7.7 S.U.	Nitrate N	0.04 mg/l
Sp.Cond.	1490 umhos/cm	Sodium	240 mg/l
TDS	976 mg/l	Iron	0.26 mg/l
T.Hardness	180 mg/l	Manganese	<0.01 mg/l
Calcium	37 mg/l	Magnesium	33 mg/l
Chloride	168 mg/l		
Sulfate	208 mg/l		
T.Alkalinity	266 mg/l		
Fluoride	1.33 mg/l		
Bicarbonate	325 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula #19-SFE8

PCS Sample#: 23574

Enter cation results in mg/l

mg/l Iron:	0.26	me/l Iron:	0.0093
mg/l Ca :	37.00	me/l Ca :	1.8463
mg/l Mg :	33.00	me/l Mg :	2.7126
mg/l Na :	240.00	me/l Na :	10.4400
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.01	me/l Mn :	0.0004
		Sum Cations(me/l):	15.0086

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	325.00	me/l HCO3:	5.3300
mg/l SO4 :	208.00	me/l SO4 :	4.3264
mg/l Cl- :	168.00	me/l Cl- :	4.7376
mg/l Fl- :	1.33	me/l Fl- :	0.0700
mg/l NO3 :	0.04	me/l NO3N:	0.0006
		Sum Anions (me/l):	14.4646

%ERROR = : 1.8457

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of: Chemical Analysis
PCS Sample # 23851

Date Received: 6/2/92
Date Reported: 6/15/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, TX 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #19-6CI5
Date Sampled: 6/2/92
Time Sampled:
Date Analyzed: 6/2/92

Parameter	Concentration	Parameter	Concentration
pH	7.4 S.U.	Nitrate N	0.47 mg/l
Sp.Cond.	590 umhos/cm	Sodium	6 mg/l
TDS	412 mg/l	Iron	<0.01 mg/l
T.Hardness	330 mg/l	Manganese	<0.01 mg/l
Calcium	75 mg/l	Magnesiumm	35 mg/l
Chloride	25 mg/l		
Sulfate	30 mg/l		
T.Alkalinity	285 mg/l		
Fluoride	0.88 mg/l		
Bicarbonate	348 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

FH-6225

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 23851

Enter cation results in mg/l

mg/l Iron:	0.00	me/l Iron:	0.0000
mg/l Ca :	75.00	me/l Ca :	3.7425
mg/l Mg :	35.00	me/l Mg :	2.8770
mg/l Na :	6.00	me/l Na :	0.2610
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.00	me/l Mn :	0.0000
		Sum Cations(me/l):	6.8805

Enter anion results in mg/l

mg/l CO3 :	0.00	me/l CO3 :	0.0000
mg/l HCO3:	348.00	me/l HCO3:	5.7072
mg/l SO4 :	30.00	me/l SO4 :	0.6240
mg/l Cl- :	25.00	me/l Cl- :	0.7050
mg/l Fl- :	0.88	me/l Fl- :	0.0463
mg/l NO3 :	0.47	me/l NO3N:	0.0076
		Sum Anions (me/l):	7.0901

%ERROR = : -1.5003

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Chemical Analysis
PCS Sample # 23549

Date Received: 5/12/92
Date Reported: 5/18/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #19-60F6 EB
Date Sampled:5/12/92
Time Sampled:
Date Analyzed:5/15/92

Parameter	Concentration	Parameter	Concentration
pH	7.4 S.U.	Nitrate N	1.5 mg/l
Sp.Cond.	530 umhos/cm	Sodium	8 mg/l
TDS	360 mg/l	Iron	<0.01 mg/l
T.Hardness	298 mg/l	Manganese	<0.01 mg/l
Calcium	95 mg/l	Magnesium	15 mg/l
Chloride	15 mg/l		
Sulfate	7 mg/l		
T.Alkalinity	280 mg/l		
Fluoride	0.46 mg/l		
Bicarbonate	342 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

7-3-80

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 23549

Enter cation results in mg/l

mg/l Iron:	0.01	me/l Iron:	0.0004
mg/l Ca :	95.00	me/l Ca :	4.7405
mg/l Mg :	15.00	me/l Mg :	1.2330
mg/l Na :	8.00	me/l Na :	0.3480
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.01	me/l Mn :	0.0004
		Sum Cations(me/l):	6.3223

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	342.00	me/l HCO3:	5.6088
mg/l SO4 :	7.00	me/l SO4 :	0.1456
mg/l Cl- :	15.00	me/l Cl- :	0.4230
mg/l Fl- :	0.46	me/l Fl- :	0.0242
mg/l NO3 :	1.50	me/l NO3N:	0.0242
		Sum Anions (me/l):	6.2258

%ERROR = : 0.7690

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Chemical Analysis Date Received: 6/10/92
PCS Sample # 24003 Date Reported: 6/15/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, TX 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #19-6GF6(Rerun)
Date Sampled:6/10/92
Time Sampled:
Date Analyzed:6/10/92

Parameter	Concentration	Parameter	Concentration
pH	7.2 S.U.	Nitrate N	1.75 mg/l
Sp.Cond.	550 umhos/cm	Sodium	6 mg/l
TDS	264 mg/l	Iron	<0.01 mg/l
T.Hardness	276 mg/l	Manganese	<0.01 mg/l
Calcium	90 mg/l	Magnesium	13 mg/l
Chloride	12 mg/l		
Sulfate	7 mg/l		
T.Alkalinity	271 mg/l		
Fluoride	0.36 mg/l		
Bicarbonate	331 mg/l		

Approved By:
Chuck Wallgren

Chuck Wallgren
Owner

#19 -

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 24003

Enter cation results in mg/l

mg/l Iron:	0.00	me/l Iron:	0.0000
mg/l Ca :	90.00	me/l Ca :	4.4910
mg/l Mg :	13.00	me/l Mg :	1.0686
mg/l Na :	6.00	me/l Na :	0.2610
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.00	me/l Mn :	0.0000
		Sum Cations(me/l):	5.8206

Enter anion results in mg/l

mg/l CO3 :	0.00	me/l CO3 :	0.0000
mg/l HCO3:	331.00	me/l HCO3:	5.4284
mg/l SO4 :	11.00	me/l SO4 :	0.2288
mg/l Cl- :	12.00	me/l Cl- :	0.3384
mg/l Fl- :	0.36	me/l Fl- :	0.0189
mg/l NO3 :	1.75	me/l NO3N:	0.0282
		Sum Anions (me/l):	6.0427

%ERROR = : -1.8722

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Chemical Analysis Date Received: 5/27/92
PCS Sample # 23780 Date Reported: 6/11/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

DA1
Sample ID: Well Water #20-1~~A05~~
Date Sampled:5/27/92
Time Sampled:
Date Analyzed:6/5/92

Parameter	Concentration		
pH	7.3 S.U.	Nitrate N	0.92 mg/l
Sp.Cond.	490 umhos/cm	Sodium	7 mg/l
TDS	312 mg/l	Iron	0.01 mg/l
T.Hardness	270 mg/l	Manganese	<0.01 mg/l
Calcium	74 mg/l	Magnesium	21 mg/l
Chloride	11 mg/l		
Sulfate	6 mg/l		
T.Alkalinity	263 mg/l		
Fluoride	0.32 mg/l		
Bicarbonate	321 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

#20-1LA1

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 23780

Enter cation results in mg/l

mg/l Iron:	0.01	me/l Iron:	0.0004
mg/l Ca :	74.00	me/l Ca :	3.6926
mg/l Mg :	21.00	me/l Mg :	1.7262
mg/l Na :	7.00	me/l Na :	0.3045
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.00	me/l Mn :	0.0000
		Sum Cations(me/l):	5.7237

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	321.00	me/l HCO3:	5.2644
mg/l SO4 :	6.00	me/l SO4 :	0.1248
mg/l Cl- :	11.00	me/l Cl- :	0.3102
mg/l Fl- :	0.32	me/l Fl- :	0.0168
mg/l NO3 :	0.92	me/l NO3N:	0.0148
		Sum Anions (me/l):	5.7310

%ERROR = : -0.0637

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Chemical Analysis   Date Received: 5/18/92
PCS Sample # 23621   Date Reported: 5/20/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, TX. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #20-3IG4
Date Sampled:5/18/92
Time Sampled:
Date Analyzed:5/18/92

Parameter	Concentration		
pH	7.2 S.U.	Nitrate N	1.1 mg/l
Sp.Cond.	502 umhos/cm	Sodium	7 mg/l
TDS	324 mg/l	Iron	0.01 mg/l
T.Hardness	300 mg/l	Manganese	<0.01 mg/l
Calcium	92 mg/l	Magnesium	17 mg/l
Chloride	14 mg/l		
Sulfate	12 mg/l		
T.Alkalinity	282 mg/l		
Fluoride	0.28 mg/l		
Bicarbonate	344 mg/l		

Approved By:
Chuck Wallgren

Chuck Wallgren
Owner

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

#20-3I64

PCS Sample#: 23621

Enter cation results in mg/l

mg/l Iron:	0.01	me/l Iron:	0.0004
mg/l Ca :	92.00	me/l Ca :	4.5908
mg/l Mg :	17.00	me/l Mg :	1.3974
mg/l Na :	7.00	me/l Na :	0.3045
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.01	me/l Mn :	0.0004
		Sum Cations(me/l):	6.2935

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	344.00	me/l HCO3:	5.6416
mg/l SO4 :	12.00	me/l SO4 :	0.2496
mg/l Cl- :	14.00	me/l Cl- :	0.3948
mg/l Fl- :	0.28	me/l Fl- :	0.0147
mg/l NO3 :	1.10	me/l NO3N:	0.0177
		Sum Anions (me/l):	6.3184

%ERROR = : -0.1974

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Chemical Analysis
PCS Sample # 23876

Date Received: 6/3/92
Date Reported: 6/12/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #20-4ED9.1
Date Sampled:6/3/92
Time Sampled:
Date Analyzed:6/5/92

Parameter	Concentration		
pH	7.5 S.U.	Nitrate N	0.58 mg/l
Sp.Cond.	500 umhos/cm	Sodium	8 mg/l
TDS	300 mg/l	Iron	0.09 mg/l
T.Hardness	266 mg/l	Manganese	<0.01 mg/l
Calcium	89 mg/l	Magnesium	11 mg/l
Chloride	11 mg/l		
Sulfate	21 mg/l		
T.Alkalinity	253 mg/l		
Fluoride	0.22 mg/l		
Bicarbonate	309 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

20-4ED9.1

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 23876

Enter cation results in mg/l

mg/l Iron:	0.09	me/l Iron:	0.0032
mg/l Ca :	89.00	me/l Ca :	4.4411
mg/l Mg :	11.00	me/l Mg :	0.9042
mg/l Na :	8.00	me/l Na :	0.3480
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.00	me/l Mn :	0.0000
		Sum Cations(me/l):	5.6965

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	309.00	me/l HCO3:	5.0676
mg/l SO4 :	21.00	me/l SO4 :	0.4368
mg/l Cl- :	11.00	me/l Cl- :	0.3102
mg/l Fl- :	0.22	me/l Fl- :	0.0116
mg/l NO3 :	0.58	me/l NO3N:	0.0093
		Sum Anions (me/l):	5.8355

%ERROR = : -1.2053

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Chemical Analysis
PCS Sample # 23573

Date Received: 5/14/92
Date Reported: 5/14/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, TX. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #20-7AA8
Date Sampled:5/14/92
Time Sampled:
Date Analyzed:5/20/92

Parameter	Concentration		
pH	7.4 S.U.	Nitrate N	<0.01 mg/l
Sp.Cond.	490 umhos/cm	Sodium	11 mg/l
TDS	316 mg/l	Iron	0.06 mg/l
T.Hardness	280 mg/l	Manganese	0.01 mg/l
Calcium	56 mg/l	Magnesium	35 mg/l
Chloride	12 mg/l		
Sulfate	44 mg/l		
T.Alkalinity	245 mg/l		
Fluoride	0.70 mg/l		
Bicarbonate	299 mg/l		

Approved By:
Chuck Wallgren

Chuck Wallgren
Owner

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

#20-7AAS

PCS Sample#: 23573

Enter cation results in mg/l

mg/l Iron:	0.06	me/l Iron:	0.0021
mg/l Ca :	56.00	me/l Ca :	2.7944
mg/l Mg :	35.00	me/l Mg :	2.8770
mg/l Na :	11.00	me/l Na :	0.4785
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.01	me/l Mn :	0.0004
		Sum Cations(me/l):	6.1524

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	299.00	me/l HCO3:	4.9036
mg/l SO4 :	31.00	me/l SO4 :	0.6448
mg/l Cl- :	12.00	me/l Cl- :	0.3384
mg/l Fl- :	0.70	me/l Fl- :	0.0368
mg/l NO3 :	0.01	me/l NO3N:	0.0002
		Sum Anions (me/l):	5.9238

%ERROR = : 1.8930

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Chemical Analysis   Date Received: 5/13/92
PCS Sample # 23550   Date Reported: 5/18/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, TX. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #20-7HD6
Date Sampled:5/13/92
Time Sampled:
Date Analyzed:5/15/92

Parameter	Concentration		
pH	7.5 S.U.	Nitrate N	0.46 mg/l
Sp.Cond.	680 umhos/cm	Sodium	16 mg/l
TDS	492 mg/l	Iron	6.4 mg/l
T.Hardness	352 mg/l	Manganese	0.34 mg/l
Calcium	101 mg/l	Magnesium	24 mg/l
Chloride	28.5 mg/l		
Sulfate	92 mg/l		
T.Alkalinity	304 mg/l		
Fluoride	0.42 mg/l		
Bicarbonate	370 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

#20-71L-

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 23550

Enter cation results in mg/l

mg/l Iron:	6.40	me/l Iron:	0.2291
mg/l Ca :	101.00	me/l Ca :	5.0399
mg/l Mg :	24.00	me/l Mg :	1.9728
mg/l Na :	16.00	me/l Na :	0.6960
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.34	me/l Mn :	0.0124
		Sum Cations(me/l):	7.9502

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	322.00	me/l HCO3:	5.2808
mg/l SO4 :	92.00	me/l SO4 :	1.9136
mg/l Cl- :	28.50	me/l Cl- :	0.8037
mg/l Fl- :	0.42	me/l Fl- :	0.0221
mg/l NO3 :	0.46	me/l NO3N:	0.0074
		Sum Anions (me/l):	8.0276

%ERROR = : -0.4844

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Chemical Analysis
PCS Sample # 23937

Date Received: 6/4/92
Date Reported: 6/12/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt.

Sample ID: Well Water #20-8DD4
Date Sampled: 6/4/92
Time Sampled:
Date Analyzed: 6/8/92

Parameter	Concentration		
pH	7.4 S.U.	Nitrate N	0.48 mg/l
Sp.Cond.	480 umhos/cm	Sodium	6 mg/l
TDS	272 mg/l	Iron	0.01 mg/l
T.Hardness	272 mg/l	Manganese	<0.01 mg/l
Calcium	91 mg/l	Magnesium	11 mg/l
Chloride	9 mg/l		
Sulfate	10 mg/l		
T.Alkalinity	256 mg/l		
Fluoride	0.43 mg/l		
Bicarbonate	313 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula #20-8004

PCS Sample#: 23937

Enter cation results in mg/l

mg/l Iron:	0.01	me/l Iron:	0.0004
mg/l Ca :	91.00	me/l Ca :	4.5409
mg/l Mg :	11.00	me/l Mg :	0.9042
mg/l Na :	6.00	me/l Na :	0.2610
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.00	me/l Mn :	0.0000
		Sum Cations(me/l):	5.7065

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	313.00	me/l HCO3:	5.1332
mg/l SO4 :	10.00	me/l SO4 :	0.2080
mg/l Cl- :	9.00	me/l Cl- :	0.2538
mg/l Fl- :	0.43	me/l Fl- :	0.0226
mg/l NO3 :	0.48	me/l NO3N:	0.0077
		Sum Anions (me/l):	5.6253

%ERROR = : 0.7166

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Chemical Analysis
PCS Sample # 24033

Date Received: 6/12/92
Date Reported: 6/16/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #21-2HD4
Date Sampled:6/12/92
Time Sampled:
Date Analyzed:6/12/92

Parameter	Concentration		
pH	7.3 S.U.	Nitrate N	0.35 mg/l
Sp.Cond.	700 umhos/cm	Sodium	16 mg/l
TDS	312 mg/l	Iron	0.01 mg/l
T.Hardness	344 mg/l	Manganese	0.01 mg/l
Calcium	75 mg/l	Magnesium	38 mg/l
Chloride	25 mg/l		
Sulfate	66 mg/l		
T.Alkalinity	276 mg/l		
Fluoride	1.62 mg/l		
Bicarbonate	337 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula #21-2H04

PCS Sample#: 24033

Enter cation results in mg/l

mg/l Iron:	0.01	me/l Iron:	0.0004
mg/l Ca :	75.00	me/l Ca :	3.7425
mg/l Mg :	38.00	me/l Mg :	3.1236
mg/l Na :	16.00	me/l Na :	0.6960
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.01	me/l Mn :	0.0004
		Sum Cations(me/l):	7.5629

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	337.00	me/l HCO3:	5.5268
mg/l SO4 :	66.00	me/l SO4 :	1.3728
mg/l Cl- :	25.00	me/l Cl- :	0.7050
mg/l Fl- :	1.62	me/l Fl- :	0.0852
mg/l NO3 :	0.35	me/l NO3N:	0.0056
		Sum Anions (me/l):	7.6954

%ERROR = : -0.8684

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Chemical Analysis Date Received: 6/17/92
PCS Sample # 24077 Date Reported: 6/22/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well WAter #21-2HI9
Date Sampled:6/17/92
Time Sampled:
Date Analyzed:6/18/92

Parameter	Concentration		
pH	7.2 S.U.	Nitrate N	0.17 mg/l
Sp.Cond.	2580 umhos/cm	Sodium	10 mg/l
TDS	2436 mg/l	Iron	0.06 mg/l
T.Hardness	1760 mg/l	Manganese	0.02 mg/l
Calcium	505 mg/l	Magnesium	160 mg/l
Chloride	19 mg/l		
Sulfate	1650 mg/l		
T.Alkalinity	242 mg/l		
Fluoride	3.6 mg/l		
Bicarbonate	295 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

#21-2HL9

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 24077

Enter cation results in mg/l

mg/l Iron:	0.06	me/l Iron:	0.0021
mg/l Ca :	505.00	me/l Ca :	25.1995
mg/l Mg :	160.00	me/l Mg :	13.1520
mg/l Na :	10.00	me/l Na :	0.4350
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.02	me/l Mn :	0.0007
		Sum Cations(me/l):	38.7893

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	295.00	me/l HCO3:	4.8380
mg/l SO4 :	1650.00	me/l SO4 :	34.3200
mg/l Cl- :	19.00	me/l Cl- :	0.5358
mg/l Fl- :	3.60	me/l Fl- :	0.1894
mg/l NO3 :	0.17	me/l NO3N:	0.0027
		Sum Anions (me/l):	39.8859

%ERROR = : -1.3938

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Chemical Analysis
PCS Sample # 23575

Date Received: 5/14/92
Date Reported: 5/20/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin,, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #21-5DE8
Date Sampled:5/14/92
Time Sampled:
Date Analyzed:5/17/92

Parameter	Concentration		
pH	7.3 S.U.	Nitrate N	<0.01 mg/l
Sp.Cond.	1180 umhos/cm	Sodium	54 mg/l
TDS	824 mg/l	Iron	0.23 mg/l
T.Hardness	590 mg/l	Manganese	0.01 mg/l
Calcium	112 mg/l	Magnesium	110 mg/l
Chloride	77 mg/l		
Sulfate	274 mg/l		
T.Alkalinity	304 mg/l		
Fluoride	3.85 mg/l		
Bicarbonate	371 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

#21-5D128

PCS Sample#: 23575

Enter cation results in mg/l

mg/l Iron:	0.23	me/l Iron:	0.0082
mg/l Ca :	112.00	me/l Ca :	5.5888
mg/l Mg :	76.00	me/l Mg :	6.2472
mg/l Na :	54.00	me/l Na :	2.3490
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.01	me/l Mn :	0.0004
		Sum Cations(me/l):	14.1936

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	371.00	me/l HCO3:	6.0844
mg/l SO4 :	274.00	me/l SO4 :	5.6992
mg/l Cl- :	77.00	me/l Cl- :	2.1714
mg/l Fl- :	3.85	me/l Fl- :	0.2025
mg/l NO3 :	0.01	me/l NO3N:	0.0002
		Sum Anions (me/l):	14.1577

%ERROR = : 0.1266

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Chemical Analysis   Date Received: 6/16/92
PCS Sample # 24056   Date Reported: 6/22/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #27-1AC4
Date Sampled:6/16/92
Time Sampled:
Date Analyzed:6/18/92

Parameter	Concentration		
pH	7.1 S.U.	Nitrate N	0.18 mg/l
Sp.Cond.	1200 umhos/cm	Sodium	10 mg/l
TDS	964 mg/l	Iron	<0.01 mg/l
T.Hardness	666 mg/l	Manganese	<0.01 mg/l
Calcium	212 mg/l	Magnesium	34 mg/l
Chloride	15 mg/l		
Sulfate	464 mg/l		
T.Alkalinity	188 mg/l		
Fluoride	1.23 mg/l		
Bicarbonate	229 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

#27-1AC4

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 24056

Enter cation results in mg/l

mg/l Iron:	0.01	me/l Iron:	0.0004
mg/l Ca :	212.00	me/l Ca :	10.5788
mg/l Mg :	34.00	me/l Mg :	2.7948
mg/l Na :	10.00	me/l Na :	0.4350
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.01	me/l Mn :	0.0004
		Sum Cations(me/l):	13.8094

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	229.00	me/l HCO3:	3.7556
mg/l SO4 :	464.00	me/l SO4 :	9.6512
mg/l Cl- :	15.00	me/l Cl- :	0.4230
mg/l Fl- :	1.23	me/l Fl- :	0.0647
mg/l NO3 :	0.18	me/l NO3N:	0.0029
		Sum Anions (me/l):	13.8974

%ERROR = : -0.3176

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Chemical Analysis
PCS Sample # 23551

Date Received: 5/13/92
Date Reported: 5/18/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, TX. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #27-3BD8
Date Sampled:5/13/92
Time Sampled:
Date Analyzed:5/15/92

Parameter	Concentration		
pH	7.8 S.U.	Nitrate N	1.1 mg/l
Sp.Cond.	510 umhos/cm	Sodium	8 mg/l
TDS	388 mg/l	Iron	0.02 mg/l
T.Hardness	304 mg/l	Manganese	<0.01 mg/l
Calcium	88 mg/l	Magnesium	20 mg/l
Chloride	13 mg/l		
Sulfate	52 mg/l		
T.Alkalinity	275 mg/l		
Fluoride	0.50 mg/l		
Bicarbonate	335 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

#727-3BDR

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 23551

Enter cation results in mg/l

mg/l Iron:	0.02	me/l Iron:	0.0007
mg/l Ca :	88.00	me/l Ca :	4.3912
mg/l Mg :	20.00	me/l Mg :	1.6440
mg/l Na :	8.00	me/l Na :	0.3480
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.01	me/l Mn :	0.0004
		Sum Cations(me/l):	6.3843

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	292.00	me/l HCO3:	4.7888
mg/l SO4 :	52.00	me/l SO4 :	1.0816
mg/l Cl- :	13.00	me/l Cl- :	0.3666
mg/l Fl- :	0.50	me/l Fl- :	0.0263
mg/l NO3 :	1.10	me/l NO3N:	0.0177
		Sum Anions (me/l):	6.2810

%ERROR = : 0.8156

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Chemical Analysis   Date Received: 5/19/92
PCS Sample # 23647   Date Reported: 5/24/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
San Antonio, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #27-5BE7
Date Sampled:5/19/92
Time Sampled:
Date Analyzed:5/19/92

Parameter	Concentration		
pH	7.5 S.U.	Nitrate N	0.88 mg/l
Sp.Cond.	720 umhos/cm	Sodium	17 mg/l
TDS	312 mg/l	Iron	0.01 mg/l
T.Hardness	384 mg/l	Manganese	0.01 mg/l
Calcium	67 mg/l	Magnesium	53 mg/l
Chloride	35 mg/l		
Sulfate	108 mg/l		
T.Alkalinity	237 mg/l		
Fluoride	2.46 mg/l		
Bicarbonate	289 mg/l		

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula #27-5BE7

PCS Sample#: 23647

Enter cation results in mg/l

mg/l Iron:	0.01	me/l Iron:	0.0004
mg/l Ca :	67.00	me/l Ca :	3.3433
mg/l Mg :	53.00	me/l Mg :	4.3566
mg/l Na :	17.00	me/l Na :	0.7395
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.01	me/l Mn :	0.0004
		Sum Cations(me/l):	8.4402

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	289.00	me/l HCO3:	4.7396
mg/l SO4 :	108.00	me/l SO4 :	2.2464
mg/l Cl- :	35.00	me/l Cl- :	0.9870
mg/l Fl- :	2.46	me/l Fl- :	0.1294
mg/l NO3 :	0.88	me/l NO3N:	0.0142
		Sum Anions (me/l):	8.1166

%ERROR = : 1.9545

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Chemical Analysis
PCS Sample # 23958

Date Received: 6/8/92
Date Reported: 6/15/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, TX 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #28-2AB6
Date Sampled:6/8/92
Time Sampled:
Date Analyzed:6/8/92

Parameter	Concentration	Parameter	Concentration
pH	7.0 S.U.	Nitrate N	0.17 mg/l
Sp.Cond.	2600 umhos/cm	Sodium	14 mg/l
TDS	2600 mg/l	Iron	1.36 mg/l
T.Hardness	1960 mg/l	Manganese	0.03 mg/l
Calcium	561 mg/l	Magnesium	137 mg/l
Chloride	14 mg/l		
Sulfate	1707 mg/l		
T.Alkalinity	235 mg/l		
Fluoride	3.80 mg/l		
Bicarbonate	286 mg/l		

Approved By:
Chuck Wallgren

Chuck Wallgren
Owner

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

#28-2AB6

PCS Sample#: 23958

Enter cation results in mg/l

mg/l Iron:	1.36	me/l Iron:	0.0487
mg/l Ca :	561.00	me/l Ca :	27.9939
mg/l Mg :	137.00	me/l Mg :	11.2614
mg/l Na :	14.00	me/l Na :	0.6090
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.03	me/l Mn :	0.0011
		Sum Cations(me/l):	39.9141

Enter anion results in mg/l

mg/l CO3 :	0.00	me/l CO3 :	0.0000
mg/l HCO3:	286.00	me/l HCO3:	4.6904
mg/l SO4 :	1707.00	me/l SO4 :	35.5056
mg/l Cl- :	14.00	me/l Cl- :	0.3948
mg/l Fl- :	3.80	me/l Fl- :	0.1999
mg/l NO3 :	0.17	me/l NO3N:	0.0027
		Sum Anions (me/l):	40.7934

%ERROR = : -1.0895

APPENDIX 2

Laboratory Reports of Bacteriological Analyses

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 24035

Date Received:6/15/92
Date Reported:6/17/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #18-9IE1
Date Sampled:6/15/92
Time Sampled:
Date Analyzed:6/15/92

Parameter	Concentration
F.Coliform	0 COL/100 ml
T.Coliform	0 COL/100 ml
F.Strep.	2 COL/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 24001

Date Received:6/10/92
Date Reported:6/12/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, TX 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #19-3FE1
Date Sampled:6/10/92
Time Sampled:
Date Analyzed:6/10/92

Parameter	Concentration
F.Coliform	0 Col/100 ml
T.Coliform	0 Col/100 ml
F.Strep.	0 Col/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 23574

Date Received:5/14/92
Date Reported:5/16/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #19-5~~3~~FE8
Date Sampled:5/14/92
Time Sampled:
Date Analyzed:5/14/92

Parameter	Concentration
F.Coliform	0 COL/100 ml
T.Coliform	0 COL/100 ml
F.Strep.	2 COL/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 23851

Date Received:6/2/92
Date Reported:6/4/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, TX 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #19-6CI5
Date Sampled:6/2/92
Time Sampled:
Date Analyzed:6/2/92

Parameter	Concentration
F.Coliform	0 Col/100 ml
T.Coliform	0 Col/100 ml
F.Strep.	0 Col/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

WATER BACTERIOLOGY
Form No. G-19 (Rev. 1/91)

Texas Department of Health
Bureau of Laboratories

Date and Time Rec'd. 5/12/92 TIME 12 139
Sample No.
Date Reported 5-14-92

Do not mark above this line — Please print with ballpoint pen or typewriter.

Water System I.D. No.
NAME OF WATER SYSTEM: V9-16GF6

POINT OF COLLECTION: FAUCET ON WELL
COUNTY: BEXAR

Submitter I.D. No. 1 KIKKI20

SEND RESULTS TO:
NAME: WILLIAM STEIN
STREET ADDRESS (P.O. Box): 3355 Bee Cave Rd Suite 401
CITY: AUSTIN Tx ZIP CODE: 78746

Date and Time of Collection: MONTH 05 DAY 12 YEAR 92 TIME 03:30 AM/PM PM
COLLECTED BY

TYPE OF SYSTEM		SAMPLE IS (Public Systems Only)		WATER SOURCE	
☑ Public	☐ Dairy	☐ Distribution	☑ Raw	☐ River	☐ Lake
☐ Individual	☐ Bottled	☐ Construction	☐ Repeat	☑ Well	Well Depth ______
☐ School		☐ Special		Chlorine Residual ______	

Ownership or other information:

LABORATORY REPORT (Do not write below)

Water of satisfactory bacteriological quality must be free from Coliform organisms

Coliform Organisms
☑ Not Found
☐ Found
☐ Total
☐ Fecal
☐ Repeat samples required
☐ Unsuitable — See below

TC = <4
FC = <2 / 100 ml
FS = <2

UNSUITABLE FOR ANALYSIS – PLEASE RESUBMIT

☐ Sample too old. Sample not received within 30 hours of collection
☐ Quantity insufficient for analysis (100 ml. required)
☐ Date discrepancy or form incomplete (See encircled item)
☐ Heavy (silt/bacterial growth) present, possibly compromising test results
☐ Leaked in transit
☐ Other

RAT

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 23780

Date Received:5/27/92
Date Reported:5/29/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #20-1~~A05~~ DA1
Date Sampled:5/27/92
Time Sampled:
Date Analyzed:5/27/92

Parameter	Concentration
F.Coliform	0 COL/100 ml
T.Coliform	<2 COL/100 ml
F.Strep.	<2 COL/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 23621

Date Received:5/14/92
Date Reported:5/16/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #20-3IG4
Date Sampled:5/14/92
Time Sampled:
Date Analyzed:5/14/92

Parameter	Concentration
F.Coliform	0 COL/100 ml
T.Coliform	0 COL/100 ml
F.Strep.	0 COL/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 23876

Date Received:6/3/92
Date Reported:6/5/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water ~~#28-2HF8~~ 20-4ED9.1
Date Sampled:6/3/92
Time Sampled:
Date Analyzed:6/3/92

Parameter	Concentration
F.Coliform	89 COL/100 ml
T.Coliform	140 COL/100 ml
F.Strep.	40 COL/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 23573

Date Received:5/14/92
Date Reported:5/16/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #20-7AA8
Date Sampled:5/14/92
Time Sampled:
Date Analyzed:5/14/92

Parameter	Concentration
F.Coliform	0 COL/100 ml
T.Coliform	0 COL/100 ml
F.Strep.	25 COL/100 ml

Approved By:
Chuck Wallgren

Chuck Wallgren
Owner

WATER BACTERIOLOGY
Form No. G-19 (Rev. 1/91)

Texas Department of Health
Bureau of Laboratories

Date and Time Rec'd.
Sample No. [illegible] Date Reported 5-15-92

Do not mark above this line — Please print with ballpoint pen or typewriter.

Water System I.D. No. | NAME OF WATER SYSTEM: 20-7HDG RUSSIAN PARK

POINT OF COLLECTION: WELL FAUCET | COUNTY: BEXAR

Submitter I.D. No. [illegible]

* WILL PICK UP RESULTS

SEND RESULTS TO:
NAME: BILL STEIN
STREET ADDRESS (P.O. Box): 3355 BEE CAVE RD SUITE 401
CITY: AUSTIN Tx ZIP CODE: 78746

Date and Time of Collection: MONTH 05 DAY 13 YEAR 92 TIME 10:40 AM/PM a COLLECTED BY WGS

TYPE OF SYSTEM
☐ Public ☐ Dairy
☐ Individual ☐ Bottled
☐ School VIRR

SAMPLE IS (Public Systems Only)
☐ Distribution ☑ Raw
☐ Construction ☐ Repeat
☐ Special

WATER SOURCE
☐ River ☐ Lake
☑ Well Well Depth ______
Chlorine Residual ______

Ownership or other information:

LABORATORY REPORT (Do not write below)
Water of satisfactory bacteriological quality must be free from Coliform organisms

Coliform Organisms
☐ Not Found
☑ Found
☑ Total
☐ Fecal
☐ Repeat samples required
☐ Unsuitable — See below

TC = 330
FC = 24
FS = 1100
/100ml

Heavy [illegible]

UNSUITABLE FOR ANALYSIS – PLEASE RESUBMIT

☐ Sample too old. Sample not received within 30 hours of collection
☐ Date discrepancy or form incomplete (See encircled item)
☐ Leaked in transit
☐ Other
☐ Quantity insufficient for analysis (100 mL required)
☐ Heavy (silt/bacterial growth) present, possibly compromising test results

RAT/FAIL

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 23937

Date Received:6/4/92
Date Reported:6/6/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #20-8DD4
Date Sampled:6/4/92
Time Sampled:
Date Analyzed:6/4/92

Parameter	Concentration
F.Coliform	0 COL/100 ml
T.Coliform	0 COL/100 ml
F.Strep.	0 COL/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 24033

Date Received:6/12/92
Date Reported:6/14/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #21-2HD4
Date Sampled:6/12/92
Time Sampled:
Date Analyzed:6/12/92

Parameter	Concentration
F.Coliform	0 COL/100 ml
T.Coliform	40 COL/100 ml
F.Strep.	40 COL/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 24077

Date Received:6/17/92
Date Reported:6/19/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #21-2HI9
Date Sampled:6/17/92
Time Sampled:
Date Analyzed:6/17/92

Parameter	Concentration
F.Coliform	0 COL/100 ml
T.Coliform	0 COL/100 ml
F.Strep.	0 COL/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 23575

Date Received:5/14/92
Date Reported:5/16/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #21-5DE8
Date Sampled:5/14/92
Time Sampled:
Date Analyzed:5/15/92

Parameter	Concentration
F.Coliform	0 COL/100 ml
T.Coliform	0 COL/100 ml
F.Strep.	2800 COL/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 24056

Date Received:6/16/92
Date Reported:6/18/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #27-1AC4
Date Sampled:6/16/92
Time Sampled:
Date Analyzed:6/16/92

Parameter	Concentration
F.Coliform	0 COL/100 ml
T.Coliform	1 COL/100 ml
F.Strep.	0 COL/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

WATER BACTERIOLOGY
Form No. G-19 (Rev. 1/91)

Texas Department of Health
Bureau of Laboratories

Date and Time Rec'd. 4101 No. 193
Sample No.

Date Reported 5-15-92

Do not mark above this line — Please print with ballpoint pen or typewriter.

Water System I.D. No.:
NAME OF WATER SYSTEM: 27-3808 CEDAR CREEK

POINT OF COLLECTION: WELL
COUNTY: BEXAR

Submitter I.D. No. 148102

Will Pick up

SEND RESULTS TO:
NAME: BILL STEIN
STREET ADDRESS (P.O. Box): 3355 BEE CAVE RD SUITE 401
CITY: AUSTIN Tx ZIP CODE: 78746

Date and Time of Collection: 05 MONTH 13 DAY 92 YEAR ~~20~~ 12:20 TIME PM AM/PM

COLLECTED BY: WS

TYPE OF SYSTEM
- ☐ Public
- ☐ Dairy
- ☐ Individual
- ☐ Bottled
- ☐ School
- ✓IRR

SAMPLE IS (Public Systems Only)
- ☐ Distribution
- ☑ Raw
- ☐ Construction
- ☐ Repeat
- ☐ Special

WATER SOURCE
- ☐ River
- ☐ Lake
- ☑ Well

Well Depth ______

Chlorine Residual ______

Ownership or other information:

LABORATORY REPORT (Do not write below)

Water of satisfactory bacteriological quality must be free from Coliform organisms

Coliform Organisms
- ☑ Not Found
- ☐ Found
  - ☐ Total
  - ☐ Fecal
  - ☐ Repeat samples required
- ☐ Unsuitable — See below

TC: <4
FC: <2 /100 ml
FS: <2

UNSUITABLE FOR ANALYSIS – PLEASE RESUBMIT
- ☐ Sample too old. Sample not received within 30 hours of collection
- ☐ Date discrepancy or form incomplete (See encircled item)
- ☐ Leaked in transit
- ☐ Other
- ☐ Quantity insufficient for analysis (100 mL required)
- ☐ Heavy (silt/bacterial growth) present, possibly compromising test results

RAT/FMB

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 24057

Date Received:6/16/92
Date Reported:6/18/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #27-5BE4
Date Sampled:6/16/92
Time Sampled:
Date Analyzed:6/16/92

Parameter	Concentration
F.Coliform	1 COL/100 ml
T.Coliform	18 COL/100 ml
F.Strep.	0 COL/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 23647

Date Received:5/19/92
Date Reported:5/21/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #27-5BE7
Date Sampled:5/19/92
Time Sampled:
Date Analyzed:5/19/92

Parameter	Concentration
F.Coliform	0 COL/100 ml
T.Coliform	0 COL/100 ml
F.Strep.	0 COL/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

P O L L U T I O N   C O N T R O L   S E R V I C E S

435 Isom Road, Suite 228   San Antonio, TX 78216   (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 23958

Date Received:6/8/92
Date Reported:6/10/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, TX 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #28-2AB6
Date Sampled:6/8/92
Time Sampled:
Date Analyzed:6/8/92

Parameter	Concentration
F.Coliform	0 Col/100 ml
T.Coliform	0 Col/100 ml
F.Strep.	0 Col/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (512)340-0343

Report of:Bacteriological Analysis
PCS Sample # 23952

Date Received:6/5/92
Date Reported:6/7/92

To: Wm. F. Guyton & Associates
3355 Bee Cave Rd., Suite 401
Austin, Tx. 78746

Attn: Mr. Bill Klemt

Sample ID: Well Water #28-2HF8
Date Sampled:6/5/92
Time Sampled:
Date Analyzed:6/5/92

Parameter	Concentration
F.Coliform	5 COL/100 ml
T.Coliform	280 COL/100 ml
F.Strep.	18 COL/100 ml

Approved By:

Chuck Wallgren

Chuck Wallgren
Owner

WATER BACTERIOLOGY
Form No. G-19 (Rev. 1/91)

Texas Department of Health
Bureau of Laboratories

Date and Time Rec'd. Date
Sample No. Reported 5-15-97

Do not mark above this line — Please print with ballpoint pen or typewriter.

Water System I.D. No. | NAME OF WATER SYSTEM: 0283545 Sonterra

POINT OF COLLECTION: Well 4 | COUNTY: BEXAR

Submitter I.D. No. 141302

Will pick up

SEND RESULTS TO:
NAME: Billy Stahn
STREET ADDRESS (P.O. Box): 3355 Bee Cave Rd Suite 401
CITY: Austin Tx ZIP CODE: 78746

Date and Time of Collection: MONTH 05 DAY 13 YEAR 97 TIME 02:45 AM/PM P COLLECTED BY WGS

TYPE OF SYSTEM		SAMPLE IS (Public Systems Only)		WATER SOURCE	
☐ Public	☐ Dairy	☐ Distribution	☑ Raw	☐ River	☐ Lake
☐ Individual	☐ Bottled	☐ Construction	☐ Repeat	☐ Well	Well Depth ____
☐ School	✓ IRR	☐ Special		Chlorine Residual ____	

Ownership or other information:

LABORATORY REPORT (Do not write below)
Water of satisfactory bacteriological quality must be free from Coliform organisms

Coliform Organisms
☑ Not Found
☐ Found
☐ Total
☐ Fecal
☐ Repeat samples required
☐ Unsuitable — See below

TC : <4
FC : <4
FS : <4
/100 ml

Heavy silt

UNSUITABLE FOR ANALYSIS – PLEASE RESUBMIT

☐ Sample too old. Sample not received within 30 hours of collection
☐ Date discrepancy or form incomplete (See encircled item)
☐ Leaked in transit
☐ Other
☐ Quantity insufficient for analysis (100 mL required)
☐ Heavy (silt/bacterial growth) present, possibly compromising test results

RAT/FML

APPENDIX 3

Laboratory Reports of Semivolatile Organic Analyses

Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
06/16/92

JOB NUMBER: 920923 CUSTOMER: POLLUTION CONTROL SERVICES ATTN: CHUCK WALLGREN

CLIENT I.D.........: 23549
DATE SAMPLED.......: 05/12/92
TIME SAMPLED.......: :
WORK DESCRIPTION...: 23549

LABORATORY I.D...: 920923-0001
DATE RECEIVED....: 05/15/92
TIME RECEIVED....: 08:15
REMARKS..........: SAMPLED BY BILL STEIN
WELL ID 19-4EB6

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
GC/MS Semivolatile Organics		*1		SW-846 8270	05/26/92	GEF
Acenaphthene	<10	10	ug/l	SW-846 8270		
Acenaphthylene	<10	10	ug/l	SW-846 8270		
Anthracene	<10	10	ug/l	SW-846 8270		
Benzo(a)anthracene	<10	10	ug/l	SW-846 8270		
Benzo(b)fluoranthene	<10	10	ug/l	SW-846 8270		
Benzo(k)fluoranthene	<10	10	ug/l	SW-846 8270		
Benzoic Acid	<50	50	ug/l	SW-846 8270		
Benzo(ghi)perylene	<10	10	ug/l	SW-846 8270		
Benzo(a)pyrene	<10	10	ug/l	SW-846 8270		
Benzyl Alcohol	<20	20	ug/l	SW-846 8270		
Bis(2-chloroethoxy)methane	<10	10	ug/l	SW-846 8270		
Bis(2-chloroethyl)ether	<10	10	ug/l	SW-846 8270		
Bis(2-chloroisopropyl)ether	<10	10	ug/l	SW-846 8270		
Bis(2-ethylhexyl) phthalate	<50	50	ug/l	SW-846 8270		
4-Bromophenyl phenyl ether	<10	10	ug/l	SW-846 8270		
Butyl benzyl phthalate	<10	10	ug/l	SW-846 8270		
4-Chloroaniline	<50	50	ug/l	SW-846 8270		
4-Chloro-3-methylphenol	<20	20	ug/l	SW-846 8270		
2-Chloronaphthalene	<10	10	ug/l	SW-846 8270		
2-Chlorophenol	<10	10	ug/l	SW-846 8270		
4-Chlorophenyl phenyl ether	<10	10	ug/l	SW-846 8270		
Chrysene	<10	10	ug/l	SW-846 8270		
1,2-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
1,3-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
1,4-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
3,3'-Dichlorobenzidine	<20	20	ug/l	SW-846 8270		
2,4-Dichlorophenol	<10	10	ug/l	SW-846 8270		
Dibenzo(a,h)anthracene	<10	10	ug/l	SW-846 8270		
Dibenzofuran	<10	10	ug/l	SW-846 8270		
Diethyl phthalate	<10	10	ug/l	SW-846 8270		
2,4-Dimethylphenol	<20	20	ug/L	SW-846 8270		
Dimethyl phthalate	<10	10	ug/l	SW-846 8270		
4,6-Dinitro-2-methylphenol	<50	50	ug/l	SW-846 8270		
2,4-Dinitrophenol	<50	50	ug/l	SW-846 8270		
2,4-Dinitrotoluene	<10	10	ug/l	SW-846 8270		
2,6-Dinitrotoluene	<10	10	ug/l	SW-846 8270		
Di-n-octyl phthalate	<10	10	ug/l	SW-846 8270		
Fluorene	<10	10	ug/l	SW-846 8270		
Fluoranthene	<10	10	ug/l	SW-846 8270		
Hexachlorobenzene	<10	10	ug/l	SW-846 8270		
Hexachlorobutadiene	<10	10	ug/l	SW-846 8270		
Hexachlorocyclopentadiene	<10	10	ug/l	SW-846 8270		
Hexachloroethane	<10	10	ug/l	SW-846 8270		

1733 NORTH PADRE ISLAND DRIVE
CORPUS CHRISTI, TX 78408
(512) 289-2673

Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
06/16/92

JOB NUMBER: 920923 CUSTOMER: POLLUTION CONTROL SERVICES ATTN: CHUCK WALLGREN

CLIENT I.D.........: 23549
DATE SAMPLED.......: 05/12/92
TIME SAMPLED.......: :
WORK DESCRIPTION...: 23549

LABORATORY I.D...: 920923-0001
DATE RECEIVED....: 05/15/92
TIME RECEIVED....: 08:15
REMARKS..........: SAMPLED BY BILL STEIN
WELL ID 19-6EB6

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Ideno(1,2,3-cd)pyrene	<10	10	ug/l	SW-846 8270		
Isophorone	<10	10	ug/l	SW-846 8270		
2-Methylnaphthalene	<10	10	ug/l	SW-846 8270		
2-Methylphenol	<10	10	ug/l	SW-846 8270		
4-Methylphenol	<10	10	ug/l	SW-846 8270		
2-Nitroaniline	<50	50	ug/l	SW-846 8270		
3-Nitroaniline	<50	50	ug/l	SW-846 8270		
4-Nitroaniline	<20	20	ug/l	SW-846 8270		
2-Nitrophenol	<10	10	ug/l	SW-846 8270		
4-Nitrophenol	<50	50	ug/l	SW-846 8270		
N-Nitrosodi-n-propylamine	<10	10	ug/l	SW-846 8270		
N-Nitrosodiphenylamine	<10	10	ug/l	SW-846 8270		
Naphthalene	<10	10	ug/l	SW-846 8270		
Nitrobenzene	<10	10	ug/l	SW-846 8270		
Pentachlorophenol	<50	50	ug/l	SW-846 8270		
Phenanthrene	<10	10	ug/l	SW-846 8270		
Phenol	<10	10	ug/l	SW-846 8270		
Pyrene	<10	10	ug/l	SW-846 8270		
1,2,4-Trichlorobenzene	<10	10	ug/l	SW-846 8270		
2,4,5-Trichlorophenol	<10	10	ug/l	SW-846 8270		
2,4,6-Trichlorophenol	<10	10	ug/l	SW-846 8270		
Extraction - Semivolatiles (BNA)	completed			SW-846 3510/3520	05/18/92	HJK
Atrazine	not found			SW-846-8270	05/26/92	GEF
Aldicarb	not found			SW-846-8270	05/26/92	GEF
Dicrotophos	not found			SW-846-8270	05/26/92	GEF
Chlorsulfuron	not found			SW-846-8270	05/26/92	GEF
Carbofuran	not found			SW-846-8270	05/26/92	GEF
Picloram + 2,4-D	not found			SW-846-8270	05/26/92	GEF
Metsulfuron Methyl	not found			SW-846-8270	05/26/92	GEF
Metolachlor	not found			SW-846-8270	05/26/92	GEF
Dicamba	not found			SW-846-8270	05/26/92	GEF
Methomyl	not found			SW-846-8270	05/26/92	GEF

1733 NORTH PADRE ISLAND DRIVE
CORPUS CHRISTI, TX 78408
(512) 289-2673

Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

L A B O R A T O R Y   T E S T S   R E S U L T S
06/16/92

JOB NUMBER: 920923   CUSTOMER: POLLUTION CONTROL SERVICES   ATTN: CHUCK WALLGREN

CLIENT I.D.........: 23573
DATE SAMPLED.......: 05/14/92
TIME SAMPLED.......: 12:00
WORK DESCRIPTION...: 23573

LABORATORY I.D...: 920923-0005
DATE RECEIVED....: 05/15/92
TIME RECEIVED....: 08:15
REMARKS..........: SAMPLED BY BILL STEIN
WELL ID 20-7AA8

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
GC/MS Semivolatile Organics		*1		SW-846 8270	05/26/92	GEF
Acenaphthene	<10	10	ug/l	SW-846 8270		
Acenaphthylene	<10	10	ug/l	SW-846 8270		
Anthracene	<10	10	ug/l	SW-846 8270		
Benzo(a)anthracene	<10	10	ug/l	SW-846 8270		
Benzo(b)fluoranthene	<10	10	ug/l	SW-846 8270		
Benzo(k)fluoranthene	<10	10	ug/l	SW-846 8270		
Benzoic Acid	<50	50	ug/l	SW-846 8270		
Benzo(ghi)perylene	<10	10	ug/l	SW-846 8270		
Benzo(a)pyrene	<10	10	ug/l	SW-846 8270		
Benzyl Alcohol	<20	20	ug/l	SW-846 8270		
Bis(2-chloroethoxy)methane	<10	10	ug/l	SW-846 8270		
Bis(2-chloroethyl)ether	<10	10	ug/l	SW-846 8270		
Bis(2-chloroisopropyl)ether	<10	10	ug/l	SW-846 8270		
Bis(2-ethylhexyl) phthalate	<50	50	ug/l	SW-846 8270		
4-Bromophenyl phenyl ether	<10	10	ug/l	SW-846 8270		
Butyl benzyl phthalate	<10	10	ug/l	SW-846 8270		
4-Chloroaniline	<50	50	ug/l	SW-846 8270		
4-Chloro-3-methylphenol	<20	20	ug/l	SW-846 8270		
2-Chloronaphthalene	<10	10	ug/l	SW-846 8270		
2-Chlorophenol	<10	10	ug/l	SW-846 8270		
4-Chlorophenyl phenyl ether	<10	10	ug/l	SW-846 8270		
Chrysene	<10	10	ug/l	SW-846 8270		
1,2-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
1,3-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
1,4-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
3,3'-Dichlorobenzidine	<20	20	ug/l	SW-846 8270		
2,4-Dichlorophenol	<10	10	ug/l	SW-846 8270		
Dibenzo(a,h)anthracene	<10	10	ug/l	SW-846 8270		
Dibenzofuran	<10	10	ug/l	SW-846 8270		
Diethyl phthalate	<10	10	ug/l	SW-846 8270		
2,4-Dimethylphenol	<20	20	ug/L	SW-846 8270		
Dimethyl phthalate	<10	10	ug/l	SW-846 8270		
4,6-Dinitro-2-methylphenol	<50	50	ug/l	SW-846 8270		
2,4-Dinitrophenol	<50	50	ug/l	SW-846 8270		
2,4-Dinitrotoluene	<10	10	ug/l	SW-846 8270		
2,6-Dinitrotoluene	<10	10	ug/l	SW-846 8270		
Di-n-octyl phthalate	<10	10	ug/l	SW-846 8270		
Fluorene	<10	10	ug/l	SW-846 8270		
Fluoranthene	<10	10	ug/l	SW-846 8270		
Hexachlorobenzene	<10	10	ug/l	SW-846 8270		
Hexachlorobutadiene	<10	10	ug/l	SW-846 8270		
Hexachlorocyclopentadiene	<10	10	ug/l	SW-846 8270		
Hexachloroethane	<10	10	ug/l	SW-846 8270		

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CORE LABORATORIES

L A B O R A T O R Y   T E S T S   R E S U L T S
06/16/92

JOB NUMBER: 920923   CUSTOMER: POLLUTION CONTROL SERVICES   ATTN: CHUCK WALLGREN

CLIENT I.D.........: 23573
DATE SAMPLED.......: 05/14/92
TIME SAMPLED.......: 12:00
WORK DESCRIPTION...: 23573

LABORATORY I.D...: 920923-0005
DATE RECEIVED....: 05/15/92
TIME RECEIVED....: 08:15
REMARKS..........: SAMPLED BY BILL STEIN
WELL ID 20-7AAB

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Ideno(1,2,3-cd)pyrene	<10	10	ug/l	SW-846 8270		
Isophorone	<10	10	ug/l	SW-846 8270		
2-Methylnaphthalene	<10	10	ug/l	SW-846 8270		
2-Methylphenol	<10	10	ug/l	SW-846 8270		
4-Methylphenol	<10	10	ug/l	SW-846 8270		
2-Nitroaniline	<50	50	ug/l	SW-846 8270		
3-Nitroaniline	<50	50	ug/l	SW-846 8270		
4-Nitroaniline	<20	20	ug/l	SW-846 8270		
2-Nitrophenol	<10	10	ug/l	SW-846 8270		
4-Nitrophenol	<50	50	ug/l	SW-846 8270		
N-Nitrosodi-n-propylamine	<10	10	ug/l	SW-846 8270		
N-Nitrosodiphenylamine	<10	10	ug/l	SW-846 8270		
Naphthalene	<10	10	ug/l	SW-846 8270		
Nitrobenzene	<10	10	ug/l	SW-846 8270		
Pentachlorophenol	<50	50	ug/l	SW-846 8270		
Phenanthrene	<10	10	ug/l	SW-846 8270		
Phenol	<10	10	ug/l	SW-846 8270		
Pyrene	<10	10	ug/l	SW-846 8270		
1,2,4-Trichlorobenzene	<10	10	ug/l	SW-846 8270		
2,4,5-Trichlorophenol	<10	10	ug/l	SW-846 8270		
2,4,6-Trichlorophenol	<10	10	ug/l	SW-846 8270		
Extraction - Semivolatiles (BNA)	completed			SW-846 3510/3520	05/18/92	HJK
Atrazine	not found			SW-846-8270	05/26/92	GEF
Aldicarb	not found			SW-846-8270	05/26/92	GEF
Dicrotophos	not found			SW-846-8270	05/26/92	GEF
Chlorsulfuron	not found			SW-846-8270	05/26/92	GEF
Carbofuran	not found			SW-846-8270	05/26/92	GEF
Picloram + 2,4-D	not found			SW-846-8270	05/26/92	GEF
Metsulfuron Methyl	not found			SW-846-8270	05/26/92	GEF
Metolachlor	not found			SW-846-8270	05/26/92	GEF
Dicamba	not found			SW-846-8270	05/26/92	GEF
Methomyl	not found			SW-846-8270	05/26/92	GEF

1733 NORTH PADRE ISLAND DRIVE
CORPUS CHRISTI, TX 78408
(512) 289-2673

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CORE LABORATORIES

LABORATORY TESTS RESULTS
06/16/92

JOB NUMBER: 920923 CUSTOMER: POLLUTION CONTROL SERVICES ATTN: CHUCK WALLGREN

CLIENT I.D.........: 23550
DATE SAMPLED.......: 05/13/92
TIME SAMPLED.......: 10:45
WORK DESCRIPTION...: 23550

LABORATORY I.D...: 920923-0002
DATE RECEIVED....: 05/15/92
TIME RECEIVED....: 08:15
REMARKS..........: SAMPLED BY BILL STEIN
WELL ID 20-7HD6

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
GC/MS Semivolatile Organics		*1		SW-846 8270	05/26/92	GEF
Acenaphthene	<10	10	ug/l	SW-846 8270		
Acenaphthylene	<10	10	ug/l	SW-846 8270		
Anthracene	<10	10	ug/l	SW-846 8270		
Benzo(a)anthracene	<10	10	ug/l	SW-846 8270		
Benzo(b)fluoranthene	<10	10	ug/l	SW-846 8270		
Benzo(k)fluoranthene	<10	10	ug/l	SW-846 8270		
Benzoic Acid	<50	50	ug/l	SW-846 8270		
Benzo(ghi)perylene	<10	10	ug/l	SW-846 8270		
Benzo(a)pyrene	<10	10	ug/l	SW-846 8270		
Benzyl Alcohol	<20	20	ug/l	SW-846 8270		
Bis(2-chloroethoxy)methane	<10	10	ug/l	SW-846 8270		
Bis(2-chloroethyl)ether	<10	10	ug/l	SW-846 8270		
Bis(2-chloroisopropyl)ether	<10	10	ug/l	SW-846 8270		
Bis(2-ethylhexyl) phthalate	<50	50	ug/l	SW-846 8270		
4-Bromophenyl phenyl ether	<10	10	ug/l	SW-846 8270		
Butyl benzyl phthalate	<10	10	ug/l	SW-846 8270		
4-Chloroaniline	<50	50	ug/l	SW-846 8270		
4-Chloro-3-methylphenol	<20	20	ug/l	SW-846 8270		
2-Chloronaphthalene	<10	10	ug/l	SW-846 8270		
2-Chlorophenol	<10	10	ug/l	SW-846 8270		
4-Chlorophenyl phenyl ether	<10	10	ug/l	SW-846 8270		
Chrysene	<10	10	ug/l	SW-846 8270		
1,2-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
1,3-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
1,4-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
3,3'-Dichlorobenzidine	<20	20	ug/l	SW-846 8270		
2,4-Dichlorophenol	<10	10	ug/l	SW-846 8270		
Dibenzo(a,h)anthracene	<10	10	ug/l	SW-846 8270		
Dibenzofuran	<10	10	ug/l	SW-846 8270		
Diethyl phthalate	<10	10	ug/l	SW-846 8270		
2,4-Dimethylphenol	<20	20	ug/L	SW-846 8270		
Dimethyl phthalate	<10	10	ug/l	SW-846 8270		
4,6-Dinitro-2-methylphenol	<50	50	ug/l	SW-846 8270		
2,4-Dinitrophenol	<50	50	ug/l	SW-846 8270		
2,4-Dinitrotoluene	<10	10	ug/l	SW-846 8270		
2,6-Dinitrotoluene	<10	10	ug/l	SW-846 8270		
Di-n-octyl phthalate	<10	10	ug/l	SW-846 8270		
Fluorene	<10	10	ug/l	SW-846 8270		
Fluoranthene	<10	10	ug/l	SW-846 8270		
Hexachlorobenzene	<10	10	ug/l	SW-846 8270		
Hexachlorobutadiene	<10	10	ug/l	SW-846 8270		
Hexachlorocyclopentadiene	<10	10	ug/l	SW-846 8270		
Hexachloroethane	<10	10	ug/l	SW-846 8270		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
06/16/92

JOB NUMBER: 920923 CUSTOMER: POLLUTION CONTROL SERVICES ATTN: CHUCK WALLGREN

CLIENT I.D.........: 23550
DATE SAMPLED.......: 05/13/92
TIME SAMPLED.......: 10:45
WORK DESCRIPTION...: 23550

LABORATORY I.D...: 920923-0002
DATE RECEIVED....: 05/15/92
TIME RECEIVED....: 08:15
REMARKS..........: SAMPLED BY BILL STEIN
WELL ID 20-7HD6

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Ideno(1,2,3-cd)pyrene	<10	10	ug/l	SW-846 8270		
Isophorone	<10	10	ug/l	SW-846 8270		
2-Methylnaphthalene	<10	10	ug/l	SW-846 8270		
2-Methylphenol	<10	10	ug/l	SW-846 8270		
4-Methylphenol	<10	10	ug/l	SW-846 8270		
2-Nitroaniline	<50	50	ug/l	SW-846 8270		
3-Nitroaniline	<50	50	ug/l	SW-846 8270		
4-Nitroaniline	<20	20	ug/l	SW-846 8270		
2-Nitrophenol	<10	10	ug/l	SW-846 8270		
4-Nitrophenol	<50	50	ug/l	SW-846 8270		
N-Nitrosodi-n-propylamine	<10	10	ug/l	SW-846 8270		
N-Nitrosodiphenylamine	<10	10	ug/l	SW-846 8270		
Naphthalene	<10	10	ug/l	SW-846 8270		
Nitrobenzene	<10	10	ug/l	SW-846 8270		
Pentachlorophenol	<50	50	ug/l	SW-846 8270		
Phenanthrene	<10	10	ug/l	SW-846 8270		
Phenol	<10	10	ug/l	SW-846 8270		
Pyrene	<10	10	ug/l	SW-846 8270		
1,2,4-Trichlorobenzene	<10	10	ug/l	SW-846 8270		
2,4,5-Trichlorophenol	<10	10	ug/l	SW-846 8270		
2,4,6-Trichlorophenol	<10	10	ug/l	SW-846 8270		
Extraction - Semivolatiles (BNA)	completed			SW-846 3510/3520	05/18/92	HJK
Atrazine	not found			SW-846-8270	05/26/92	GEF
Aldicarb	not found			SW-846-8270	05/26/92	GEF
Dicrotophos	not found			SW-846-8270	05/26/92	GEF
Chlorsulfuron	not found			SW-846-8270	05/26/92	GEF
Carbofuran	not found			SW-846-8270	05/26/92	GEF
Picloram + 2,4-D	not found			SW-846-8270	05/26/92	GEF
Metsulfuron Methyl	not found			SW-846-8270	05/26/92	GEF
Metolachlor	not found			SW-846-8270	05/26/92	GEF
Dicamba	not found			SW-846-8270	05/26/92	GEF
Methomyl	not found			SW-846-8270	05/26/92	GEF

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LABORATORY TESTS RESULTS
06/16/92

JOB NUMBER: 920923 CUSTOMER: POLLUTION CONTROL SERVICES ATTN: CHUCK WALLGREN

CLIENT I.D.........: 23551
DATE SAMPLED.......: 05/13/92
TIME SAMPLED.......: 12:30
WORK DESCRIPTION...: 23551

LABORATORY I.D...: 920923-0003
DATE RECEIVED....: 05/15/92
TIME RECEIVED....: 08:15
REMARKS..........: SAMPLED BY BILL STEIN
WELL ID 27-3BD8

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Ideno(1,2,3-cd)pyrene	<10	10	ug/l	SW-846 8270		
Isophorone	<10	10	ug/l	SW-846 8270		
2-Methylnaphthalene	<10	10	ug/l	SW-846 8270		
2-Methylphenol	<10	10	ug/l	SW-846 8270		
4-Methylphenol	<10	10	ug/l	SW-846 8270		
2-Nitroaniline	<50	50	ug/l	SW-846 8270		
3-Nitroaniline	<50	50	ug/l	SW-846 8270		
4-Nitroaniline	<20	20	ug/l	SW-846 8270		
2-Nitrophenol	<10	10	ug/l	SW-846 8270		
4-Nitrophenol	<50	50	ug/l	SW-846 8270		
N-Nitrosodi-n-propylamine	<10	10	ug/l	SW-846 8270		
N-Nitrosodiphenylamine	<10	10	ug/l	SW-846 8270		
Naphthalene	<10	10	ug/l	SW-846 8270		
Nitrobenzene	<10	10	ug/l	SW-846 8270		
Pentachlorophenol	<50	50	ug/l	SW-846 8270		
Phenanthrene	<10	10	ug/l	SW-846 8270		
Phenol	<10	10	ug/l	SW-846 8270		
Pyrene	<10	10	ug/l	SW-846 8270		
1,2,4-Trichlorobenzene	<10	10	ug/l	SW-846 8270		
2,4,5-Trichlorophenol	<10	10	ug/l	SW-846 8270		
2,4,6-Trichlorophenol	<10	10	ug/l	SW-846 8270		
Extraction - Semivolatiles (BNA)	completed			SW-846 3510/3520	05/18/92	HJK
Atrazine	not found			SW-846-8270	05/26/92	GEF
Aldicarb	not found			SW-846-8270	05/26/92	GEF
Dicrotophos	not found			SW-846-8270	05/26/92	GEF
Chlorsulfuron	not found			SW-846-8270	05/26/92	GEF
Carbofuran	not found			SW-846-8270	05/26/92	GEF
Picloram + 2,4-D	not found			SW-846-8270	05/26/92	GEF
Metsulfuron Methyl	not found			SW-846-8270	05/26/92	GEF
Metolachlor	not found			SW-846-8270	05/26/92	GEF
Dicamba	not found			SW-846-8270	05/26/92	GEF
Methomyl	not found			SW-846-8270	05/26/92	GEF

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L A B O R A T O R Y   T E S T S   R E S U L T S
06/16/92

JOB NUMBER: 920923   CUSTOMER: POLLUTION CONTROL SERVICES   ATTN: CHUCK WALLGREN

CLIENT I.D.........: 23551
DATE SAMPLED.......: 05/13/92
TIME SAMPLED.......: 12:30
WORK DESCRIPTION...: 23551

LABORATORY I.D...: 920923-0003
DATE RECEIVED....: 05/15/92
TIME RECEIVED....: 08:15
REMARKS..........: SAMPLED BY BILL STEIN
WELL ID 27-38D8

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
GC/MS Semivolatile Organics		*1		SW-846 8270	05/26/92	GEF
Acenaphthene	<10	10	ug/l	SW-846 8270		
Acenaphthylene	<10	10	ug/l	SW-846 8270		
Anthracene	<10	10	ug/l	SW-846 8270		
Benzo(a)anthracene	<10	10	ug/l	SW-846 8270		
Benzo(b)fluoranthene	<10	10	ug/l	SW-846 8270		
Benzo(k)fluoranthene	<10	10	ug/l	SW-846 8270		
Benzoic Acid	<50	50	ug/l	SW-846 8270		
Benzo(ghi)perylene	<10	10	ug/l	SW-846 8270		
Benzo(a)pyrene	<10	10	ug/l	SW-846 8270		
Benzyl Alcohol	<20	20	ug/l	SW-846 8270		
Bis(2-chloroethoxy)methane	<10	10	ug/l	SW-846 8270		
Bis(2-chloroethyl)ether	<10	10	ug/l	SW-846 8270		
Bis(2-chloroisopropyl)ether	<10	10	ug/l	SW-846 8270		
Bis(2-ethylhexyl) phthalate	<50	50	ug/l	SW-846 8270		
4-Bromophenyl phenyl ether	<10	10	ug/l	SW-846 8270		
Butyl benzyl phthalate	<10	10	ug/l	SW-846 8270		
4-Chloroaniline	<50	50	ug/l	SW-846 8270		
4-Chloro-3-methylphenol	<20	20	ug/l	SW-846 8270		
2-Chloronaphthalene	<10	10	ug/l	SW-846 8270		
2-Chlorophenol	<10	10	ug/l	SW-846 8270		
4-Chlorophenyl phenyl ether	<10	10	ug/l	SW-846 8270		
Chrysene	<10	10	ug/l	SW-846 8270		
1,2-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
1,3-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
1,4-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
3,3'-Dichlorobenzidine	<20	20	ug/l	SW-846 8270		
2,4-Dichlorophenol	<10	10	ug/l	SW-846 8270		
Dibenzo(a,h)anthracene	<10	10	ug/l	SW-846 8270		
Dibenzofuran	<10	10	ug/l	SW-846 8270		
Diethyl phthalate	<10	10	ug/l	SW-846 8270		
2,4-Dimethylphenol	<20	20	ug/L	SW-846 8270		
Dimethyl phthalate	<10	10	ug/l	SW-846 8270		
4,6-Dinitro-2-methylphenol	<50	50	ug/l	SW-846 8270		
2,4-Dinitrophenol	<50	50	ug/l	SW-846 8270		
2,4-Dinitrotoluene	<10	10	ug/l	SW-846 8270		
2,6-Dinitrotoluene	<10	10	ug/l	SW-846 8270		
Di-n-octyl phthalate	<10	10	ug/l	SW-846 8270		
Fluorene	<10	10	ug/l	SW-846 8270		
Fluoranthene	<10	10	ug/l	SW-846 8270		
Hexachlorobenzene	<10	10	ug/l	SW-846 8270		
Hexachlorobutadiene	<10	10	ug/l	SW-846 8270		
Hexachlorocyclopentadiene	<10	10	ug/l	SW-846 8270		
Hexachloroethane	<10	10	ug/l	SW-846 8270		

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L A B O R A T O R Y   T E S T S   R E S U L T S
06/16/92

JOB NUMBER: 920923   CUSTOMER: POLLUTION CONTROL SERVICES   ATTN: CHUCK WALLGREN

CLIENT I.D.........: 23552
DATE SAMPLED.......: 05/13/92
TIME SAMPLED.......: 15:45
WORK DESCRIPTION...: 23552

LABORATORY I.D...: 920923-0004
DATE RECEIVED....: 05/15/92
TIME RECEIVED....: 08:15
REMARKS..........: SAMPLED BY BILL STEIN
WELL ID 28-3FHS

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
GC/MS Semivolatile Organics		*1		SW-846 8270	05/26/92	GEF
Acenaphthene	<10	10	ug/l	SW-846 8270		
Acenaphthylene	<10	10	ug/l	SW-846 8270		
Anthracene	<10	10	ug/l	SW-846 8270		
Benzo(a)anthracene	<10	10	ug/l	SW-846 8270		
Benzo(b)fluoranthene	<10	10	ug/l	SW-846 8270		
Benzo(k)fluoranthene	<10	10	ug/l	SW-846 8270		
Benzoic Acid	<50	50	ug/l	SW-846 8270		
Benzo(ghi)perylene	<10	10	ug/l	SW-846 8270		
Benzo(a)pyrene	<10	10	ug/l	SW-846 8270		
Benzyl Alcohol	<20	20	ug/l	SW-846 8270		
Bis(2-chloroethoxy)methane	<10	10	ug/l	SW-846 8270		
Bis(2-chloroethyl)ether	<10	10	ug/l	SW-846 8270		
Bis(2-chloroisopropyl)ether	<10	10	ug/l	SW-846 8270		
Bis(2-ethylhexyl) phthalate	<50	50	ug/l	SW-846 8270		
4-Bromophenyl phenyl ether	<10	10	ug/l	SW-846 8270		
Butyl benzyl phthalate	<10	10	ug/l	SW-846 8270		
4-Chloroaniline	<50	50	ug/l	SW-846 8270		
4-Chloro-3-methylphenol	<20	20	ug/l	SW-846 8270		
2-Chloronaphthalene	<10	10	ug/l	SW-846 8270		
2-Chlorophenol	<10	10	ug/l	SW-846 8270		
4-Chlorophenyl phenyl ether	<10	10	ug/l	SW-846 8270		
Chrysene	<10	10	ug/l	SW-846 8270		
1,2-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
1,3-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
1,4-Dichlorobenzene	<10	10	ug/l	SW-846 8270		
3,3'-Dichlorobenzidine	<20	20	ug/l	SW-846 8270		
2,4-Dichlorophenol	<10	10	ug/l	SW-846 8270		
Dibenzo(a,h)anthracene	<10	10	ug/l	SW-846 8270		
Dibenzofuran	<10	10	ug/l	SW-846 8270		
Diethyl phthalate	<10	10	ug/l	SW-846 8270		
2,4-Dimethylphenol	<20	20	ug/L	SW-846 8270		
Dimethyl phthalate	<10	10	ug/l	SW-846 8270		
4,6-Dinitro-2-methylphenol	<50	50	ug/l	SW-846 8270		
2,4-Dinitrophenol	<50	50	ug/l	SW-846 8270		
2,4-Dinitrotoluene	<10	10	ug/l	SW-846 8270		
2,6-Dinitrotoluene	<10	10	ug/l	SW-846 8270		
Di-n-octyl phthalate	<10	10	ug/l	SW-846 8270		
Fluorene	<10	10	ug/l	SW-846 8270		
Fluoranthene	<10	10	ug/l	SW-846 8270		
Hexachlorobenzene	<10	10	ug/l	SW-846 8270		
Hexachlorobutadiene	<10	10	ug/l	SW-846 8270		
Hexachlorocyclopentadiene	<10	10	ug/l	SW-846 8270		
Hexachloroethane	<10	10	ug/l	SW-846 8270		

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L A B O R A T O R Y   T E S T S   R E S U L T S
06/16/92

JOB NUMBER: 920923   CUSTOMER: POLLUTION CONTROL SERVICES   ATTN: CHUCK WALLGREN

CLIENT I.D.........: 23552
DATE SAMPLED.......: 05/13/92
TIME SAMPLED.......: 15:45
WORK DESCRIPTION...: 23552

LABORATORY I.D...: 920923-0004
DATE RECEIVED....: 05/15/92
TIME RECEIVED....: 08:15
REMARKS..........: SAMPLED BY BILL STEIN
WELL ID 28-3FHS

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Ideno(1,2,3-cd)pyrene	<10	10	ug/l	SW-846 8270		
Isophorone	<10	10	ug/l	SW-846 8270		
2-Methylnaphthalene	<10	10	ug/l	SW-846 8270		
2-Methylphenol	<10	10	ug/l	SW-846 8270		
4-Methylphenol	<10	10	ug/l	SW-846 8270		
2-Nitroaniline	<50	50	ug/l	SW-846 8270		
3-Nitroaniline	<50	50	ug/l	SW-846 8270		
4-Nitroaniline	<20	20	ug/l	SW-846 8270		
2-Nitrophenol	<10	10	ug/l	SW-846 8270		
4-Nitrophenol	<50	50	ug/l	SW-846 8270		
N-Nitrosodi-n-propylamine	<10	10	ug/l	SW-846 8270		
N-Nitrosodiphenylamine	<10	10	ug/l	SW-846 8270		
Naphthalene	<10	10	ug/l	SW-846 8270		
Nitrobenzene	<10	10	ug/l	SW-846 8270		
Pentachlorophenol	<50	50	ug/l	SW-846 8270		
Phenanthrene	<10	10	ug/l	SW-846 8270		
Phenol	<10	10	ug/l	SW-846 8270		
Pyrene	<10	10	ug/l	SW-846 8270		
1,2,4-Trichlorobenzene	<10	10	ug/l	SW-846 8270		
2,4,5-Trichlorophenol	<10	10	ug/l	SW-846 8270		
2,4,6-Trichlorophenol	<10	10	ug/l	SW-846 8270		
Extraction - Semivolatiles (BNA)	completed			SW-846 3510/3520	05/18/92	HJK
Atrazine	not found			SW-846-8270	05/26/92	GEF
Aldicarb	not found			SW-846-8270	05/26/92	GEF
Dicrotophos	not found			SW-846-8270	05/26/92	GEF
Chlorsulfuron	not found			SW-846-8270	05/26/92	GEF
Carbofuran	not found			SW-846-8270	05/26/92	GEF
Picloram + 2,4-D	not found			SW-846-8270	05/26/92	GEF
Metsulfuron Methyl	not found			SW-846-8270	05/26/92	GEF
Metolachlor	not found			SW-846-8270	05/26/92	GEF
Dicamba	not found			SW-846-8270	05/26/92	GEF
Methomyl	not found			SW-846-8270	05/26/92	GEF

1733 NORTH PADRE ISLAND DRIVE
CORPUS CHRISTI, TX 78408
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APPENDIX 4

Laboratory Reports of Volatile Organic Analyses

Western Atlas International
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CORE LABORATORIES

LABORATORY TESTS RESULTS
06/29/92

JOB NUMBER: 921158 CUSTOMER: POLLUTION CONTROL SERVICES ATTN: CHUCK WALLGREN

CLIENT I.D.........: 24003
DATE SAMPLED.......: 06/10/92
TIME SAMPLED.......: 15:00
WORK DESCRIPTION...: 24003

LABORATORY I.D...: 921158-0001
DATE RECEIVED....: 06/13/92
TIME RECEIVED....: 11:00
REMARKS..........: WELL ID 19-6EB6

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
GC/MS VOLATILE ORGANICS (WATER)		*1		SW-846 8260	06/17/92	BJH
Acetone	<50	50	ug/l	SW-846 8260		
Acrolein	<50	50	ug/l	SW-846 8260		
Acrylonitrile	<50	50	ug/l	SW-846 8260		
Benzene	<5	5	ug/l	SW-846 8260		
Bromodichloromethane	<5	5	ug/l	SW-846 8260		
Bromoform	<5	5	ug/l	SW-846 8260		
Bromomethane	<5	5	ug/l	SW-846 8260		
2-Butanone	<10	10	ug/l	SW-846 8260		
Carbon disulfide	<5	5	ug/l	SW-846 8260		
Carbon tetrachloride	<5	5	ug/l	SW-846 8260		
Chlorobenzene	<5	5	ug/l	SW-846 8260		
Chlorodibromomethane	<5	5	ug/l	SW-846 8260		
Chloroethane	<5	5	ug/l	SW-846 8260		
2-Chloroethylvinyl ether	<5	5	ug/l	SW-846 8260		
Chloroform	<5	5	ug/l	SW-846 8260		
Chloromethane	<5	5	ug/l	SW-846 8260		
Dibromomethane	<5	5	ug/l	SW-846 8260		
Dichlorodifluoromethane	<10	10	ug/l	SW-846 8260		
1,1-Dichloroethane	<5	5	ug/l	SW-846 8260		
1,2-Dichloroethane	5	5	ug/l	SW-846 8260		
1,1-Dichloroethene	<5	5	ug/l	SW-846 8260		
trans-1,2-Dichloroethene	<5	5	ug/l	SW-846 8260		
1,2-Dichloropropane	<5	5	ug/l	SW-846 8260		
cis-1,3-Dichloropropene	<5	5	ug/l	SW-846 8260		
trans-1,3-Dichloropropene	<5	5	ug/l	SW-846 8270		
Ethylbenzene	<5	5	ug/l	SW-846 8260		
Ethyl methacrylate	<5	5	ug/l	SW-846 8260		
2-Hexanone	<5	5	ug/l	SW-846 8260		
Iodomethane	<5	5	ug/l	SW-846 8260		
Methylene chloride	<5	5	ug/l	SW-846 8260		
4-Methyl-2-pentanone	<5	5	ug/l	SW-846 8260		
Styrene	<5	5	ug/l	SW-846 8260		
1,1,2,2-Tetrachloroethane	<5	5	ug/l	SW-846 8260		
Tetrachloroethene	<5	5	ug/l	SW-846 8260		
Toluene	<5	5	ug/l	SW-846 8260		
1,1,1-Trichloroethane	<5	5	ug/l	SW-846 8260		
1,1,2-Trichloroethane	<5	5	ug/l	SW-846 8260		
Trichloroethene	<5	5	ug/l	SW-846 8260		
Trichlorofluoromethane	<5	5	ug/l	SW-846 8260		
1,2,3-Trichloropropane	<5	5	ug/l	SW-846 8260		
Vinyl acetate	<10	10	ug/l	SW-846 8260		
Vinyl chloride	<5	5	ug/l	SW-846 8260		
Total Xylenes	<15	15	ug/l	SW-846 8260		

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LABORATORY TESTS RESULTS
06/29/92

JOB NUMBER: 921158 CUSTOMER: POLLUTION CONTROL SERVICES ATTN: CHUCK WALLGREN

CLIENT I.D.........: 24004
DATE SAMPLED.......: 06/10/92
TIME SAMPLED.......: 14:55
WORK DESCRIPTION...: 24004

LABORATORY I.D...: 921158-0002
DATE RECEIVED....: 06/13/92
TIME RECEIVED....: 11:00
REMARKS..........: WELL ID 01-BBB2 (Field Blank)

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
GC/MS VOLATILE ORGANICS (WATER)		*1		SW-846 8260	06/17/92	BJH
Acetone	<50	50	ug/l	SW-846 8260		
Acrolein	<50	50	ug/l	SW-846 8260		
Acrylonitrile	<50	50	ug/l	SW-846 8260		
Benzene	<5	5	ug/l	SW-846 8260		
Bromodichloromethane	<5	5	ug/l	SW-846 8260		
Bromoform	<5	5	ug/l	SW-846 8260		
Bromomethane	<5	5	ug/l	SW-846 8260		
2-Butanone	<10	10	ug/l	SW-846 8260		
Carbon disulfide	<5	5	ug/l	SW-846 8260		
Carbon tetrachloride	<5	5	ug/l	SW-846 8260		
Chlorobenzene	<5	5	ug/l	SW-846 8260		
Chlorodibromomethane	<5	5	ug/l	SW-846 8260		
Chloroethane	<5	5	ug/l	SW-846 8260		
2-Chloroethylvinyl ether	<5	5	ug/l	SW-846 8260		
Chloroform	<5	5	ug/l	SW-846 8260		
Chloromethane	<5	5	ug/l	SW-846 8260		
Dibromomethane	<5	5	ug/l	SW-846 8260		
Dichlorodifluoromethane	<10	10	ug/l	SW-846 8260		
1,1-Dichloroethane	<5	5	ug/l	SW-846 8260		
1,2-Dichloroethane	<5	5	ug/l	SW-846 8260		
1,1-Dichloroethene	<5	5	ug/l	SW-846 8260		
trans-1,2-Dichloroethene	<5	5	ug/l	SW-846 8260		
1,2-Dichloropropane	<5	5	ug/l	SW-846 8260		
cis-1,3-Dichloropropene	<5	5	ug/l	SW-846 8260		
trans-1,3-Dichloropropene	<5	5	ug/l	SW-846 8270		
Ethylbenzene	<5	5	ug/l	SW-846 8260		
Ethyl methacrylate	<5	5	ug/l	SW-846 8260		
2-Hexanone	<5	5	ug/l	SW-846 8260		
Iodomethane	<5	5	ug/l	SW-846 8260		
Methylene chloride	<5	5	ug/l	SW-846 8260		
4-Methyl-2-pentanone	<5	5	ug/l	SW-846 8260		
Styrene	<5	5	ug/l	SW-846 8260		
1,1,2,2-Tetrachloroethane	<5	5	ug/l	SW-846 8260		
Tetrachloroethene	<5	5	ug/l	SW-846 8260		
Toluene	<5	5	ug/l	SW-846 8260		
1,1,1-Trichloroethane	<5	5	ug/l	SW-846 8260		
1,1,2-Trichloroethane	<5	5	ug/l	SW-846 8260		
Trichloroethene	<5	5	ug/l	SW-846 8260		
Trichlorofluoromethane	<5	5	ug/l	SW-846 8260		
1,2,3-Trichloropropane	<5	5	ug/l	SW-846 8260		
Vinyl acetate	<10	10	ug/l	SW-846 8260		
Vinyl chloride	<5	5	ug/l	SW-846 8260		
Total Xylenes	<15	15	ug/l	SW-846 8260		

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L A B O R A T O R Y   T E S T S   R E S U L T S
06/29/92

JOB NUMBER: 921158   CUSTOMER: POLLUTION CONTROL SERVICES   ATTN: CHUCK WALLGREN

CLIENT I.D.........: 24031
DATE SAMPLED.......: 06/12/92
TIME SAMPLED.......: 11:10
WORK DESCRIPTION...: 24031

LABORATORY I.D...: 921158-0003
DATE RECEIVED....: 06/13/92
TIME RECEIVED....: 11:00
REMARKS..........: WELL ID 21-5DE8

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
GC/MS VOLATILE ORGANICS (WATER)		*1		SW-846 8260	06/17/92	BJH
Acetone	<50	50	ug/l	SW-846 8260		
Acrolein	<50	50	ug/l	SW-846 8260		
Acrylonitrile	<50	50	ug/l	SW-846 8260		
Benzene	<5	5	ug/l	SW-846 8260		
Bromodichloromethane	<5	5	ug/l	SW-846 8260		
Bromoform	<5	5	ug/l	SW-846 8260		
Bromomethane	<5	5	ug/l	SW-846 8260		
2-Butanone	<10	10	ug/l	SW-846 8260		
Carbon disulfide	<5	5	ug/l	SW-846 8260		
Carbon tetrachloride	<5	5	ug/l	SW-846 8260		
Chlorobenzene	<5	5	ug/l	SW-846 8260		
Chlorodibromomethane	<5	5	ug/l	SW-846 8260		
Chloroethane	<5	5	ug/l	SW-846 8260		
2-Chloroethylvinyl ether	<5	5	ug/l	SW-846 8260		
Chloroform	<5	5	ug/l	SW-846 8260		
Chloromethane	<5	5	ug/l	SW-846 8260		
Dibromomethane	<5	5	ug/l	SW-846 8260		
Dichlorodifluoromethane	<10	10	ug/l	SW-846 8260		
1,1-Dichloroethane	<5	5	ug/l	SW-846 8260		
1,2-Dichloroethane	<5	5	ug/l	SW-846 8260		
1,1-Dichloroethene	<5	5	ug/l	SW-846 8260		
trans-1,2-Dichloroethene	<5	5	ug/l	SW-846 8260		
1,2-Dichloropropane	<5	5	ug/l	SW-846 8260		
cis-1,3-Dichloropropene	<5	5	ug/l	SW-846 8260		
trans-1,3-Dichloropropene	<5	5	ug/l	SW-846 8270		
Ethylbenzene	<5	5	ug/l	SW-846 8260		
Ethyl methacrylate	<5	5	ug/l	SW-846 8260		
2-Hexanone	<5	5	ug/l	SW-846 8260		
Iodomethane	<5	5	ug/l	SW-846 8260		
Methylene chloride	<5	5	ug/l	SW-846 8260		
4-Methyl-2-pentanone	<5	5	ug/l	SW-846 8260		
Styrene	<5	5	ug/l	SW-846 8260		
1,1,2,2-Tetrachloroethane	<5	5	ug/l	SW-846 8260		
Tetrachloroethene	<5	5	ug/l	SW-846 8260		
Toluene	<5	5	ug/l	SW-846 8260		
1,1,1-Trichloroethane	<5	5	ug/l	SW-846 8260		
1,1,2-Trichloroethane	<5	5	ug/l	SW-846 8260		
Trichloroethene	<5	5	ug/l	SW-846 8260		
Trichlorofluoromethane	<5	5	ug/l	SW-846 8260		
1,2,3-Trichloropropane	<5	5	ug/l	SW-846 8260		
Vinyl acetate	<10	10	ug/l	SW-846 8260		
Vinyl chloride	<5	5	ug/l	SW-846 8260		
Total Xylenes	<15	15	ug/l	SW-846 8260		

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QUALITY ASSURANCE REPORT
06/29/92

JOB NUMBER: 921158   CUSTOMER: POLLUTION CONTROL SERVICES   ATTN: CHUCK WALLGREN

Volatiles Matrix Spike Compounds   DATE ANALYZED: 06/17/92   TIME ANALYZED: 11:42   METHOD: SW-846 8260   QC NUMBER:926850

BLANKS

TEST DESCRIPTION	ANALY SUB-TYPE	ANALYSIS I.D.	DILUTION FACTOR	ANALYZED VALUE	DETECTION LIMIT	UNITS OF MEASURE
Chloromethane	Reagent	D.Water	1	<5	5	ug/l
Vinyl chloride	Reagent	D.Water	1	<5	5	ug/l
1,1-Dichloroethene	Reagent	D.Water	1	<5	5	ug/l
1,1-Dichloroethane	Reagent	D.Water	1	<5	5	ug/l
Chloroform	Reagent	D.Water	1	<5	5	ug/l
Benzene	Reagent	D.Water	1	<5	5	ug/l
Trichloroethene	Reagent	D.Water	1	<5	5	ug/l
1,2-Dichloropropane	Reagent	D.Water	1	<5	5	ug/l
Toluene	Reagent	D.Water	1	<5	5	ug/l
Chlorobenzene	Reagent	D.Water	1	<5	5	ug/l
Ethylbenzene	Reagent	D.Water	1	<5	5	ug/l
Bromoform	Reagent	D.Water	1	<5	5	ug/l
1,1,2,2-Tetrachloroethane	Reagent	D.Water	1	<5	5	ug/l

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QUALITY ASSURANCE REPORT
06/29/92

JOB NUMBER: 921158 CUSTOMER: POLLUTION CONTROL SERVICES ATTN: CHUCK WALLGREN

Volatiles Matrix Spike Compounds DATE ANALYZED: 06/17/92 TIME ANALYZED: 11:42 METHOD: SW-846 8260 QC NUMBER:926850

REFERENCE STANDARDS

TEST DESCRIPTION	ANALYSIS SUB-TYPE	ANALYSIS I. D.	DILUTION FACTOR	ANALYZED VALUE	TRUE VALUE	PERCENT RECOVERY	DETECTION LIMITS	UNITS OF MEASURE
Dibromofluoromethane	Reference	Bk20.19.4	1	43	50	86	5	ug/l
Toluene d-8	Reference	Bk20.19.4	1	48	50	96	5	ug/l
4-Bromofluorobenzene	Reference	Bk20.19.4	1	53	50	106	5	ug/l
Chloromethane	Reference	Bk20.19.4	1	15	20	75	5	ug/l
Vinyl chloride	Reference	Bk20.19.4	1	19	20	95	5	ug/l
1,1-Dichloroethene	Reference	Bk20.19.4	1	28	20	140	5	ug/l
1,1-Dichloroethane	Reference	Bk20.19.4	1	23	20	115	5	ug/l
Chloroform	Reference	Bk20.19.4	1	18	20	90	5	ug/l
Benzene	Reference	Bk20.19.4	1	27	20	135	5	ug/l
Trichloroethene	Reference	Bk20.19.4	1	29	20	145	5	ug/l
1,2-Dichloropropane	Reference	Bk20.19.4	1	28	20	140	5	ug/l
Toluene	Reference	Bk20.19.4	1	27	20	135	5	ug/l
Chlorobenzene	Reference	Bk20.19.4	1	21	20	105	5	ug/l
Ethylbenzene	Reference	Bk20.19.4	1	17	20	85	5	ug/l
Bromoform	Reference	Bk20.19.4	1	21	20	105	5	ug/l
1,1,2,2-Tetrachloroethane	Reference	Bk20.19.4	1	27	20	135	5	ug/l

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QUALITY ASSURANCE REPORT
06/29/92

JOB NUMBER: 921158 CUSTOMER: POLLUTION CONTROL SERVICES ATTN: CHUCK WALLGREN

Volatiles Matrix Spike Compounds DATE ANALYZED: 06/17/92 TIME ANALYZED: 11:42 METHOD: SW-846 8260 QC NUMBER:926850

MATRIX SPIKES

TEST DESCRIPTION	ANALYSIS SUB-TYPE	ANALYSIS I. D.	DILUTION FACTOR	ANALYZED VALUE	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY	DETECTION LIMITS	UNITS OF MEASURE
Dibromofluoromethane	Matrix	921158-00	1	43	0	50	86	5	ug/l
	Matrix	921158-1	1	52	0	50	104	5	ug/l
	Matrix	921158-2	1	55	0	50	110	5	ug/l
	Matrix	921158-3	1	53	0	50	106	5	ug/l
Toluene d-8	Matrix	921158-00	1	48	0	50	96	5	ug/l
	Matrix	921158-1	1	48	0	50	96	5	ug/l
	Matrix	925115-2	1	47	0	50	94	5	ug/l
	Matrix	921158-3	1	47	0	50	94	5	ug/l
4-Bromofluorobenzene	Matrix	921158-00	1	53	0	50	106	5	ug/l
	Matrix	921158-1	1	48	0	50	96	5	ug/l
	Matrix	921158-2	1	50	0	50	100	5	ug/l
	Matrix	921158-3	1	50	0	50	100	5	ug/l
Chloromethane	Matrix	921158-3	1	23	0	25	92	5	ug/l
Vinyl chloride	Matrix	921158-3	1	24	0	25	96	5	ug/l
1,1-Dichloroethene	Matrix	921158-3	1	22	0	25	88	5	ug/l
1,1-Dichloroethane	Matrix	921158-3	1	26	0	25	104	5	ug/l
Chloroform	Matrix	921158-3	1	28	0	25	112	5	ug/l
Benzene	Matrix	921158-3	1	25	0	25	100	5	ug/l
Trichloroethene	Matrix	921158-3	1	26	0	25	104	5	ug/l
1,2-Dichloropropane	Matrix	921158-3	1	23	0	25	92	5	ug/l
Toluene	Matrix	921158-3	1	25	0	25	100	5	ug/l
Chlorobenzene	Matrix	921158-3	1	18	0	25	72	5	ug/l
Ethylbenzene	Matrix	921158-3	1	18	0	25	72	5	ug/l
Bromoform	Matrix	921158-3	1	15	0	25	60	5	ug/l
1,1,2,2-Tetrachloroethane	Matrix	921158-3	1	17	0	25	68	5	ug/l

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QUALITY ASSURANCE REPORT
06/29/92

JOB NUMBER: 921158 CUSTOMER: POLLUTION CONTROL SERVICES ATTN: CHUCK WALLGREN

Volatiles Matrix Spike Compounds DATE ANALYZED: 06/17/92 TIME ANALYZED: 11:42 METHOD: SW-846 8260 QC NUMBER:926850

DUPLICATES

TEST DESCRIPTION	ANALYSIS SUB-TYPE	ANALYSIS I. D.	DILUTION FACTOR	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	DETECTION LIMITS	UNITS OF MEASURE
Chloromethane	Analytical	921158-3	1	<5	<5	NC	5	ug/l
Vinyl chloride	Analytical	921158-3	1	<5	<5	NC	5	ug/l
1,1-Dichloroethene	Analytical	921158-3	1	<5	<5	NC	5	ug/l
1,1-Dichloroethane	Analytical	921158-3	1	<5	<5	NC	5	ug/l
Chloroform	Analytical	921158-3	1	<5	<5	NC	5	ug/l
Benzene	Analytical	921158-3	1	<5	<5	NC	5	ug/l
Trichloroethene	Analytical	921158-3	1	<5	<5	NC	5	ug/l
1,2-Dichloropropane	Analytical	921158-3	1	<5	<5	NC	5	ug/l
Toluene	Analytical	921158-3	1	<5	<5	NC	5	ug/l
Chlorobenzene	Analytical	921158-3	1	<5	<5	NC	5	ug/l
Ethylbenzene	Analytical	921158-3	1	<5	<5	NC	5	ug/l
Bromoform	Analytical	921158-3	1	<5	<5	NC	5	ug/l
1,1,2,2-Tetrachloroethane	Analytical	921158-3	1	<5	<5	NC	5	ug/l

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06/29/92

Standard Methods for the Examination of Water and Wastewater, 17th Ed. APHA,AWWA,WPCF.
USEPA SW-846 3rd. Edition, Test Methods for the Evaluation of Solid Waste
EPA-600/4-79-020, Methods for the Analysis of Water and Wastes, March 1983
Federal Register, Friday, October 26, 1984 (40 CFR Part 136).
EPA-600/2-78-054, Field and Laboratory Methods Applicable to Overburdens and Minesoils.

Quality control acceptance criteria is method dependent.
GCMS tuning criteria meet EPA CLP Statement of Work OLM01.0.
All data reported on sample "as received" unless noted.

NC = Not Calculated due to value at or below detection limit.

NOTE: Data in QA report may differ from final results due to digestion and/or dilution of sample into analytical ranges.

The "TIME ANALYZED" in the QA Report refers to the start time of the analytical batch which may not reflect the actual time of each analysis. The "DATE ANALYZED" is the actual date of analysis.

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Final Report

North Bexar County Water Resources Study

for the

Edwards Underground Water District

Volume 2
ALTERNATIVE RESOURCES

September, 1993

Prepared by
W. E. Simpson Company, Inc.

TABLE OF CONTENTS

TABLES

FIGURES

(Continued)

I. INTRODUCTION

The study area of north Bexar County is bounded on the west, north and east by the county line and by the down-dip limit of the Edwards Aquifer Recharge Zone (EARZ) on the south. It is located in the south central region of Texas as shown in Figure 1. The study area is located within the Balcones fault zone, a region of faulted and fractured limestone. Due to the amount of fractures and faults, most streams in the area are intermittent and flow only during and immediately after rain events. Consequently, water is supplied to the study area population almost exclusively from groundwater by the Edwards and Trinity aquifers.

In 1990, the population of north Bexar County numbered approximately 27,900 with an average historical growth rate since 1960 of approximately 80 percent per decade. With limited water resources in the area, growing demand upon the Trinity aquifer is becoming a concern. This study, developed in response to the increasing demand, consists of two main portions. The groundwater portion of the study is addressed primarily in Volume 1 of the report. Volume 1 was prepared by William F. Guyton Associates, Inc. and provides an inventory of wells in the study area, lists well data and results of chemical and biological testing, includes pump test results

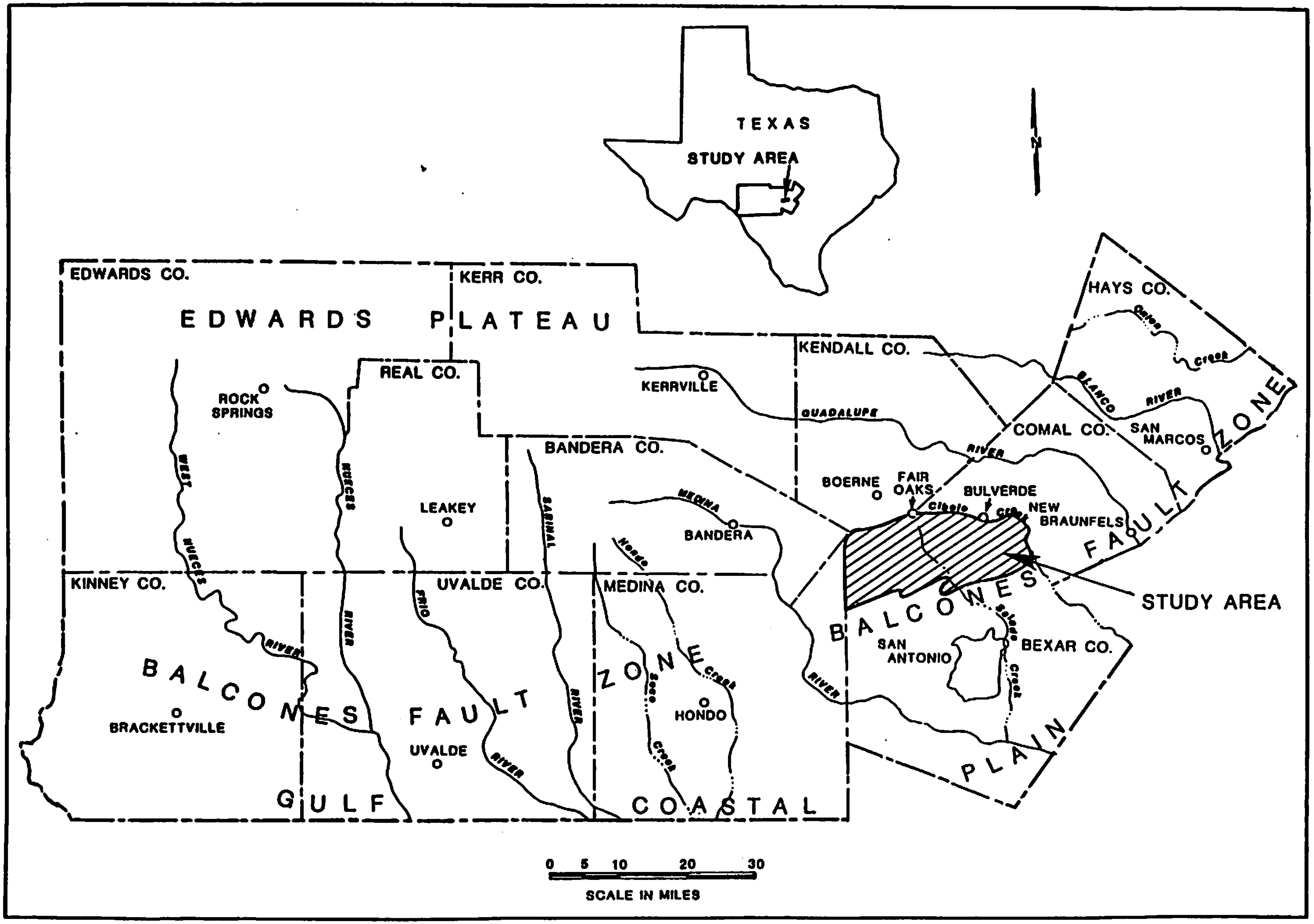

Figure 1

LOCATION OF STUDY AREA

and presents mapping of potentiometric water surfaces and makes recommendations for further study and conservation measures.

The remaining portion of the study, prepared by W. E. Simpson Company, Inc. and found in Volume 2, compares the growing demand for water with the limited groundwater supply. Volume 2 estimates future demands, establishes corresponding target supply quantities and investigates alternative water resources and their abilities to provide target supply quantities. Water quantity, quality, and the cost of resource development are considered in the evaluation. Several alternative resources are ranked accordingly and recommendations are made for further study.

The reader should note the preliminary nature of the study. All figures, except for actual test results, are estimates for helping to determine future courses of study and should not be considered as actual designs, costs, or quantities.

II. WATER DEMAND STUDY

As population increases and growth occurs within the study area, the demand for water will increase. The study presents an investigation of past population and water use trends and provides a correlation that can be used for estimating future water demand.

A. Population Growth

Three population groups are considered in the study. First, the population of Bexar County is discussed to establish a benchmark from which to begin the analysis. The total population of the study area and the population of the study area which uses Trinity aquifer water are shown to be related to the county population. Future projections of the county population are used to estimate future projections for the total population of the study area and for the population of the study area which uses water from the Trinity aquifer.

1. **Bexar County Population.** The historical population of Bexar County is determined from the U.S. Census Bureau for the years 1960, 1970, 1980 and 1990 and is listed in Table 1.

TABLE 1: HISTORICAL AND PROJECTED
POPULATION OF BEXAR COUNTY

	BEXAR COUNTY POPULATION		
		PROJECTIONS	
YEAR	HISTORICAL	LOW	HIGH
1960	687,151	----	----
1970	830,460	----	----
1980	988,788	----	----
1990	1,185,394	----	----
2000	----	1,390,886	1,422,629
2010	----	1,587,516	1,705,074
2020	----	1,753,971	2,034,080

Future population projections are available for the county from a number of sources, however, most of them do not project to the year 2020, the end of the investigation period for this study. Two projections which qualify are those of the Texas Water Development Board (TWDB) and Texas A&M College of Agriculture and Life Sciences Department of Rural Sociology (TX A&M). Both projections are available for more than one scenario. Since the various projections indicate differing rates of future growth, two projections are used to determine a range of expected population increases. The TWDB's "high" scenario projection is used to establish the upper limit for the study. TX A&M's projection, which assumes a future migration rate equal to that of the 1980's, is used to establish the lower limit for the study. Values of the population projections are also listed in Table 1.

2. **Study Area Population.** The historical population of the study area is determined from the U.S. Census Bureau for the years 1960, 1970, 1980 and 1990. The census tracts used by the Census Bureau are different for each decade and none of them correspond exactly with the southern boundary of the study area. Figure 2 shows the census tracts considered in determining the population for the study area in 1990. It demonstrates how small regions of the study area are neglected in population estimates, such as the regions adjacent to tracts 1219.02, 1819, 1820 and 1918.03. It also demonstrates the need to reduce census tract counts in order to represent only the population within the study area. For example, a

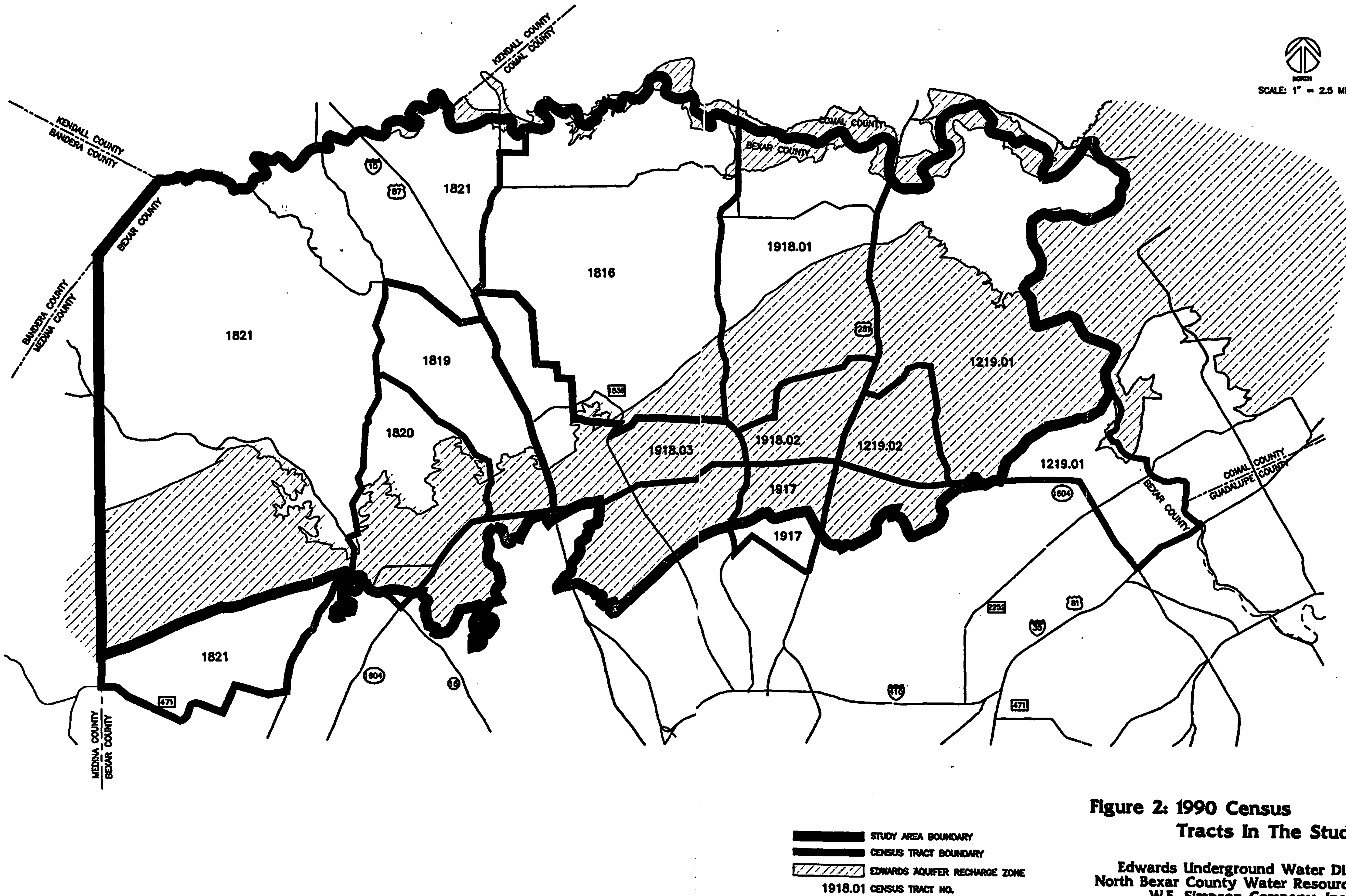

Figure 2: 1990 Census Tracts In The Study Area

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North Bexar County Water Resource Study
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Wm. F. Guyton Associates, Inc.

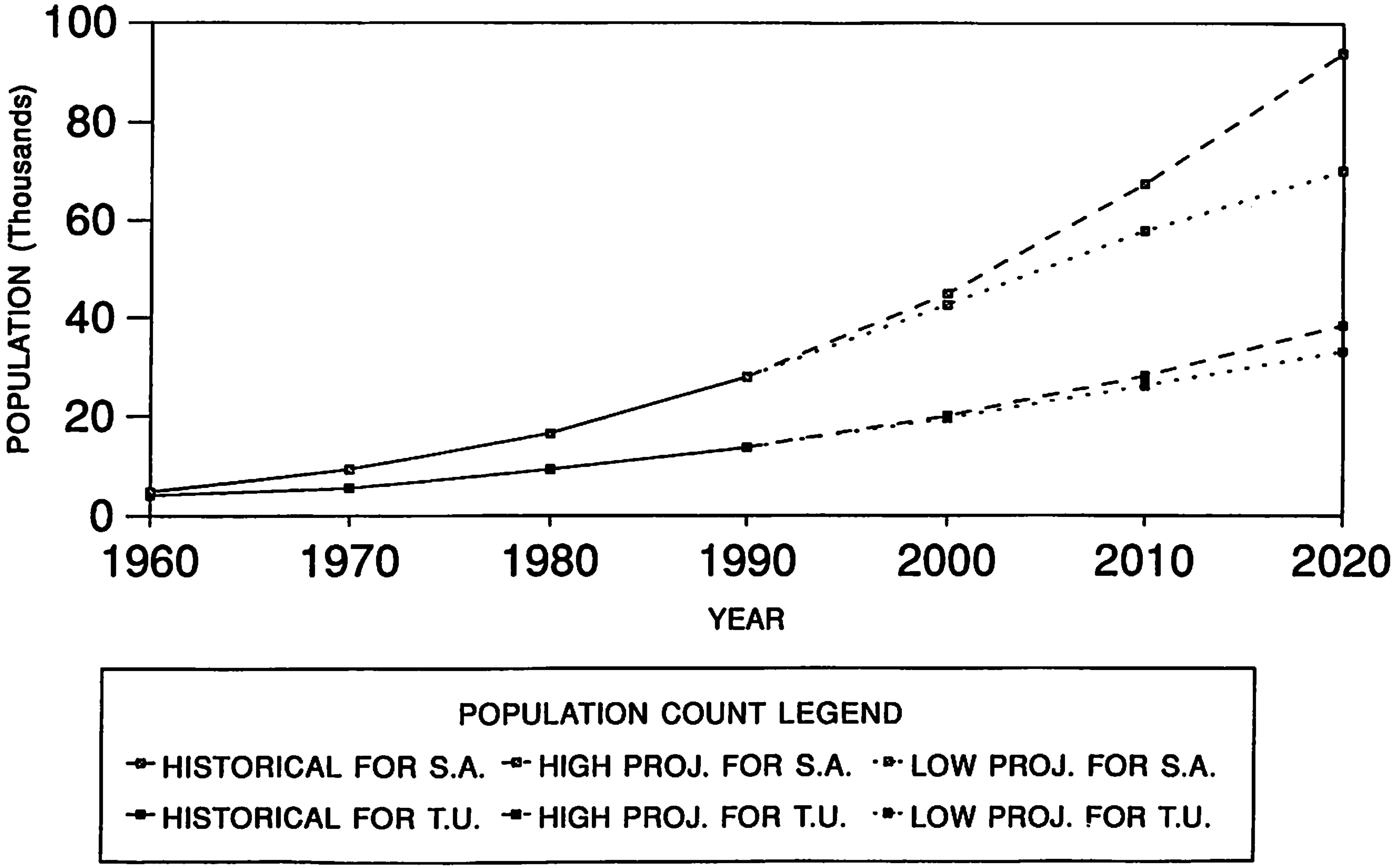
certain amount of the population in tracts 1819 and 1219.01 live outside of the study area. Estimates of these amounts are subtracted from the count for the study area. However, the population in small portions of tracts 1820 and 1917 which extend outside of the study area were included in the study area population count. The small population inhabiting tract 1820 outside of the study area is estimated to be insignificant. The population inhabiting tract 1917 outside the study area is expected to be significant, but is difficult to estimate. Also, the southern boundary of tract 1917 closely follows the southern service area boundary for Hill Country water works. Keeping this service area population entirely inside or outside of the study area boundary is important later for calculating the amount of the study area population which uses Trinity water. Therefore, the population in this region is included in the count. The resulting historical study area population estimates are listed in Table 2.

Comparison of county growth patterns and study area growth patterns indicates that the ratio of the percent rate of study area growth to the percent rate of county growth has decreased linearly since 1960. Based on this relationship, future study area population figures are projected and also listed in Table 2. Figure 3 shows a plot of the historical population and future population projections for the study area.

TABLE 2: HISTORICAL AND PROJECTED POPULATION OF NORTH BEXAR COUNTY

	NORTH BEXAR COUNTY POPULATION		
		PROJECTIONS	
YEAR	HISTORICAL ESTIMATES	LOW	HIGH
1960	4,766	----	----
1970	9,233	----	----
1980	16,480	----	----
1990	27,927	----	----
2000	----	42,616	44,885
2010	----	57,880	67,463
2020	----	70,220	93,931

FIGURE 3: HISTORICAL AND FUTURE POPULATION COUNTS FOR THE STUDY AREA AND TRINITY USERS



ABBREVIATIONS: S.A. FOR STUDY AREA, T.U. FOR TRINITY USERS AND PROJ. FOR PROJECTION.

3. **Trinity-Using Population.** The historical population within the study area which uses water from the Trinity aquifer, or the historical "Trinity-using population," is estimated by two methods. One method involves estimating the population within the study area which uses Edwards Aquifer water and subtracting it from the total study area population. The Edwards-using population is estimated from reports issued by the San Antonio Water System and records kept by the TWDB and the Texas Water Commission (TWC). The second method involves dividing the study area into two effective aquifer "service areas", Edwards and Trinity, and estimating the population falling into the Trinity "service area". Results of the two methods were cross checked and corrected as needed in order provide as accurate an estimate as possible. Figure 4 shows the gross service areas of some of the water purveyors in the study area which were considered in the analysis. The estimates of the historical Trinity-using population of the study area are listed in Table 3.

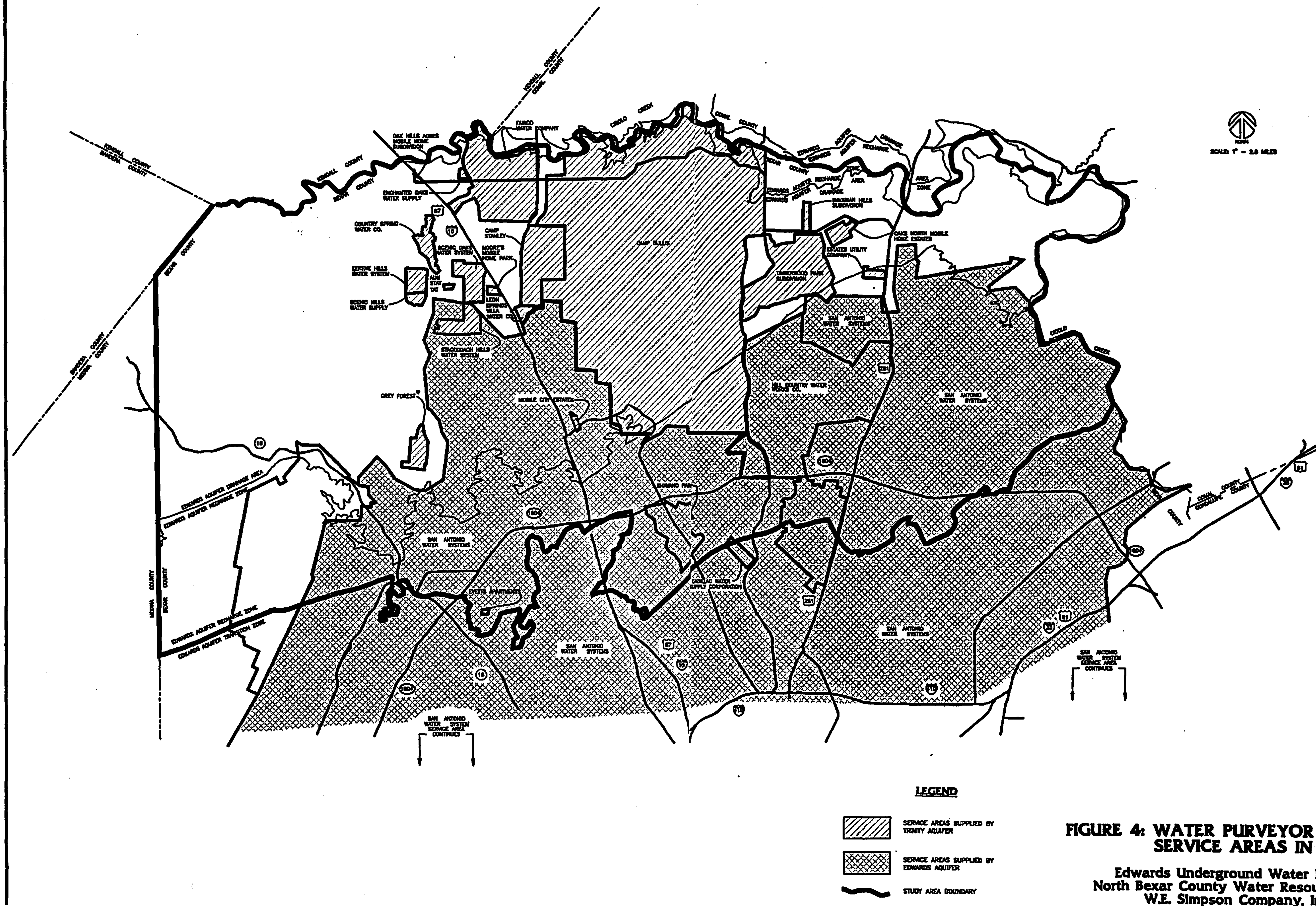


FIGURE 4: WATER PURVEYOR SERVICE AREAS IN 1993

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TABLE 3: HISTORICAL AND PROJECTED POPULATION OF NORTH BEXAR COUNTY WHICH USES TRINITY WATER			
	TRINITY-USING POPULATION		
		PROJECTIONS	
YEAR	HISTORICAL ESTIMATES	LOW	HIGH
1960	4,049	-----	-----
1970	5,520	-----	-----
1980	9,268	-----	-----
1990	13,643	-----	-----
2000	--------	19,526	19,972
2010	--------	26,146	28,082
2020	--------	33,152	38,446

Comparison of the Trinity-using population growth pattern with the county growth pattern shows a different relationship than the one between study area growth pattern and the county growth pattern. The difference can be expected since the study area has a fixed boundary and the Trinity aquifer service area has a moving boundary. The shape and size of the Trinity aquifer service area has changed substantially through the years with the expansion of Edwards-using water purveyors such as the San Antonio Water System and Hill Country Water Works. Consequently, it is found that, starting in 1970, the Trinity-using population count can be expressed as a percentage of the county population, a percentage which increases linearly through time. Future Trinity-using populations are estimated by applying this relationship to the county projections and are listed in Table 3. The relationship is applied to both county projections in order to project upper and lower limits. Figure 4 shows a plot of the historical Trinity-using population estimates and future Trinity-using population projections.

B. <u>Water Use Patterns</u>

Trinity aquifer water is used within the study area for four general purposes: public supply, domestic supply, irrigation and industrial use. In order to identify consumption patterns, historical consumptions are estimated for each category over a number of years. Each type of use is discussed in order of decreasing magnitude, as found in the later years of the historical period. Historical water use estimates are tabulated in Table 4 and shown graphically in Figures 5 and 6. Figure 5 uses a line graph to show how total consumption and separate categories of consumption have varied through time. Figure 5 is useful for identifying historical trends in individual use categories. Figure 6 uses stacked bar graphs to show, for each year studied, the cumulative effect of the four types of consumption.

TABLE 4: ESTIMATES OF HISTORICAL DEMAND ON THE TRINITY AQUIFER IN NORTH BEXAR COUNTY

	ANNUAL DEMAND (ACRE-FEET)				
YEAR	INDUSTRIAL	PUBLIC	DOMESTIC	IRRIGATION	TOTAL
1960	550	110	590	50	1300
1965	1290	150	680	150	2270
1970	2170	200	770	120	3260
1975	2820	410	920	240	4390
1980	2630	720	1080	180	4610
1981	2630	700	1070	170	4570
1982	2560	890	1060	190	4700
1983	1840	920	1050	130	3940
1984	2550	1110	1040	170	4870
1985	3330	1120	1030	250	5730
1986	3210	1540	1020	250	6020
1987	3320	1600	1010	250	6180
1988	3290	1860	1000	300	6450
1989	3280	1910	1000	400	6590
1990	3260	1700	990	400	6350

FIGURE 5: HISTORICAL DEMAND ON TRINITY AQUIFER IN NORTH BEXAR COUNTY

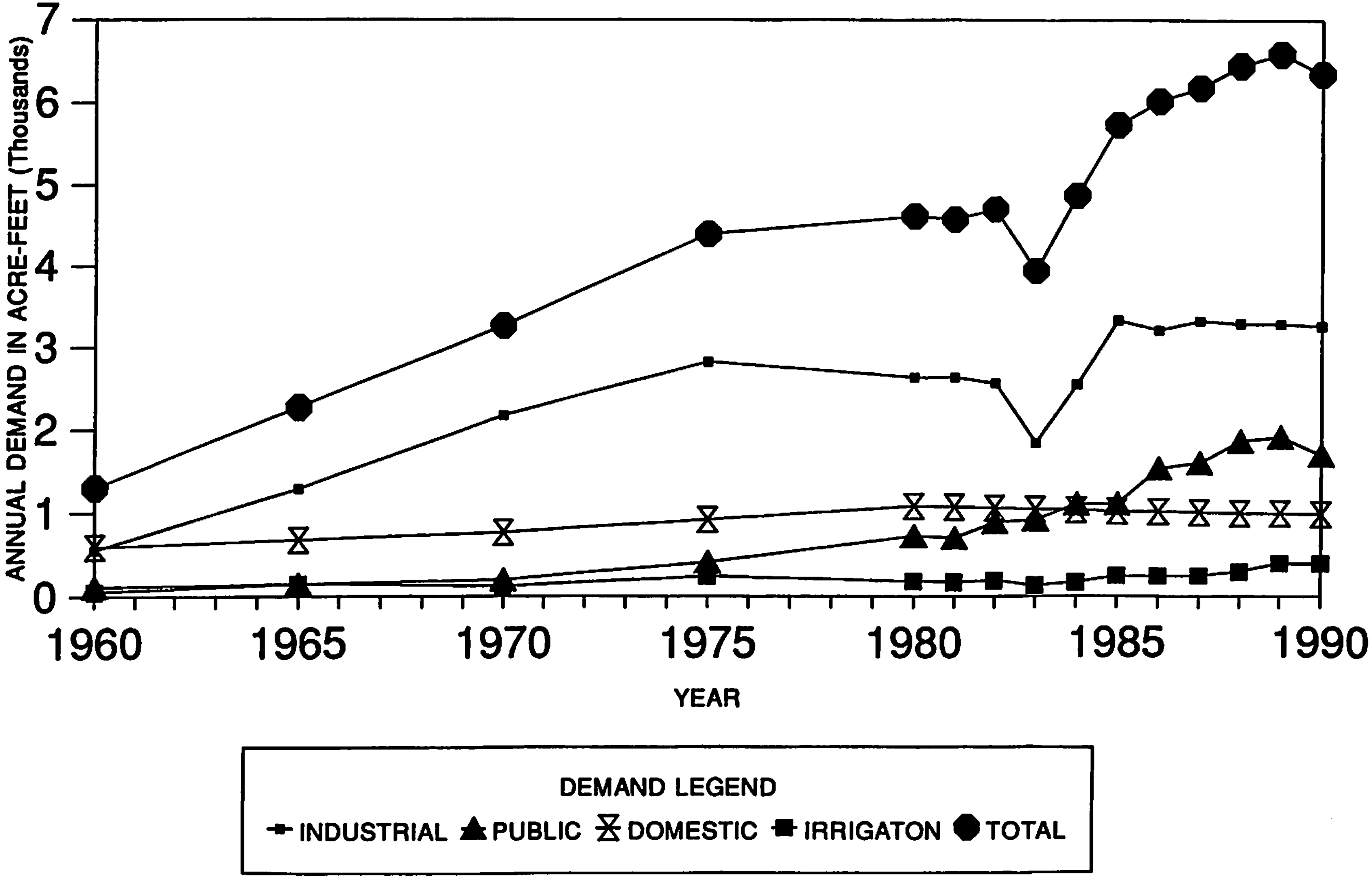
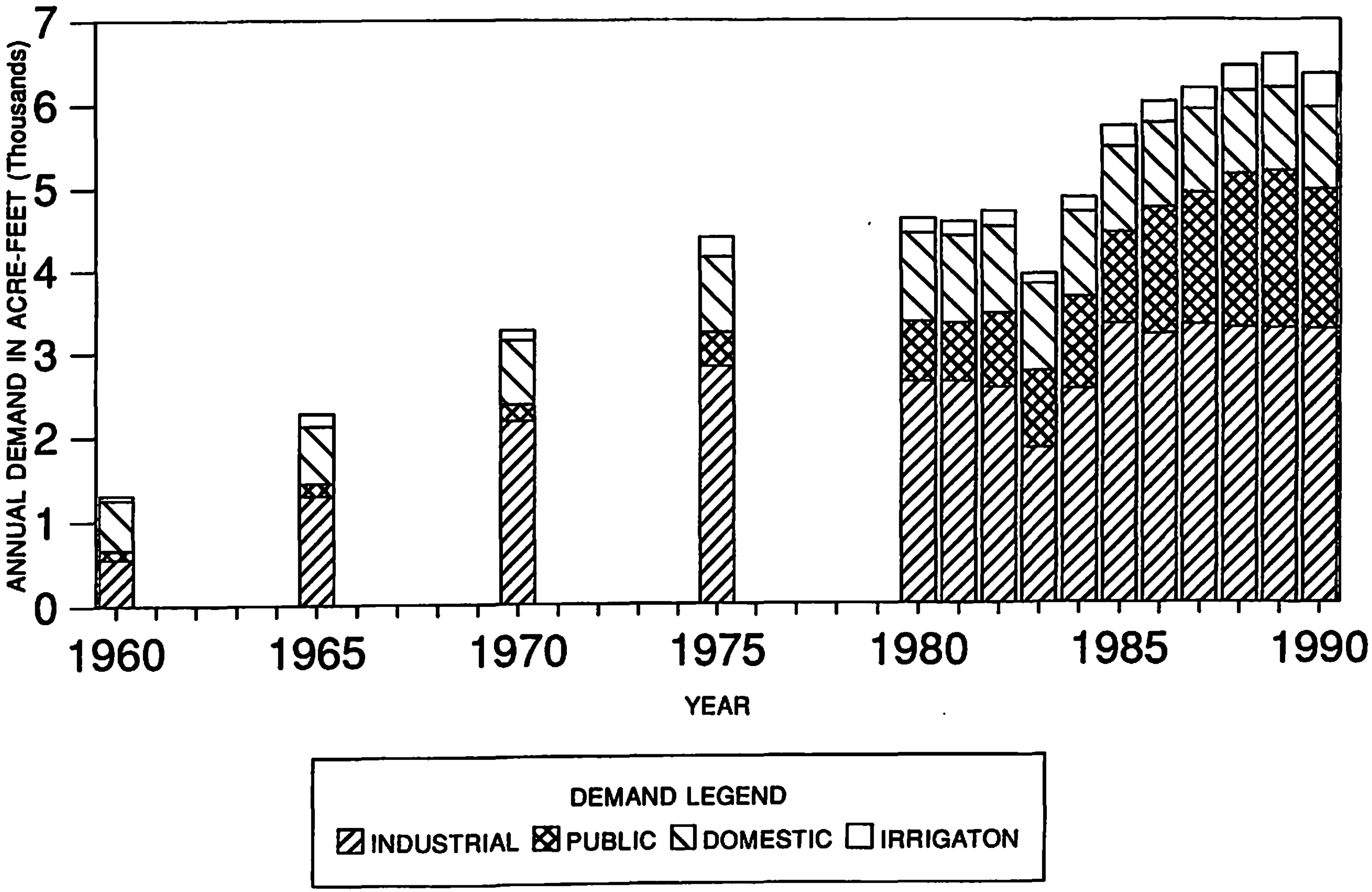


FIGURE 6: HISTORICAL DEMAND ON TRINITY AQUIFER IN NORTH BEXAR COUNTY



Industrial use is defined as the use of water for manufacturing or processing in industry. William F. Guyton Associates, Inc. identifies three major industrial users within the study area and developed pumpage estimates from U.S. Geological well surveys, site visits and interviews. The combined annual use estimates for Barrett Industries, Redland Stone and Redland Worth show a general increase from 1960 to 1990, but with several irregularities in the trend.

Public supply is defined, for the purposes of the study, as water distributed through a system which has at least 25 separate connections or water that is distributed at a public place such as a park, restaurant or school. The historical annual consumption of publicly supplied water is estimated through information obtained from the files of the TWC and the TWDB concerning pumpage records, service populations and system capacities. In some cases, system owners were contacted and interviewed. A review of the annual estimates indicates that consumption through public supply has generally increased from 1960 to 1990.

Domestic supply is defined as water obtained from small private well systems. The historical annual domestic consumption is estimated by subtracting the population estimate of publicly supplied Trinity users from the total Trinity-using population count and multiplying the difference by 130 gallons per capita per day (gpcd). A review of the annual estimates indicates that domestic use nearly doubled from 1960 through 1980 and then gradually decreased through 1990.

Irrigation occurs in the study area with the watering of golf courses and cemeteries. Annual irrigation use is estimated by reviewing pumpage records from the TWDB and from information obtained by William F. Guyton, Associates on pump tests, recorded pumpage, and system capacities.

C. Future Demands

Trinity aquifer demand can be related to the magnitude of the Trinity-using population. Regression analysis indicates that, for the years where population and demand data are both readily available, the relationship can be approximated by a logarithmic equation

$$D = 8965 * \mathrm{Log}(P) - 30754$$

where D is the annual demand on the Trinity aquifer in acre-feet and P is the population count of Trinity users. Table 5 provides a comparison between estimated historical demand and historical demand calculated by the regression model. Figure 7 shows the same comparison graphically and also shows the regression model extrapolated to larger populations. Based on the larger deviations at the low end of the curve and the negative demand values predicted for small populations, the curve is recommended only for approximating future demands and not for studying past historical conditions.

TABLE 5: COMPARISON BETWEEN HISTORICAL ESTIMATES AND REGRESSION MODEL APPROXIMATIONS OF THE DEMAND ON THE TRINITY AQUIFER IN NORTH BEXAR COUNTY

	DEMAND ON TRINITY (ACRE-FEET)	
YEAR	HISTORICAL ESTIMATE	REGRESSION APPROXIMATION
1960	1,300	1,590
1970	3,260	2,790
1980	4,610	4,810
1990	6,350	6,320

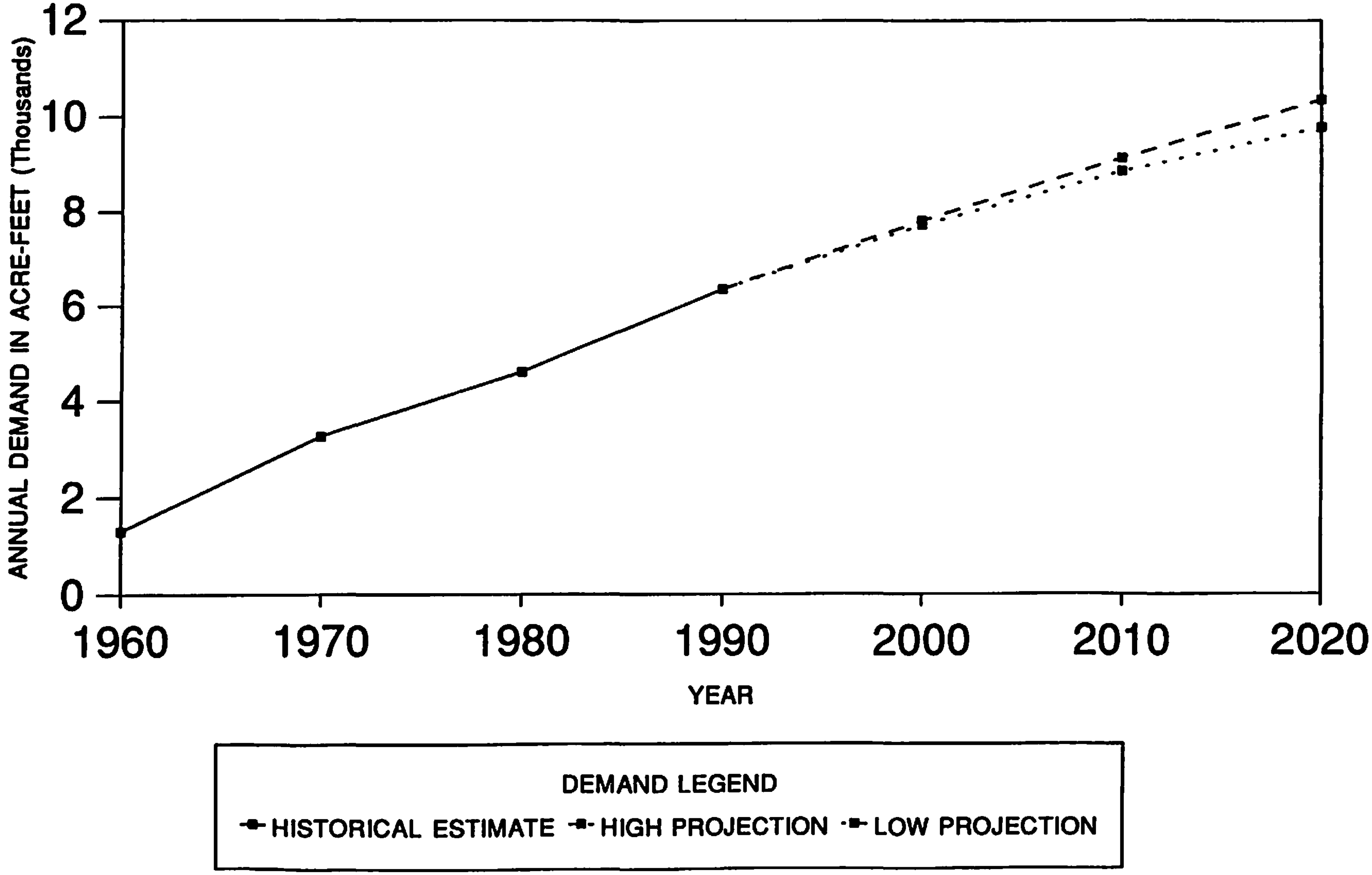
Future demand can be estimated with the extrapolated regression curve based upon projected population figures. Table 6 shows lower and upper limit population projections for a number of years and the corresponding Trinity water demands estimated with the regression curve. Figure 8 graphically shows the variation in total demand on the Trinity aquifer within the study area through time.

FIGURE 7: TRINITY PUMPAGE BASED ON POPULATION

TABLE 6: PROJECTED COUNTS OF THE TRINITY USING POPULATION IN NORTH BEXAR COUNTY AND THE RESULTING APPROXIMATED DEMANDS ON THE TRINITY AQUIFER

	PROJECTED POPULATION		FUTURE TRINITY DEMAND (ACRE-FEET)	
YEAR	LOW	HIGH	LOW	HIGH
2000	19,526	19,972	7,710	7,800
2010	26,146	28,082	8,850	9,130
2020	33,152	38,446	9,770	10,350

FIGURE 8: HISTORICAL AND FUTURE DEMAND ON THE TRINITY AQUIFER IN NORTH BEXAR COUNTY



III. SURFACE WATER

A. Background

In studying the role of surface water as an alternative resource for north Bexar County, three types of sources are considered: existing impoundments with permanent storage, existing flood control structures with temporary storage, and potential impoundment sites. Since the effective potable yield of each source type is dependant upon watershed yield, water quality, and existing water use appropriations, each source is considered in terms of each of the three concerns.

1. **Watershed Yield.** Two methods are used to estimate available water for existing or potential dam sites. The first method is a rough approximation developed by the Soil Conservation Service and is used for smaller watersheds in the study. The second method is used for the larger watersheds of the study and relies upon information developed by the TWC. In either case, only sources which can supply a minimum of 150 acre-feet annually are considered as potential supplies.

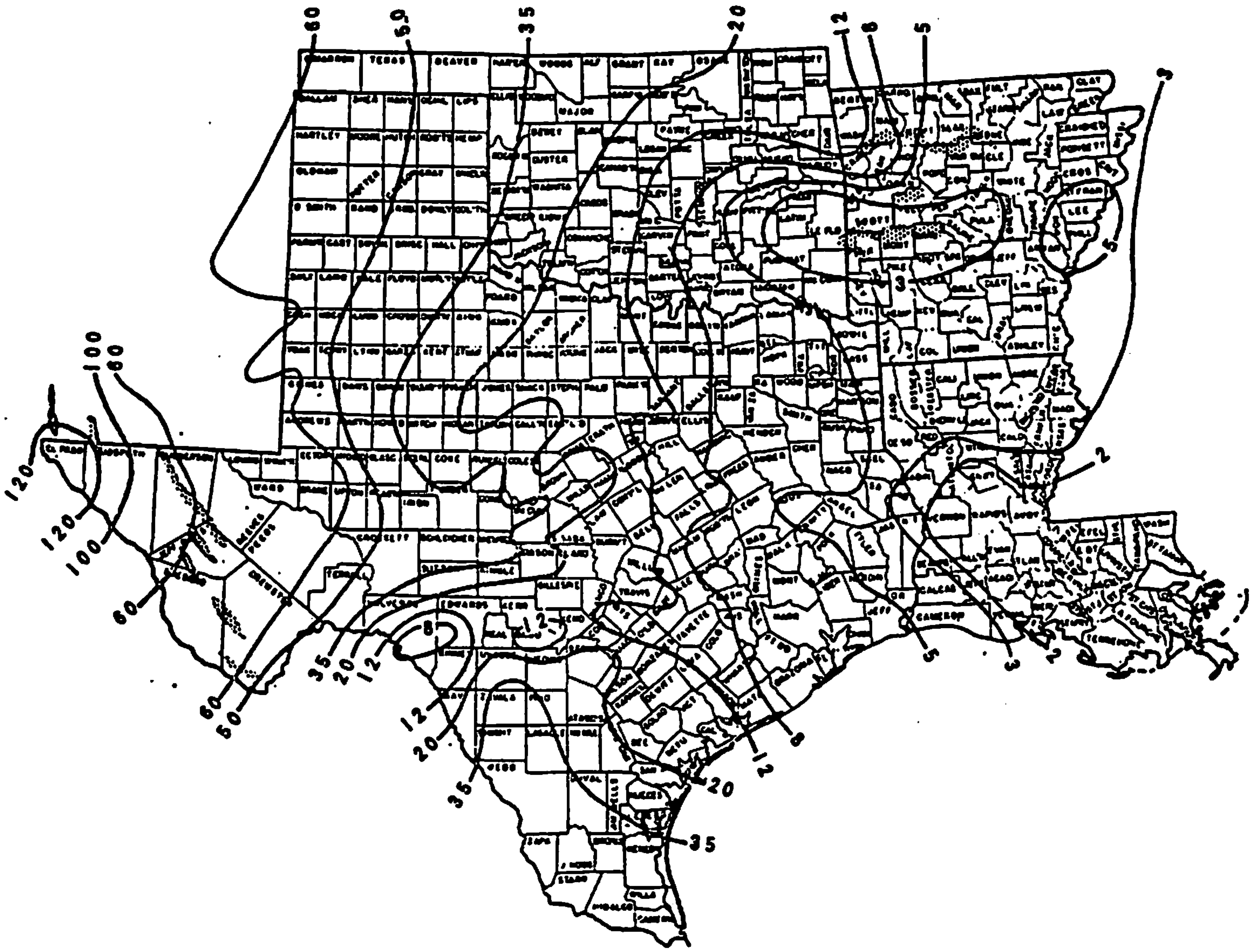
a. **Yield of Small Watersheds.** Watershed yield is dependent upon many factors such as size of drainage area, runoff characteristics, storm characteristics and annual rainfall. The study estimates watershed yields on a preliminary basis for smaller surface sources with a simplified procedure developed by the Soil Conservation Service (SCS) and presented in the Engineering Field Manual for Conservation Practices (EFM). Exhibit 11-1 of Chapter 11

(Figure 9 in this report) indicates that for the study area, approximately twenty acres of "...watershed [are] required for each acre-foot of capacity in a...reservoir to maintain normal pool level..." For the purposes of the study, maintainable reservoir capacity is taken as a preliminary estimate of a watershed's annual safe yield and the figure is calculated as 0.050 acre-feet of safe yield per acre of watershed.

A comparison of the modified SCS value with the historical drought records suggests that the value is probably a good preliminary estimate for the safe yield of small watersheds within the study area. A draft report by the TWDB entitled Continuing Water Resources Planning and Development for Texas discusses average runoff and low flow for the San Antonio River basin. The report indicates that under the low flow conditions of 1950 through 1956 and of 1962 through 1964, the average annual yields in the San Antonio River Basin were 0.075 and 0.078 acre-feet per acre of watershed, respectively. The report also indicates that the lowest annual discharge occurred in 1956 at 0.036 acre-feet per acre of watershed.

Although the safe yield used in the study is higher than the lowest annual discharge of the river, it is considered acceptable because each of the surface sources considered involves at least one reservoir. Reservoirs serve to increase the safe yield of a stream over that of the natural condition

FIGURE 9: DRAINAGE BASIN YIELD



A general guide for use in estimating the approximate size of drainage area required for a desired storage capacity in either excavated or impounding reservoirs. The numbers on the chart show the number of acres of drainage area required for 1 acre foot of water impounded. Based on a figure found in the S.C.S. Engineering Field Manual.

NOTE: Mountainous areas have been crosshatched. The numbers may not apply to these areas since rainfall in them is very spotty and varies sharply.

through the introduction of storage. The increased safe yield is often referred to as the firm yield of the reservoir. The exact increase in safe yield depends upon the magnitude of various losses, the size of the reservoir and the sequencing of drought periods and wet periods. Consequently, the safe yield figure used for the study is approximate and may be considered as a conservative or minimum estimate of a reservoir's firm yield.

The SCS EFM suggests that areas to the north of the study area provide higher safe yields. A value of 0.071 acre-feet of safe yield per acre of watershed is applied in the study to the watershed for a potential dam site on Cibolo Creek in Kendall County.

Near the study area, average runoff from a watershed appears to be approximately 6.33 times greater than its safe yield. Records from the U.S. Geological Survey's stream gage on Cibolo Creek south of Boerne show an average annual runoff of 0.45 acre-feet per acre for the record period of 1963 through 1991.

b. **Yield of Large Watersheds.** The yields of larger water watersheds considered in the study are not directly estimated because the existence of water rights impacts the effective yield significantly. Instead, water rights allocation amounts are compared to actual water usage. Allocation amounts are determined from permits or certificates of adjudication and usage reports are obtained from the TWC.

In cases where allocations are much greater than actual usage, the impoundment is considered as a potential source for supplying the study area. In such cases, the water rights owner may be willing to negotiate a Water Sale Agreement with users within the study area, or perhaps the state may consider adjudication or readjudication of water rights. The viability of both courses of action is not addressed in this study and requires further investigation.

2. **Water Quality.** Although a watershed may yield an adequate quantity of water, the amount will be of little benefit if it is of poor quality. The study considers water quality information for eight creek locations (two of them being on the same creek), five locations on Medina Lake and four locations on Canyon Lake. Although the original scope and budget of the study did not include the collection and testing of samples, limited surface water quality information was available from public agencies. Consequently, field samples were collected from five creeks and tested to augment available data. It should be noted that good samples were difficult to obtain from pleasant Valley Creek and Salado Creek because, at the points of interest, the creeks are ephemeral. Samples taken from the two creeks were from quiescent, turbid pools which may have been of a lesser quality than that of the free flowing condition. The tests performed include mineralogical, orthophosphate, ammonia nitrogen, biochemical oxygen demand and fecal coliform

analyses. Public agency test results were obtained from the TWC for Cibolo Creek, Leon Creek, Canyon Lake and Medina Lake and from the San Antonio Water System (SAWS) for another location along Leon Creek. Figure 10, found at the end of Volume 2, shows the locations from which the creek samples were taken and where the creek monitoring points are located.

Tables 7, 8 and 9 show the results of the analyses for each creek and lake location. One out of the eight sites shows pH values slightly lower than the recommended secondary constituent level (RSCL) minimum of 7.0. Two of the sites show iron levels which exceed the RSCL maximum of 0.3 mg/L. Three sites have hard water and five of the sites exhibit fecal coliform levels over the TWC's typical target value for streams of 200 colonies per 100 mL. Water from two of the sites might require coagulation or reverse osmosis to reduce elevated iron concentrations. However, the samples which

TABLE 7: WATER QUALITY TEST RESULTS FOR STREAMS

	W. E. SIMPSON COMPANY SAMPLES					T.W.C. SAMPLES		S.A.W.S. SAMPLE	DRINKING WATER STANDARDS (4)
Sample Location Number	1	2	3	4	5	6	7	8	---------
Location	San Geronimo Creek	Balcones Creek	Salado Creek	Lewis Creek	Pleasant Valley	Cibolo Creek	Leon Creek	Leon Creek (I-10)	---------
Collection Date	5/24/93	5/24/93	5/24/93	5/25/93	5/24/93	(1)	(2)	(3)	
pH (S.U.)	8.3	8.3	7.9	8.0	8.1	7.0-9.4	7.5-8.0	6.6-6.7	>7.0 S
BOD_5 (mg/L)	1	<1	2	<1	2	---------	---------	2-3	---------
TSS (mg/L)	16	2	22	12	13	---------	---------	41-29	---------
TDS (mg/L)	280	276	248	320	92	---------	---------	124-136	<1000 S
Ammonia Nitrogen (mg/L)	<0.10	<0.10	0.67	<0.10	<0.10	0.02-1.40	0.01-0.06	---------	---------
Orthophosphate (mg/L)	0.05	0.03	0.68	0.07	0.22	0.28-2.92	0.01-0.03	---------	---------
Specific Conductance (µmhos)	455	480	230	560	128	330-750	500-850	149-269	---------
Iron (mg/L)	<0.01	<0.01	6.73	0.27	1.27	---------	---------	---------	<0.3 S
Dissolved Iron (1.2 µm filter)(mg/L)	---------	---------	5.82	---------	0.87	---------	---------	---------	---------
Dissolved Iron (0.45 µm filter)(mg/L)	---------	---------	1.08	---------	---------	---------	---------	---------	---------
Calcium (mg/L)	62	72	40	95	24	---------	---------	32-52	---------
Magnesium (mg/L)	18	12	1	9	0	---------	---------	2-3	---------
Hardness as $CaCO_3$ (mg/L)	228	228	106	272	60	---------	---------	66-106	---------
Sodium (mg/L)	8	5	<1	7	<1	---------	---------	3-12	---------
Potassium (mg/L)	---------	---------	---------	---------	---------	---------	---------	3-11	---------
Manganese (mg/L)	<0.01	<0.01	<0.07	<0.01	0.01	---------	---------	---------	<0.05 S
Total Alkalinity (mg/L)	186	228	114	288	60	---------	---------	<16-44	---------
HCO_3 Alkalinity (mg/L)	227	278	139	351	73	---------	---------	---------	---------
Sulfate (mg/L)	37	21	34	13	9	18-78	44-158	21-72	<300 S
Chloride (mg/L)	13	10	1	11	1	16-69	17-23	3-6	<300 S
Fluoride (mg/L)	0.51	0.43	0.24	0.32	0.36	---------	---------	<0.50	<2 S
Nitrate as Nitrogen (mg/L)	0.14	<0.10	0.48	0.08	0.21	0.0-6.0	0.01-1.67	<0.1-1.3	<10 M
Fecal Coliform (colonies/100 mL)	380	130	420	200	4000	0-990	4-30	3,600-15,000	(5)
Dissolved O_2 (mg/L)	---------	---------	---------	---------	---------	6.4-13.0	10.6-12.5	6.5-10.2	---------

(1) The data are from 12 samples taken during the period 01/12/88 through 11/12/91.
(2) The data are from 3 samples taken during the period of 05/09/90 through 01/15/92.
(3) The data are from 2 samples taken on 02/10/93 and 03/12/93.
(4) From the Texas Administrative Code, Title 31, Chapter 290, 1992-1993 Supplement. "M" indicates maximum constituent level for drinking water and "S" indicates recommended secondary constituent level for drinking water.
(5) Standards are based on population served by system and number of positive total coliform tests per month.

TABLE 8: HERBICIDE AND PESTICIDE TEST RESULTS
FOR SAMPLE LOCATION NUMBER 8 ON LEON CREEK AT IH-10 WEST

CONTAMINANT	CONCENTRATION IN MICROGRAMS/LITER		
	COLLECTION DATE		MAXIMUM CONTAMINANT LEVEL (1)
	02/10/93	03/12/93	
Lindane	---	---	0.2
Alpha-hexachlorocyclohexane	<.02	.05	(2)
Gamma-hexachlorocyclohexane	<.02	.05	(2)
Beta-hexachlorocyclohexane	<.02	.10	(2)
Delta-hexachlorocyclohexane	<.02	.05	(2)
Chlordane	<.02	.05	2.0
Heptachlor	<.02	.05	0.4
Heptachlor Epoxide	<.02	.05	0.2
Aldrin	<.02	.05	(3)
Endosulfan I	<.02	.05	(2)
Endosulfan II	<.02	.05	(2)
Endosulfan Sulfate	<.02	.05	(2)
DDD	<.02	.05	(2)
DDE	<.02	.05	(2)
DDT	<.02	.05	(2)
Endrin	<.02	.05	2.0
Endrin Aldehyde	<.02	.05	(2)
Dieldrin	<.02	.05	(3)
Toxaphene	<.20	.50	3.0
Methoxychlor	<.08	.20	40.0

(1) From the Texas Water Commission's Drinking Water Standards - Phases II & V, December 3, 1993.
(2) Unregulated and unmonitored.
(3) Unregulated, but currently being monitored.

TABLE 9: WATER QUALITY TEST RESULTS FOR
CANYON LAKE AND MEDINA LAKE OBTAINED FROM TEXAS WATER COMMISSION

Location	CANYON LAKE	MEDINA LAKE	DRINKING WATER STANDARDS
Collection Date	(1)	(2)	(3)
pH (S.U.)	7.3-8.4	7.4-8.48	>7.0 S
BOD (mg/L)	---	---	---
TSS (mg/L)	---	237-289	---
TDS (mg/L)	3-51	3-57	<1000 S
Ammonia Nitrogen (mg/L)	.01-.55	.01-18	---
Orthophosphate (mg/L)	.01-.024	.01-.036	---
Specific Conductance (μmhos)	361-495	385-518	---
Iron (mg/L)	---	---	0.3 S
Dissolved Iron (1.2 μm filter) (mg/L)	---	---	---
Dissolved Iron (0.45 μm filter) (mg/L)	---	---	---
Calcium (mg/L)	---	---	---
Magnesium (mg/L)	---	---	---
Hardness as $CaCO_3$ (mg/L)	---	---	---
Sodium (mg/L)	---	---	---
Potassium (mg/L)	---	---	---
Manganese (mg/L)	---	---	<0.5 S
Total Alkalinity (mg/L)	122-200	100-168	---
HCO_3 Alkalinity (mg/L)	---	---	---
Sulfate (mg/L)	12-27	44-64	<300 S
Chloride (mg/L)	9-19	8-16	<300 S
Fluoride (mg/L)	---	---	<2 S
Nitrate as Nitrogen (mg/L)	.01-.68	.01-.23	<10 M
Fecal Coliform (colonies/100 mL)	2-11	1-10	(4)
Dissolved O_2 (mg/L)	0-10.4	0-8.6	---

(1) The data are from 3 samples taken on 03/09/88, 08/01/89 & 08/20/90.
(2) The data are from 4 samples taken on 08/18/88, 08/02/89, 08/03/89 & 08/13/90.
(3) From the Texas Administrative Code, Title 31, Chapter 290, 1992-1993 Supplement. "M" indicates maximum constituent level and "S" indicates recommended secondary constituent level.
(4) Standards are based on population served by system and number of positive total coliform tests per month.

suggest so are suspected of not being representative since, as mentioned above, they were obtained from turbid pools a number of hours after a rain event. Iron concentrations in the pools may have been much higher than that of the typical runoff or reservoir sample. The test results generally show that the water is of good quality and that it does not require unusual considerations for treatment.

3. **Water Rights.** Although the yield of a watershed may be high and the water quality may be excellent, the water may not be available for use. The rights to the water may be owned by downstream users or an excessive amount of upstream rights may make a stream's discharge unreliable. The study uses two methods for determining on a preliminary basis whether unappropriated water is available at potential impoundment sites and at sites where flood control dams might be converted to permanent storage structures.

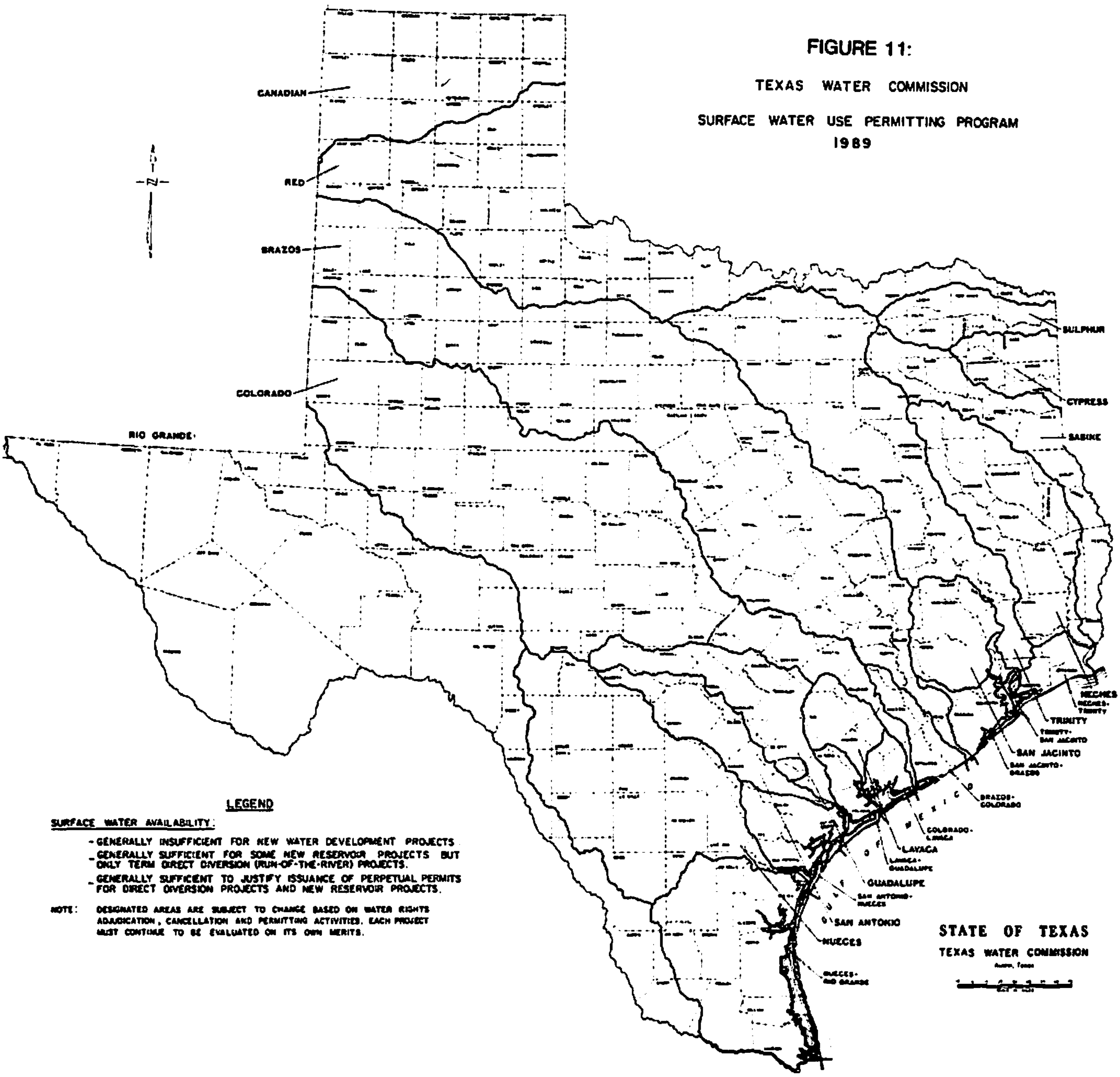
a. **Permitting Program Map.** The first method involves the use of Figure 11 which shows a 1989 map developed by the TWC entitled "TWC Surface Use Permitting Program, 1989" (SUPP). The map delineates three types of regions in Texas: where water availability is generally insufficient for new water development projects, where moderate amounts of water are generally available on a term basis, and where water availability is generally sufficient for new water projects on a perpetual basis.

Figure 11 shows that the study area falls in two regions. The eastern portion of the study area is shown to generally have sufficient amounts of unappropriated water for new water projects. The western portion of the study area, which is

FIGURE 11:

TEXAS WATER COMMISSION

SURFACE WATER USE PERMITTING PROGRAM
1989



within the Applewhite Reservoir and Leon Creek Diversion watersheds, is shown to generally have only moderate amounts of water available on a term basis. Although the future of the Applewhite Reservoir and the Leon Creek Diversion Dam is unknown, the water rights for the projects are still intact under appropriation permit No. 3914. Term lengths of water rights for new projects in the western portion of the study area may be related to the viability and/or construction schedule of the Applewhite Reservoir and Leon Diversion projects.

Locations outside of the study area, immediately to the north and to the west, are also considered as potential impoundment sites. Figure 11 shows that in Medina County, just west of the study area, moderate amounts of water are available on a term basis. (The area is located in the Applewhite watershed.) In Bandera and Kendall Counties, just northwest of the study area, generally there is an insufficient amount of water available for new water projects. Immediately north of the study area, in Kendall and Comal Counties, the surface water availability is generally sufficient to allow new water projects with perpetual permits.

b. The 1983 Revised Interim Report. The <u>Revised Interim Report of Water Availability in the San Antonio River Basin, Texas</u> (RIRWA) (Texas Department of Water Resources, March 1983) is used in the study to quantify unappropriated (available) surface water on a preliminary basis and to confirm some of the indications of Figure 11. The report estimates annual amounts of available unappropriated water at various points within the San Antonio River Basin based upon the difference between historical runoff and appropriation quantities for the period 1940 through 1979. In order to update the appropriation data, listings of water allocation permit additions and cancellations since 1979 were obtained from the TWC. Net changes in appropriations are added or subtracted from the amounts of unappropriated water listed in the 1983 report. However, historical runoff data are not updated. High and low values of available unappropriated water are estimated based upon the runoff extremes which occurred during the original RIRWA study period of 1940 through 1979.

B. Existing Impoundments

Existing impoundments are considered in the study area of north Bexar County and in nearby portions of adjoining counties. The impoundments in the study area are identified through a computer search performed by the TWC. The impoundments located outside of the study area are identified through common knowledge and the use of U.S.G.S. topographic sheets.

1. **Existing Impoundments in the Study Area.** Many impoundments currently exist in north Bexar County for irrigation and recreation purposes. Most of the impoundments are very small and do not involve the use of water rights. A computer search performed by the TWC Information Resources Department indicates that water rights are owned at only three different locations within the study area. None of the rights are municipal in nature. Figure 10, found at the end of Volume 2, shows the location of the three sites within the study area that utilize water rights.

a. **Lorence Creek Tributary**. At Site "a", the Midway Development Company owns nonconsumptive recreational water rights on a tributary of Lorence Creek (which is a tributary of Salado Creek). The facilities are located immediately north of Loop 1604, across from the City of Hollywood Park. The drainage area is only approximately 250 acres in size and is expected to safely yield an insignificant amount of water in regard to the purposes of the study.

b. **Balcones Creek**. At Site "b", Margaret B. Harper, et al, own nonconsumptive recreational water rights for impounding 10 acre-feet of water on Balcones Creek approximately 900 feet upstream of the bridge for Boerne Stage Road. Although the contributing watershed measures approximately 10,000 acres, the structure and impoundment capacity are so small that they would not be worth modifying for public drinking water purposes. The site is also not appropriate for a much larger structure.

c. **Los Reyes Creek Tributary**. At Site "c", the San Antonio Ranch, Ltd., et al, own irrigation water rights on a tributary of Los Reyes Creek. The site is located approximately 10,000 feet upstream from the center of Helotes. Although the owner is permitted to divert 100 acre-feet annually, and the reservoir capacity is reported to be 152 acre-feet, the contributing watershed measures only approximately 1200 acres and is estimated to safely yield only about 60 acre-feet annually, less than the minimum of 150 acre-feet annually. In addition, the reservoir is reported to not hold water.

2. **Existing Impoundments Outside of the Study Area.**

Three significant impoundments are identified outside of north

Bexar County: Lake Boerne in Kendall County, Canyon Lake in Comal County, and Medina Lake in Bandera and Medina Counties. Their locations can be found on Figure 12.

a. **Lake Boerne**. The City of Boerne owns water rights at Lake Boerne, northwest of the city. Under certificate of adjudication no. 19-1143, the City of Boerne is permitted to divert and to use up to a total of 833 acre-feet annually for municipal and domestic purposes from an impoundment with a capacity of 4,046 acre-feet. The watershed which supplies the impoundment measures approximately 12,550 acres and is estimated to safely yield 895 acre-feet annually. Therefore, most of the safe yield from the upper Cibolo watershed is owned by the City of Boerne. The City's reported usage for 1992 was approximately 520 acre-feet, leaving a small allocation surplus of about 313 acre-feet for that year.

Figure 11 indicates that Lake Boerne falls just within the zone where water is expected to be available on a perpetual permit basis. The RIRWA indicates that during its study period of 1940 through 1979, there was commonly insufficient water to meet the requirements of all permitted allocations upstream of Selma, approximately in the Boerne area. However, the records of the TWC show that water rights for a net of approximately 23,260 acre-feet have been canceled upstream of Selma since 1979 and water rights for an additional net of approximately only 1,070 acre-feet have been allocated downstream of Selma. Although, additional water rights may now be available at Lake Boerne, they would be for low safe yield quantities. A formal inquiry of the TWC is required to determine exactly how much unallocated water is available at Lake Boerne.

Figure 12 : Distant Surface Water Resources For North Bexar County

Edwards Underground Water District
North Bexar County Water Resource Study
W.E. Simpson Company, Inc.
Wm. F. Guyton Associates, Inc.

Average runoff at lake Boerne is estimated to be 5,600 acre-feet per year.

Assuming that Lake Boerne's water quality can be represented by the sample taken at location No. 6 as shown on Figure 10, the quality appears to be good, but with some occurrences of high counts of fecal coliform.

b. Canyon Lake. The Guadalupe-Blanco River Authority (GBRA) owns water rights at Canyon Lake. Under certificate of adjudication no. 18-2074 the GBRA is permitted to divert and to use up to 50,000 acre-feet annually for recreational, municipal, domestic, industrial, and irrigation purposes. During the years 1990, 1991 and 1992 GBRA used 2,135; 6,187 and 8,317 acre-feet, leaving annual allocation surpluses of 47,865; 43,813 and 41,683 acre-feet respectively.

Figure 11 indicates that Canyon Lake is located within the zone where water availability is considered to be generally insufficient for new water development projects.

Table 9 shows that Canyon Lake water is generally of good quality and that unusual methods of treatment are probably not required.

c. Medina Lake. The Bexar-Medina-Atascosa Counties Water Control and Improvement District No. One (BMA) owns water rights at Medina Lake. Under certificate of adjudication no. 19-2130 the BMA is permitted to divert and to use up to 66,750 acre-feet annually for irrigation, domestic, and livestock purposes. During the years 1990, 1991 and 1992 the BMA used 43,619; 14,917 and 29,536 acre-feet, leaving annual allocation surpluses of 23,131; 51,833 and 37,214 acre-feet, respectively. A Water Sale Agreement, executed August 19, 1991, allows the Bexar Metropolitan Water District (BMWD) to buy an unspecified quantity of "excess water" from the BMA. However, no substantial amounts of water can be sold under this agreement until the certificate of adjudication is amended, allowing more of the allocation to be used for municipal purposes. In addition, a recent study by the U.S. Bureau of Reclamation indicates that the lake has a firm yield of only 29,000 acre-feet annually.

Figure 11 indicates that Medina Lake is located on the boundary between the zone where water availability is considered to be generally insufficient for new water development projects and the zone where water availability is considered to be generally sufficient only for term projects.

Table 9 shows that Medina Lake water is generally of good quality and that unusual methods of treatment are probably not required.

C. Existing Flood Control Structures

The Salado Project is a program involving the San Antonio River Authority (SARA), Bexar County, the City of San Antonio, the U.S. Department of Agriculture Soil Conservation Service and the Alamo Soil and Water Conservation District No. 330. The project provides flood protection, aquifer recharge, water conservation and erosion control through the use of 14 dams.

Twelve of the dams are located in the study area. However, 10 of the 12 are located over the EARZ and are considered, for purposes of the study, as recharge structures for the Edwards Aquifer. Therefore, only two structures are considered to be relevant to the study. The two dams are located on the Camp Bullis Military Reservation and are referred to as SARA Structures No. 1 and No. 2. Figure 10, found at the end of Volume 2, shows the locations of the structures and the extent of their contributing watersheds.

1. **Salado Creek.** SARA Structure No. 1 is located on Salado Creek between Middleton Hill and Neutze Hill. It is 75 feet high, creates 4,189 acre-feet of storage and has a contributing watershed of 7,535 acres. The estimated safe annual yield is 378 acre-feet.

At least one sink hole is known to exist in the storage area.

Figure 11 indicates that SARA Structure No. 1 falls within the zone where water is expected to be available on a perpetual permit basis. The RIRWA indicates that during the study period of 1940 through 1979, there was sufficient water to exceed the requirements of all permitted allocations in the Salado Creek watershed. Excess amounts of water ranged from a low of 1,386 to a high of 75,769 acre-feet annually. The records of the TWC show that water rights for approximately 13,800 acre-feet annually have been canceled since 1979. Therefore, new water rights may be obtainable at SARA Structure No. 1.

Water quality tests show elevated iron concentrations and fecal coliform counts to be slightly higher than the TWC Stream Standards. However, the sample was taken from a turbid pool a number of hours after a rain storm and may be of a lesser quality than the general runoff.

2. **Lewis Creek.** SARA Structure No. 2 is located on a tributary of Salado Creek called Lewis Creek between Neutze Hill and McIndoe Hill. It is 55 feet high, creates 2,293

acre-feet of storage and has a contributing watershed of 3,294 acres. The estimated safe annual yield is 165 acre-feet.

Figure 11 indicates that, like SARA Structure No. 1, SARA Structure No. 2 falls within the zone where water is expected to be available on a perpetual permit basis. The RIRWA indicates that during the study period of 1940 through 1979, there was sufficient water to exceed the requirements of all permitted allocations in the Salado Creek watershed. Excess amounts of water ranged from a low of 1,386 to a high of 75,769 acre-feet annually. The records of the TWC show that water rights for approximately 13,800 acre-feet annually have been canceled since 1979. Therefore, new water rights may be obtainable at SARA Structure No. 2.

Water quality tests show that the stream base flow is hard and that the fecal coliform count falls right at the TWC's typical stream target value of 200. In general, the water quality appears to be good.

D. <u>Potential Impoundments</u>

Potential impoundments are identified as sites which have topographic features that are suitable for dam construction, safely yield more than 150 acre-feet annually, have low levels of development in the dam and impoundment areas, and are not far from population centers in the study area. Although geology is very important in assessing a potential dam site, the scope of the study limits the discussion of geology to cursory references.

Nine potential impoundment sites are identified and are shown with contributing watersheds in Figure 10, found at the end of Volume 2. Three of the sites and their watersheds are located entirely within the study area. Two of the sites and their watersheds are located on the boundary of the study and four of the sites and their watersheds are located entirely outside of Bexar County, north of the study area.

1. **San Geronimo Creek.** Site No. 1 is located on San Geronimo Creek on the west boundary of the study area. The contributing watershed of 10,930 acres has an estimated safe annual yield of approximately 547 acre-feet.

However, Figure 11 indicates that the site is located in the zone where new water rights are available only on a term basis. The site is also within the Applewhite watershed. The RIRWA indicates that during the study period of 1940 through 1979, there was sufficient water to exceed the requirements of all permitted allocations in the Medina River watershed between Medina Lake and the San Antonio River. Excess amounts of water ranged from a low of 62 to a high of 95,808 acre-feet annually. Since the Applewhite Reservoir project has rights to 70,000 acre-feet annually, new water rights of any significant amount may not be available on San Geronimo Creek on a permanent basis.

Water quality tests indicate hard water and a slightly elevated fecal coliform count. In general, the quality is good.

2. **Balcones Creek.** Site No. 2 is located on Balcones Creek on the northwest boundary of the study area. The contributing watershed of 11,388 acres has an estimated safe annual yield of approximately 569 acre-feet. Figure 11 indicates that the site is located in the zone where new water rights are available on a perpetual basis.

Figure 11 indicates that Balcones Creek falls just within the zone where water is expected to be available on a perpetual permit basis. The RIRWA indicates that during the study period of 1940 through 1979, there was commonly insufficient water to meet the requirements of all permitted allocations in the watershed of Cibolo Creek upstream of Selma. However, the records of the TWC show that water rights for approximately 22,000 acre-feet have been canceled since 1979. Therefore, additional water rights may now be available on Balcones Creek.

Quality tests indicate that the water is of good quality, but hard.

3. **Unnamed Tributary of San Geronimo Creek.** Site No. 3 is located on an unnamed tributary of San Geronimo Creek in the west part of the study area. The contributing watershed of 5,968 acres has an estimated safe annual yield of approximately 298 acre-feet.

However, Figure 11 indicates that the site is located in the zone where new water rights are available only on a term basis. The site is also within the Applewhite watershed. The RIRWA indicates that during the study period of 1940 through 1979, there was sufficient water to exceed the requirements of all permitted allocations in the Medina River watershed between Medina Lake and the San Antonio River. Excess amounts of water ranged from a low of 62 to a high of 95,808 acre-feet annually.

Since the Applewhite Reservoir project has rights to 70,000 acre-feet annually, new water rights of any significant amount may not be available at the site on a permanent basis.

Although no water samples were taken on this creek and no analysis results were found, the inorganic makeup is probably similar to that of San Geronimo Creek - good quality, but hard.

4. <u>**Leon Creek.**</u> Site No. 4 is located on Leon Creek in the west part of the study area. The contributing watershed of 3,082 acres has an estimated safe annual yield of approximately 154 acre-feet.

However, Figure 11 indicates that the site is located in the zone where new water rights are available only on a term basis. The site is also within the watershed of the Leon Creek Diversion Dam. The RIRWA indicates that during the study period of 1940 through 1979, there was sufficient water to exceed the requirements of all permitted allocations in the Medina River watershed between Medina Lake and the San Antonio River. Excess amounts of water ranged from a low of 62 to a high of 95,808 acre-feet annually. Since the Leon Creek Diversion Dam project has rights to 12,300 acre-feet annually, new water rights of any significant amount may not be available at the site on a permanent basis.

Water quality information is available for two locations on Leon Creek. Test results at Raymond Russell Park are obtained from the TWC and test results at a point about 3.2 miles downstream are obtained from SAWS. It should be kept in mind that the nearest sample site is approximately 7.5 miles downstream from the potential impoundment site. However, samples taken from the nearest site show no quality problems. The samples taken from the farthest site show low pH levels and high fecal coliform counts. The reason for the difference in water quality is uncertain and may require further investigation. The upstream sample with the better quality is probably more representative of the water at the potential impoundment site.

5. **Chimenea Creek.** Site No. 5 is located on Chimenea Creek in the west part of the study area. The contributing watershed of 3,287 acres has an estimated safe annual yield of approximately 164 acre-feet.

However, Figure 11 indicates that the site is located in the zone where new water rights are available only on a term basis. The site is also within the watershed of the Leon Creek Diversion Dam. The RIRWA indicates that during the study period of 1940 through 1979, there was sufficient water to exceed the requirements of all permitted allocations in the Medina River watershed between Medina Lake and the San Antonio River. Excess amounts of water ranged from a low of 62 to a high of 95,808 acre-feet annually. Since the Leon Creek Diversion Dam project has rights to 12,300 acre-feet annually, new water rights of any significant amount may not be available at the site on a permanent basis.

Although no water quality test results are known for the watershed, a similarity to San Geronimo Creek and Upper Leon Creek is expected. Therefore, the general water quality is expected to be good with possible hardness or slightly elevated fecal coliform counts.

6. **Pleasant Valley Creek.** Site No. 6 is located on Pleasant Valley Creek north of the study area. The contributing watershed of 13,934 acres has an estimated safe annual yield of approximately 697 acre-feet.

Figure 11 indicates that the site is located in the zone where new water rights are available on a perpetual basis.

The RIRWA indicates that during the study period of 1940 through 1979, there was commonly insufficient water to meet the requirements of all permitted allocations in the watershed of Cibolo Creek upstream of Selma. However, the records of the TWC show that water rights for approximately 22,000 acre-feet have been canceled since 1979. Therefore, additional water rights may now be available on Pleasant Valley Creek.

Testing of the sample from location number 5 shows the water quality to be generally good, but with high iron content and a high fecal coliform count. The high iron content may be due to the exposed Glen Rose formation in the area and the high fecal count is probably due to the fact that much of Pleasant Valley is used for grazing cattle. Although coagulation and filtration or reverse osmosis may be required to remove the iron, it should be noted that the sample was taken from a quiescent, but turbid pool a number of hours after a rain event. Water captured in an impoundment would probably be less turbid and have less iron content because solids would have a better opportunity to settle out.

Dam construction may be complicated by the presence of a new residential subdivision. If the site is considered in further studies, the impact of the development should taken into consideration.

7. **Kelly Creek.** Site No. 7 is located on Kelly Creek north of the study area. The contributing watershed of 3,496 acres has an estimated safe annual yield of approximately 175 acre-feet.

Figure 11 indicates that the site is located in the zone where new water rights are available on a perpetual basis. The RIRWA indicates that during the study period of 1940 through 1979, there was commonly insufficient water to meet the requirements of all permitted allocations in the watershed of Cibolo Creek upstream of Selma. However, the records of the TWC show that water rights for a net of approximately 22,000 acre-feet have been canceled since 1979. Therefore, additional water rights may now be available on Kelly Creek.

The water quality of Kelly Creek is expected to be similar to that of Pleasant Valley Creek. There may be a high iron content requiring coagulation and filtration or reverse osmosis.

8. **Cibolo Creek.** Site No. 8 is located on Cibolo Creek north of the study area. The contributing watershed of 48,650 acres has the potential to safely yield nearly 3,500 acre-feet annually with a small reservoir. A higher yield could be obtained with a larger reservoir. Average runoff is estimated at 22,000 acre-feet per year.

Figure 11 indicates that the site is located just within the zone where new water rights are available on a perpetual basis. Although the RIRWA indicates that during the study period of 1940 through 1979 there was commonly insufficient water to meet the requirements of all permitted allocations in the watershed of Cibolo Creek upstream of Selma, the records of the TWC show that water rights for approximately 22,000 acre-feet have been canceled since 1979. Therefore, additional water rights may now be available at Site No. 8 on Cibolo Creek. However, the City of Boerne owns rights to 833 acre-feet upstream which should be subtracted from yield estimates for Site No. 8.

Samples from location No. 6 indicate that the water quality is good, except for fecal counts which are elevated at times.

IV. WASTEWATER REUSE

Offsetting water supply shortfalls can sometimes be aided by the reuse of wastewater. A study of the TWC's waste disposal permit file indicates that six facilities have permits to handle wastewater in the study area. Five of the facilities are wastewater treatment plants and one is a concrete manufacturing plant. Two of the wastewater treatment plants currently have users for their effluent and the concrete manufacturing plant recycles all of its process water. The remaining three wastewater treatment plants discharge a total of approximately 230 acre-feet annually which can potentially be reused. Table 10 summarizes the study findings for wastewater reuse in the study area. Figure 10, found at the end of Volume 2, shows the locations of the facilities as potential and existing reuse sites.

TABLE 10: WASTEWATER EFFLUENT IN NORTH BEXAR COUNTY							
PLANT	PERMITTEE	PLANT LOCATION	PERMITTED CAPACITY (MGD)	1993 PLANT LOAD (MGD)	1993 REUSE (MGD)	1993 EFFLUENT AVAILABLE FOR REUSE (MGD)	TYPE OF EXISTING REUSE
1.	Elkhorn Company, Inc.	Fair Oaks	0.5	0.04	0.04	0	Golf course irrigation
2.	Leon Springs Utility company	Dominion	0.15	0.125	0.125	0	Golf course irrigation
3.	San Antonio Municipal Utility District No. 1	San Antonio Ranch	0.04	0.025	0	0.025	---
4.	San Antonio Pre-Stressed Company	San Antonio Pre-Stressed Company	0.08	0.040	0.040	0	manufacturing
5.	U.S. Department of the Army	Camp Bullis	0.18	0.15	0	0.15	---
6.	U.S. Department of the Army	Camp Stanley	0.03	0.033	0	0.033	---
				TOTAL EFFLUENT AVAILABLE FOR RE-USE		0.208 MGD (230 ACRE-FEET ANNUALLY)	

A. **Fair Oaks Subdivision**

The wastewater treatment plant for the Fair Oaks subdivision (and city) is permitted in the name of the Elkhorn Company, Inc. of Boerne, Texas under permit number 11867-01. The permit is a zero discharge permit, allowing no direct outfall to a receiving water course. Instead, spray irrigation of a golf course is specified as the means of discharge. The facility, which treats residential wastewater, is permitted for 0.5 MGD and is currently treating approximately 0.04 MGD. All effluent from the facility is currently being reused. The facility location is indicated as Site No. 1 on Figure 10, found at the end of Volume 2.

B. **The Dominion Subdivision**

The wastewater treatment plant for the Dominion subdivision is permitted under the name of the Leon Springs Utility Company of Austin, Texas under permit number 12557-001. Spray irrigation of a golf course is used as the means of discharge. The facility, which treats residential wastewater, is permitted on an interim basis for 0.15 MGD and is currently treating approximately 0.125 MGD. The permit also allows for expansion of the facility in order that it may treat up to 0.8 MGD. All effluent from the facility is currently being reused. The facility location is indicated as Site No.2 on Figure 10, found at the end of Volume 2.

C. **San Antonio Ranch Subdivision**

The wastewater treatment plant for the San Antonio Ranch subdivision is permitted under the name of the San Antonio Municipal Utility District No. 1 of Helotes, Texas under permit number 11647-001. The permit allows two stages of treatment capacity, both stages requiring a zero discharge facility with no direct outfall to a receiving water course. The facility site is located adjacent to the San Antonio Ranch subdivision and is indicated as Site No. 3 on Figure 10, found at the end of Volume 2. The interim facility, which treats residential wastewater, is permitted for 0.04 MGD and is currently treating approximately 0.025 MGD. The future expanded facility is permitted to treat up to 0.075 MGD. Effluent for reuse may be available from both interim and final plant stages.

D. <u>San Antonio Pre-stressed Company</u>

The San Antonio Pre-Stressed Company of San Antonio, Texas is permitted under permit number 02961 to store and to recycle process wastewater from concrete production. The permit is a zero discharge permit, allowing no outfall to a receiving water course. Instead, all wastewater is recycled by the facility. The facility is permitted for an average daily load of 0.04 MGD with allowable daily maximums of 0.08 MGD. All effluent from the facility is currently being reused. The facility location is indicated as Site No. 4 on Figure 10, found at the end of Volume 2.

E. <u>Camp Bullis</u>

The wastewater treatment plant for Camp Bullis is permitted under the name of the U.S. Department of the Army under permit number 12080-01. The permit is a zero discharge permit, allowing no direct outfall to a receiving water course. Instead, the effluent is discharged as irrigation to a perennial pasture located near the treatment plant. The facility, which treats domestic wastewater, is permitted for 0.8 MGD and is currently treating approximately 0.15 MGD. The plant operator indicates that the facility's capacity may soon be increased to 0.6 MGD. All of the effluent from the facility may be available for other forms of reuse. The facility location is indicated as Site No. 5 on Figure 10, found at the end of Volume 2.

F. Camp Stanley

The wastewater treatment plant for Camp Stanley is permitted under the name of the U.S. Department of the Army under permit number 12111-01. The permit allows effluent to be discharged to an unnamed tributary of Leon Creek. The facility, which treats domestic wastewater, is permitted for 0.03 MGD and is currently treating approximately 0.033 MGD. All of the effluent may be available for reuse from the facility. The facility location is indicated as Site No. 6 on Figure 10, found at the end of Volume 2.

V. WATER RESOURCES AVAILABILITY

A. Groundwater

1. **Trinity aquifer** Demand for water from the Trinity aquifer was approximately 6,300 acre-feet in 1990. The groundwater portion of the report (Volume 1) shows that, in response to the demand, the Trinity aquifer lost approximately 600 acre-feet of storage that year. Considering the historic trend of increasing demand, it is clear that the Trinity aquifer has an insufficient capacity to meet the increasing demand of the Trinity-using population using

current pumping arrangements and that the amount of water in aquifer storage has probably decreased since 1990 and will continue to do so unless additional water resources are developed. Even if the pumping practices of north Bexar County were to be improved by reducing the density of well sites, it is estimated in the groundwater portion of the report that only 1,000 to 2,000 acre-feet of additional sustainable yield can be achieved.

In order to stop the reduction in aquifer storage, the minimum course of action would be to provide a quantity of water to the study area equivalent to that which is being removed from storage. This figure can be estimated based on the difference between the sustainable yield and projected demand figures. Table 11 lists future demand estimates, as developed previously in the report, and the corresponding aquifer storage loss or minimum supplement requirement. The table shows that minimum target values of supply from

TABLE 11: ESTIMATED FUTURE DEMAND AND STORAGE LOSS FOR THE TRINITY AQUIFER IN NORTH BEXAR COUNTY

	FUTURE TRINITY AQUIFER DEMAND (ACRE-FEET/YEAR)		FUTURE AQUIFER STORAGE LOSS (ACRE-FEET/YEAR)	
YEAR	LOW	HIGH	LOW	HIGH
2000	7,710	7,800	2,710	2,800
2010	8,850	9,130	3,850	4,130
2020	9,770	10,350	4,770	5,350

from supplemental sources of water should be approximately 2,710 to 2,800 acre-feet in the year 2000; 3,850 to 4,130 acre-feet in the year 2010; and 4,770 to 5,350 acre-feet in the year 2020.

2. **Edwards Aquifer.** Water systems serving Edwards water have been making ever increasing contributions to meet the growing demand. Figure 4 shows the extent of service areas of Edwards and Trinity purveyors in 1993. In 1990, an estimated 14,284 people were being served Edwards water in the study area. The Edwards "service area" is not nearly fully developed and at first glance a potential appears to exist for the Edwards purveyors to be able meet some of the future increased demand. However, since the Texas Legislature passed Senate Bill 1477 in May of 1993, the ability of Edwards purveyors to meet increasing demand in the study area will be drastically reduced. Therefore, this study is based on the assumption that Edwards water will not provide the necessary supplements required for future growth and is not considered as a potential source.

B. Surface Water

Since the North Bexar County study region measures approximately 198,100 acres in area, theoretically it could safely yield over 9,900 acre-feet of surface water annually. However, a significant amount of the study area is unsuitable as watershed or impoundment area because it includes approximately 81,400 acres of the EARZ, it includes highly developed areas, and it includes many small disconnected watersheds which could not be "harvested" cost effectively. Impoundments in the EARZ are considered as potential recharge structures for the Edwards Aquifer and not as potential sources of water for North Bexar County. The highly developed areas are impractical locations for impoundments because land costs and demolition costs are high. Highly developed regions do not make ideal watersheds for potable supply because they have many potential sources for contamination. And small watersheds require a higher cost per acre-foot of yield than larger watersheds. Approximately only 11,930 acres of the study area may serve as suitable watershed, safely yielding approximately 596 acre-feet of water annually. Because such a yield is too small to meet future demand, surface water sources located outside of the study area are also considered.

1. **Existing Impoundments.** A search of the TWC's files reveals no existing impoundments within the study area that can produce significant yields. However, three significant impoundments are located outside of the study area.

Although most of Lake Boerne's safe yield is presently owned by the City of Boerne for a drinking water supply, the reservoir may be able to supply additional quantities of water on an irregular basis. Data from the gaging station near Boerne indicates that the "average" year sees approximately 4,800 acre-feet of runoff in excess of the City of Boerne's permitted use of 833 acre-feet. If the necessary agreements can be made with the City of Boerne, the existing 4,046 acre-foot reservoir might be used in a "scalping" arrangement to serve north Bexar County also. It should be noted that, although an excess of water will be available some years, little or no excess water would be available for scalping in other years.

Annual allocation surpluses of over 40,000 acre-feet at Canyon Lake could supply more than the expected maximum shortfall of 5,350 acre-feet per year expected in the year 2020. The GBRA has developed an agreement with the Canyon Lake Water Supply Corporation (CLWSC). The CLWSC has a service area which extends from the Canyon Lake area to the City of Bulverde which is just outside the north boundary of Bexar County as shown in Figure 12. The CLWSC had considered at one time extending mains from Bulverde along U.S. Highway 281 to Loop 1604. The Canyon Lake supply is expected to be accessible, but would require enlarging the planned water treatment plant and transmission system to Bulverde. The transmission would also have to be extended into the study area.

Annual allocation surpluses of over 20,000 acre-feet at Medina Lake could supply more than the expected maximum shortfall of 5,350 acre-feet per year expected in the year 2020. However, a U.S. Bureau of Reclamation's firm yield estimate of 29,000 acre-feet per year suggests that none of the allocation excess is firm yield. The BMA's current use exceeds the firm yield of the lake. Also, the Water Sale Agreement with the BMWD could reduce the allocation surplus and would have to be considered further. The use of Medina Lake would require the construction of a water treatment plant and transmission line with pump stations and ground storage.

2. **Existing Flood Control Structures.** SARA Structures No. 1 and 2 on Salado and Lewis Creeks together are estimated to be able to safely yield 542 acre-feet annually. This relatively small quantity could be used in an Aquifer Storage and Recovery (ASR) system to relieve groundwater

storage loss. The primary construction costs may be relatively low with minor changes to the dams, a chlorination system, and a transmission pipeline to be built. However, the geology of the area may not to be suitable for maintaining the required permanent reservoir storage. More investigation is necessary.

3. **Potential Impoundments.** Four of the potential impoundment sites listed earlier in the report, Site No. 1 on San Geronimo Creek, Site No. 3 on a tributary of San Geronimo Creek, Site No. 4 on Leon Creek and Site No.5 on Chiminea Creek are located in the watershed for the Applewhite Reservoir and Leon Creek Diversion Dam. Because water rights are still intact for the Applewhite and Leon Diversion projects, only insignificant amounts of unallocated water are expected to be available and none of the four sites within the watershed are considered further.

Three small potential impoundment sites, including Site No. 2 on Balcones Creek, Site No. 6 on Pleasant Valley Creek and Site No. 7 on Kelly Creek, could collectively provide a safe yield of approximately 1,440 acre-feet. Although it would not satisfy the future demands of the entire study area, the combined yield would probably meet the growing needs of the Fair Oaks area.

The larger potential impoundment, Site No. 8 on Cibolo Creek, may have a potential of safely yielding enough to meet the growing demand for the study. More study is required to determine the availability of unallocated water, the effects of reservoir storage on safe yield, and upon the geologic character of the site.

C. Reusable Wastewater

A total of approximately 230 acre-feet of wastewater effluent annually is potentially available from three wastewater treatment plants in the study area. The potential reuse quantity is small compared to the total demand on the Trinity aquifer and, although the availability of reuse water is expected to increase as the population grows, it will probably remain small compared to the increasing demand.

VI. DEVELOPMENT OF ALTERNATIVE RESOURCES

In the planning of water resource development, the demand for water must be weighed against the effective availability of water under present and future conditions. The effective availability of water is discussed in terms of quantity, water quality, and capital development cost. The reader should note that a complete cost analysis would go beyond capital development costs and include treatment costs, operation and maintenance costs over the life of the projects. However, such an analysis is beyond the scope of the study and should be pursued in further study. The reader should note that the estimates are based upon 1993 engineering and construction costs of treatment plants, transmission systems, disinfection systems, storage tanks, dams and reservoirs. Land costs are not included except for reservoirs. Three types of water resources; groundwater, surface water and reusable wastewater; are discussed with regard to their ability to economically meet future demands. Costs, target supply quantities and rankings are listed in Table 12.

A. Groundwater

The groundwater portion of the report indicates that the Trinity aquifer has a sustainable yield of approximately 5,000 acre-feet annually in the study area. The aquifer was overpumped by about 600 acre-feet in 1990. At the anticipated rates of development and if no alternative sources are introduced, future overpumping is expected to be approximately

TABLE 12: ALTERNATIVE SURFACE WATER RESOURCES					
GENERAL RESOURCE	SPECIFIC ALTERNATIVE RESOURCE AND TYPE	TARGET SUPPLY (ACRE-FEET/YEAR)	APPROXIMATE COST (MILLIONS)	APPROXIMATE COST PER ACRE-FOOT OF ANNUAL SUPPLY	RANK
EXISTING IMPOUNDMENTS	LAKE BOERNE, ASR	1,500	$6	$4,000	1
	CANYON LAKE, CONVENTIONAL	5,350	$29	$5,400	2
	MEDINA LAKE, CONVENTIONAL	5,350	$39	$7,300	5
POTENTIAL IMPOUNDMENTS	BALCONES, PLEASANT VALLEY & KELLY CREEKS, ASR	1,400	$19	$10,000 TO $14,000	4
	CIBOLO CREEK, CONVENTIONAL	5,350	$33 TO $43	$6,200 TO $8,000	3

2,710 to 2,800 acre-feet in the year 2000; 3,850 to 4,130 acre-feet in the year 2010; and 4,770 to 5,350 acre-feet in the year 2020. Although the relocation of wells may increase the sustainable yield by 1,000 to 2,000 acre-feet annually as indicated in the groundwater portion of the report, this expensive approach would be only a partial solution to a regional problem.

B. <u>Surface Water</u>

1. **<u>Existing Impoundments.</u>** Lake Boerne may be able to supply enough water to feed an ASR system which could offset the cone of depression in the Fair Oaks area. The ASR system would address only the Fair Oaks area and would not address the entire study area. It would require approximately 62,500

lineal feet of transmission line and a disinfection system in order to meet the Fair Oaks estimated demand of 1,500 acre-feet per year for the year 2020. Construction and engineering costs for the system are estimated to be approximately $6 million. A potential transmission concept plan is shown in Figure 14.

Canyon Lake is expected to be able to supply enough water to meet all of the growing demand of the study area for the duration of the study period. Canyon Lake would be used as a conventional surface source and would require upgrading the facilities currently planned by the Canyon Lake Water Supply Corporation (CLWSC). The water treatment plant would have to be upgraded from a 2 MGD capacity to a 7 MGD capacity. Approximately 98,700 lineal feet of transmission pipe would have to be upgraded accordingly, approximately 98,000 lineal feet of transmission line would have to be added to the system near and within the study area, storage would have to be added and lift stations would have to be modified. The increase over the cost of the CLWSC's existing plan is estimated to be approximately $29 million. A potential transmission concept plan is shown in Figure 12.

The Water Sale Agreement with the BMWD and the limited reservoir yield are expected to prevent Medina Lake from being capable of supplying water to the study area. However, if it were to be used, Medina Lake would be used as a conventional surface source. Its use would require the construction of a 5

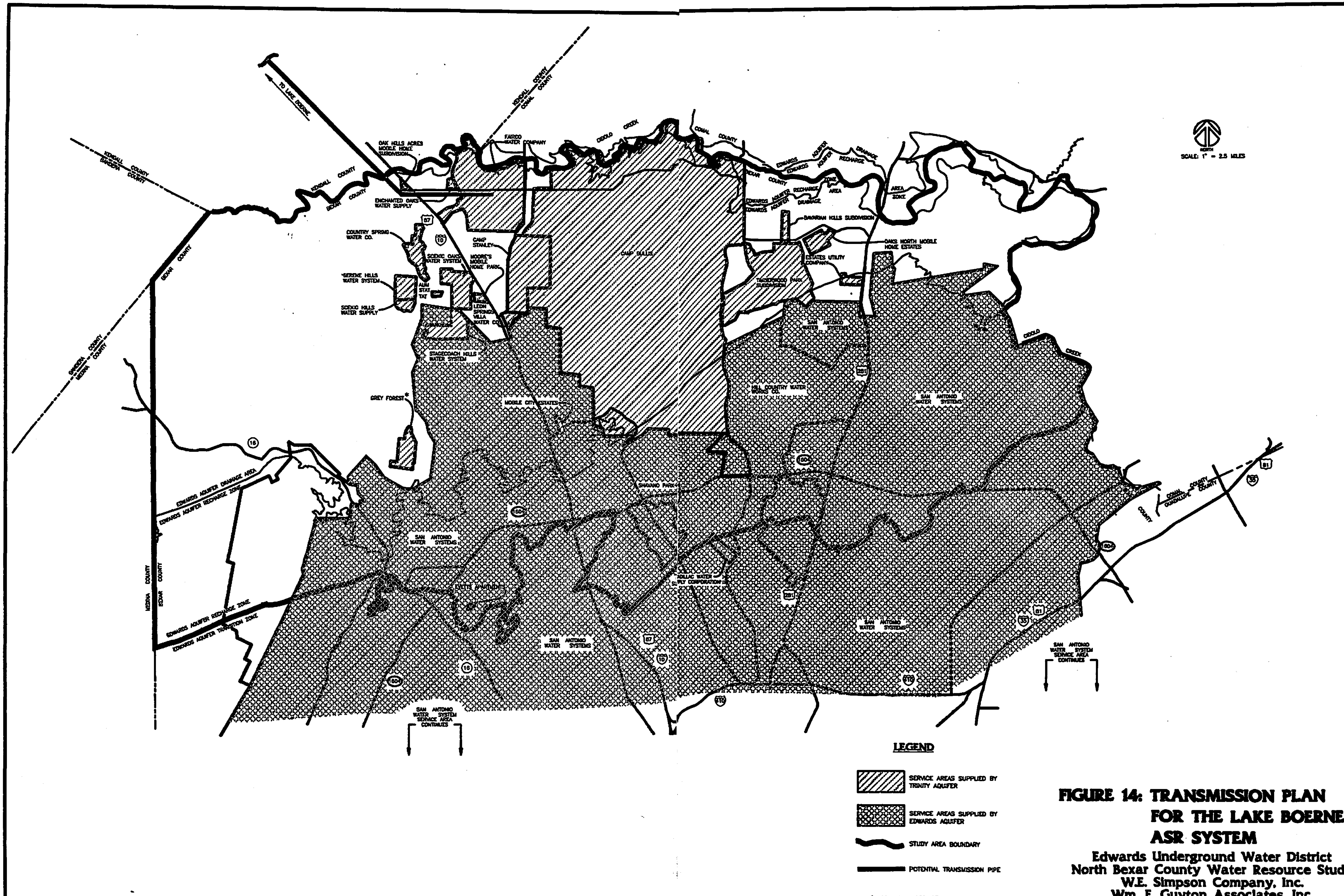


FIGURE 14: TRANSMISSION PLAN FOR THE LAKE BOERNE ASR SYSTEM

Edwards Underground Water District
North Bexar County Water Resource Study
W.E. Simpson Company, Inc.
Wm. F. Guyton Associates, Inc.

MGD water treatment plant; 194,000 lineal feet of transmission pipe; storage tanks and lift stations. The approximate cost is estimated to be $39 million. A potential transmission concept plan is shown in Figure 12.

2. **Existing Flood Control Structures.** The dams at existing flood control Site Numbers 1 and 2 on Salado and Lewis Creeks could be modified to capture a safe yield of 542 acre-feet annually for an ASR system or as a conventional surface impoundment. However, the yield is small compared to the estimated future demand for water from new sources of 4,650 acre-feet annually. Additionally, modifications would probably require raising the dams in order to add permanent storage to the existing flood storage in the impoundment area. Because raising of the large structures would probably be costly and the impoundment areas are not expected to hold water well, no costs are estimated for this alternative.

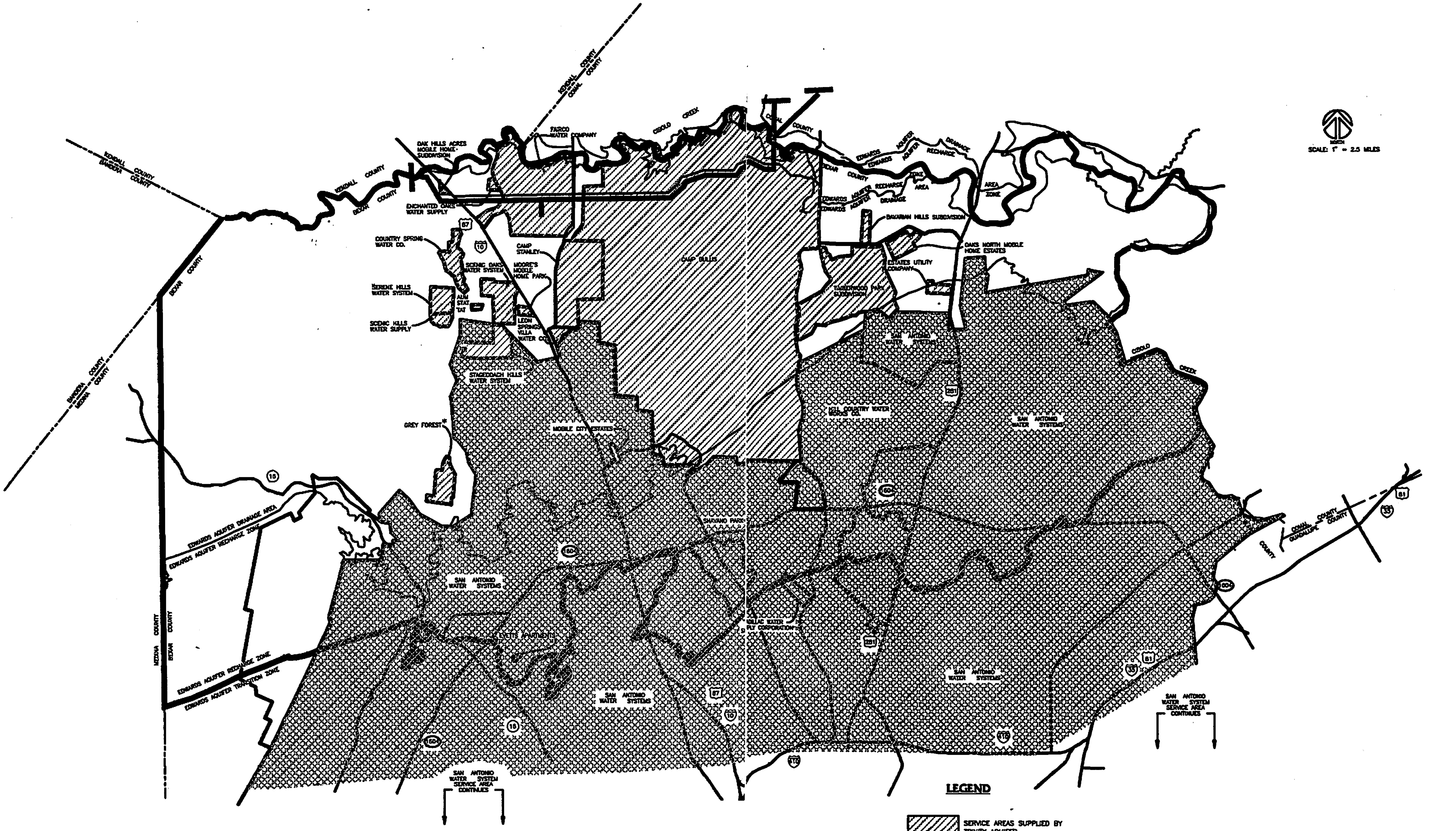
3. **Potential Impoundments.** A safe yield of over 1,400 acre-feet per year could potentially be obtained from a system of three small dams at the following locations: Site Number 2 on Balcones Creek, Site Number 6 on Pleasant Valley Creek and Site Number 7 on Kelly Creek. Treatment plant costs could be saved by using the system for ASR to recharge the Fair Oaks region. The system would require three new dams, a disinfection system, 72,000 lineal feet of transmission pipe, pump stations, realignment of Ammann Road and a ground storage tank. Cost is estimated at $19 million and does not include

the cost for a reverse osmosis or coagulation system which might be needed for the removal of iron. A potential impoundment and transmission concept plan is shown in Figure 15.

A dam at potential impoundment Site Number 8 on Cibolo Creek could possibly impound as much as 18,000 acre-feet of water. However, perhaps a smaller, less expensive, version of the dam could be constructed to yield the 5,350 acre-feet per year required to augment north Bexar County's existing sources. In addition to a new dam, the Cibolo Creek system would require a water treatment plant, approximately 65,000 lineal feet of transmission pipe, pump stations, and ground storage tanks. The cost is sensitive to the sizing of the dam and is estimated to be in the range of $33 million to $43 million. A potential impoundment and transmission concept plan is shown in Figure 16.

C. Reusable Wastewater

Although approximately 230 acre-feet of reusable wastewater was available in 1990 and the quantity is expected to grow with the population, the amount is only approximately one third of the 1990 aquifer storage loss. Additionally, the sources are scattered and two of the three sources are believed to have sporadic discharges. Presently, reusable wastewater is not available in significant quantities, but should be monitored for future applications as the supply grows.



LEGEND

SERVICE AREAS SUPPLIED BY TRINITY AQUIFER

SERVICE AREAS SUPPLIED BY EDWARDS AQUIFER

STUDY AREA BOUNDARY

POTENTIAL TRANSMISSION PIPE

POTENTIAL DAM SITE

* NOT YET IN SERVICE.

FIGURE 15: TRANSMISSION PLAN FOR THE BALCONES, PLEASANT VALLEY AND KELLY CREEKS ASR SYSTEM

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W.E. Simpson Company, Inc.
Wm. F. Guyton Associates, Inc.

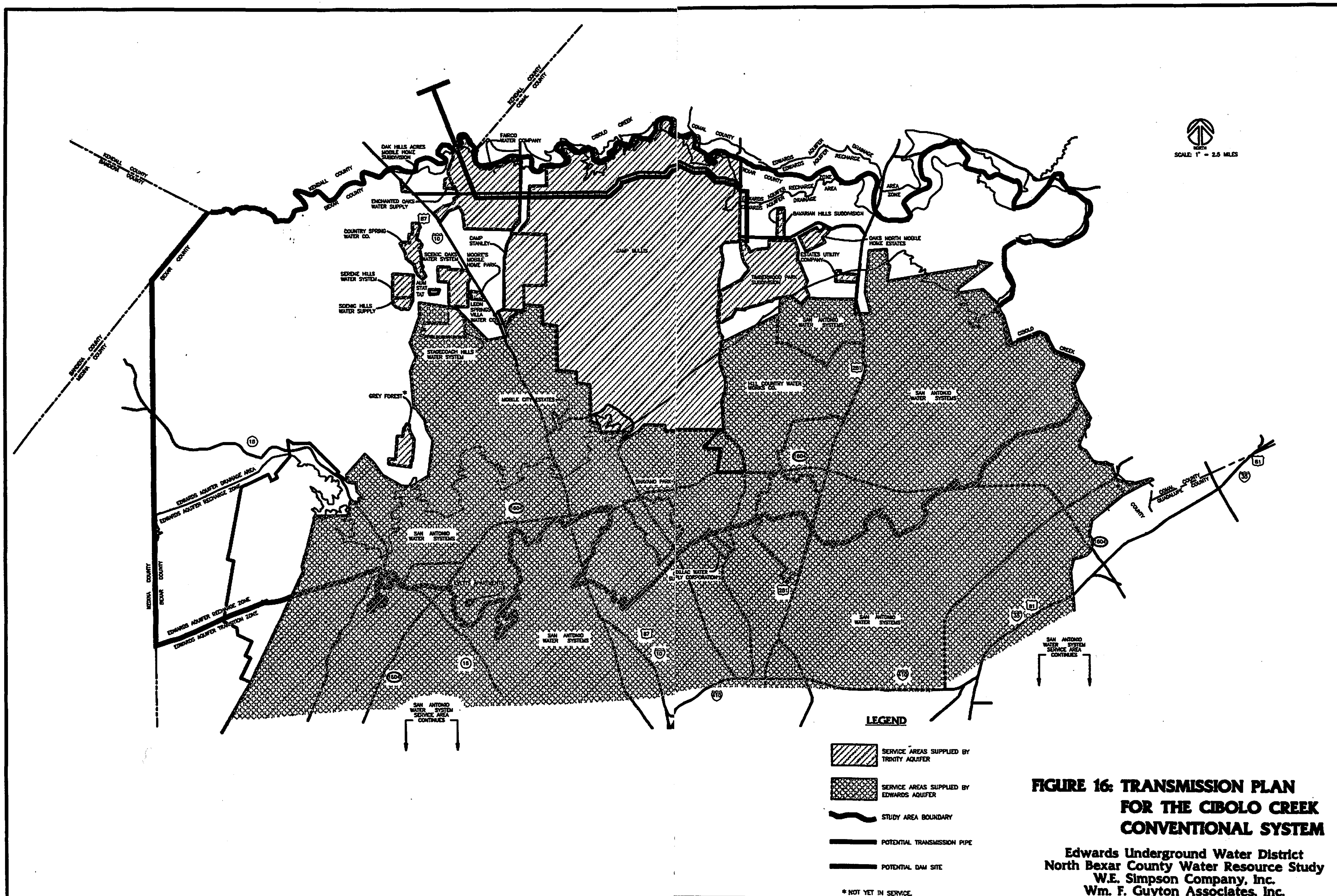

FIGURE 16: TRANSMISSION PLAN FOR THE CIBOLO CREEK CONVENTIONAL SYSTEM

Edwards Underground Water District
North Bexar County Water Resource Study
W.E. Simpson Company, Inc.
Wm. F. Guyton Associates, Inc.

VII. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

1. The population count of north Bexar County was approximately 27,900 in 1990 and may increase to approximately 93,900 by the year 2020.

2. The portion of the population in north Bexar County which uses Trinity water numbered approximately 13,600 in 1990 and may increase to approximately 38,500 by the year 2020.

3. Overpumpage or reduction in storage of the Trinity aquifer occurred at a rate of approximately 600 acre-feet per year in 1990 and is anticipated to increase to a rate possibly as high as 5,350 acre-feet per year by the year 2020 if alternative resources are not employed.

4. The effective yield of the Trinity aquifer for household use is reduced by poor water quality found especially in the upper and lower Trinity. Complex and expensive water treatment such as reverse osmosis and coagulation may be required to remove excess calcium, sulfates, fluorides, and iron.

5. One large surface water source located outside of north Bexar County appears to have the available firm yield to adequately meet its current user demands and to compensate for anticipated shortruns in water in the study area. The surface source is Canyon Lake. A Water Sale Agreement with BMWD and a limited firm yield prevent Medina Lake from being a potential source for the study area.

6. The City of Boerne owns the water rights to virtually all of Lake Boerne's watershed. Therefore, only excess runoff is available at Lake Boerne.

7. A large portion of north Bexar County's surface water yield is lost to water rights for the Applewhite Reservoir/Leon Diversion Dam project.

8. Three small potential dam sites just north of Bexar County on Balcones, Pleasant Valley and Kelly Creeks may provide an annual firm yield of at least 1,400 acre-feet.

9. A potential dam site on Cibolo Creek, just north of Bexar County, may supply a firm yield of 2,650 acre-feet annually, and possibly more.

10. The availability of reusable wastewater was only approximately 230 acre-feet in 1990. Presently, reusable wastewater is not available in significant quantities.

B. RECOMMENDATIONS

1. Pursuing alternative surface water resources is recommended in order to prevent detrimental storage loss in the Trinity aquifer. Top priority should be given to the Fair Oaks region where the groundwater cone of depression is creating an urgent condition.

2. Begin further study as soon as possible to see if an ASR project which supplies water from Lake Boerne to Fair Oaks is feasible.

3. Initiate further study to confirm and to more precisely determine the availability of water from Canyon Lake and Lake Boerne and the lack of water from Medina Lake.

4. Initiate further study of potential dam sites on Cibolo Creek, Balcones Creek, Kelly Creek and Pleasant Valley Creek. Include further hydrologic analysis to refine drainage basin yield potentials and to determine the appropriate dam sizing for optimizing yields. Also include more developed geologic analyses of potential dam sites in order to determine their suitability as dam sites. Consider foundation and permeability conditions and impacts upon cost.

5. Further study of the ranked alternatives is recommended to develop a complete cost analysis, including distribution systems, system life expectancies and costs of operation and maintenance.

6. Although the reusable wastewater is currently of a small quantity, it should be monitored for future applications as the supply grows with the increasing population.

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IX. APPENDICES

A. TWDB Trinity Pumpage Records for Selected Years

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ===================

TWDB CODE: [58260] | BEXAR

* * YEAR [1980] |SOURCE COUNTY [015]

BAVARIAN HILLS SUBDIV. |SOURCE BASIN [19]
WATER SERVICE II |AQUIFER 28 -[319]
C/O RONALD MAY, PRES. |NUMBER WELLS [2]
P.O. BOX 791325 |RESERVOIR [ ]
SAN ANTONIO, TEXAS 78279-1325 |STATUS = 0

Jan	[800000]	May	[1600000]	Sep	[800000]	
Feb	[800000]	Jun	[1600000]	Oct	[800000]	
Mar	[800000]	Jul	[1600000]	Nov	[800000]	
Apr	[800000]	Aug	[1600000]	Dec	[800000]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[12800000]	Gallons
					39.3	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: ~~80~~ 60?
Outside conn: Pop served: % Connections metered:
% Connections: RES COMM IND. ; EFFLUENT(gal)

------------------ TWDB WATER USE SURVEY - MUNICIPAL USERS -------------------

TWDB CODE: [58260] | BEXAR

* * YEAR [1990] |SOURCE COUNTY [015]

BAVARIAN HILLS SUBDIV. |SOURCE BASIN [19]
WATER SERVICE II |AQUIFER 28-[319] TRINITY
C/O RONALD MAY, PRES. |NUMBER WELLS [4]
P.O. BOX 791325 |RESERVOIR [ ]
SAN ANTONIO, TEXAS 78279-1325 |STATUS = 0

Jan	[379000]	May	[734000]	Sep	[839000]				
Feb	[406000]	Jun	[1010000]	Oct	[692000]				
Mar	[419000]	Jul	[914000]	Nov	[500000]				
Apr	[439000]	Aug	[945000]	Dec	[639000]	Units:			
	WATER TYPE	[SG]	ANNUAL TOTAL		[7916000]	Gallons			
	SELF-SUPPLIED GROUND WATER				24.3	Acre-feet			

Remarks: [ ]
Seller Code: [ ] Metered/Est: [2] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 62
Outside conn: Pop served: % Connections metered: 100
% Connections: RES 100 COMM IND ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ===================

TWDB CODE: [58260] | BEXAR

* * YEAR [1992] |SOURCE COUNTY [015]

BAVARIAN HILLS SUBDIV. |SOURCE BASIN [19]

WATER SERVICE II |AQUIFER 28 -[319]

C/O RONALD MAY, PRES. |NUMBER WELLS [4]

P.O. BOX 791325 |RESERVOIR [ ]

SAN ANTONIO, TEXAS 78279-1325 |STATUS = 0

Jan	[422000]	May	[745000]	Sep	[239000]	
Feb	[515000]	Jun	[1093000]	Oct	[1243000]	
Mar	[533000]	Jul	[995000]	Nov	[484000]	
Apr	[563000]	Aug	[742000]	Dec	[472000]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[8046000]	Gallons
					24.7	Acre-feet

Remarks: [ ]

Seller Code: [ ] Metered/Est: [2] Activity Code: [ ]

If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 64

Outside conn: Pop served: % Connections metered: 100

% Connections: RES 100 COMM IND ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ===================

```
    TWDB CODE:  [84008 ]                                      | BEXAR
                                           * * YEAR  [1990 ]|SOURCE COUNTY  [015]
     COUNTRY SPRINGS WATER COMPANY                          |SOURCE BASIN    [19]
     C/O UTILITY MANAGMENT SYSTEMS                          |AQUIFER     28 -[000]
     ATTN: MANAGER                                          |NUMBER WELLS    [  1]
     P.O. BOX 791325                                        |RESERVOIR    [      ]
     SAN ANTONIO, TEXAS                    78279-1325       |STATUS =  0

     Jan  [            ]  May  [            ]  Sep  [            ]
     Feb  [            ]  Jun  [            ]  Oct  [            ]
     Mar  [            ]  Jul  [            ]  Nov  [            ]
     Apr  [            ]  Aug  [            ]  Dec  [            ]  Units:
                WATER TYPE [SG ]      ANNUAL TOTAL  [     32734000]  Gallons
                                                           100.5    Acre-feet
Remarks:  [EST BY TWDB                                ]
Seller Code:  [      ]       Metered/Est:  [    ]     Activity Code: [    ]
If purchased, % RAW =[     ], % TREATED =[     ];       Connections:      114
Outside conn:            Pop served:            % Connections metered:
% Connections: RES       COMM       IND       ; EFFLUENT(gal)
```

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ===================

```
    TWDB CODE:  [84008 ]                                        | BEXAR
                                           * * YEAR  [1992 ]|SOURCE COUNTY  [015]
     COUNTRY SPRINGS WATER COMPANY                             |SOURCE BASIN    [19]
     C/O UTILITY MANAGMENT SYSTEMS                             |AQUIFER    28 -[000]
     ATTN: MANAGER                                             |NUMBER WELLS   [  1]
     P.O. BOX 791325                                           |RESERVOIR    [     ]
     SAN ANTONIO, TEXAS                    78279-1325          |STATUS =  0
```

Jan	[	791000]	May	[	1381000]	Sep	[	2470000]	
Feb	[	852000]	Jun	[	1653000]	Oct	[	2512000]	
Mar	[	913000]	Jul	[	3131000]	Nov	[	1227000]	
Apr	[	1340000]	Aug	[	2210000]	Dec	[	1052000]	Units:
		WATER TYPE [SG]			ANNUAL TOTAL		[	19532000]	Gallons
								59.9	Acre-feet

```
Remarks:  [                                                        ]
Seller Code:   [       ]        Metered/Est:   [2    ]      Activity Code: [     ]
If purchased, % RAW =[     ], % TREATED =[     ];          Connections:       135
Outside conn:              Pop served:              % Connections metered:   100
% Connections: RES  100  COMM       IND       ; EFFLUENT(gal)
```

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ===================

TWDB CODE: [179302] | BEXAR

* * YEAR [1990] |SOURCE COUNTY [015]

AUM SAT TAT RANCH |SOURCE BASIN [19]
C/O CONCEPT-THERAPY INST. INC. |AQUIFER 28 -[284]
ATTN: WARREN P. MCKINNEY |NUMBER WELLS [1]
25550 BOERNE STAGE ROAD |RESERVOIR [ ]
SAN ANTONIO, TEXAS 78255 |STATUS = 0

Jan	[416000]	May	[720000]	Sep	[433000]	
Feb	[487000]	Jun	[1349000]	Oct	[473000]	
Mar	[380000]	Jul	[834000]	Nov	[387000]	
Apr	[521000]	Aug	[809000]	Dec	[462000]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[7271000]	Gallons
					22.3	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 85
Outside conn: Pop served: 102 % Connections metered: 100
% Connections: RES 80 COMM 20 IND ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ===================

```
    TWDB CODE:  [179302]                                    | BEXAR
                                         * * YEAR  [1992 ]|SOURCE COUNTY  [015]
     AUM SAT TAT RANCH                                     |SOURCE BASIN    [19]
     C/O CONCEPT-THERAPY INST. INC.                        |AQUIFER    28 -[284]
     ATTN: WARREN P. MCKINNEY                              |NUMBER WELLS   [   ]
     25550 BOERNE STAGE ROAD                               |RESERVOIR    [     ]
     SAN ANTONIO, TEXAS                  78255             |STATUS =  0
     ______________________________________________________________
     Jan  [       424000]  May  [       445000]  Sep  [       592000]
     Feb  [       320000]  Jun  [       401000]  Oct  [       613000]
     Mar  [       473000]  Jul  [      1136000]  Nov  [       389000]
     Apr  [       456000]  Aug  [       814000]  Dec  [       277000]   Units:
                WATER TYPE [SG ]      ANNUAL TOTAL  [      6340000]   Gallons
                                                              19.5    Acre-feet
Remarks:  [                                         ]
Seller Code:  [      ]       Metered/Est:  [    ]      Activity Code: [     ]
If purchased, % RAW =[     ], % TREATED =[     ];        Connections:
Outside conn:            Pop served:            % Connections metered:
% Connections: RES       COMM       IND       ; EFFLUENT(gal)
```

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ===================

TWDB CODE: [267335] | BEXAR

* * YEAR [1992] |SOURCE COUNTY [015]

ENCHANTED OAKS SUBDIVISION |SOURCE BASIN [19]

|AQUIFER 28 -[000]

ATTN: LOUIS L. VOELCKER, OWNER |NUMBER WELLS [1]

29212 ENCHANTED GLEN |RESERVOIR [ ]

BOERNE, TEXAS 78006 |STATUS = 0

Jan	[23100]	May	[ ]	Sep	[ ]	
Feb	[21600]	Jun	[ ]	Oct	[ ]	
Mar	[25700]	Jul	[ ]	Nov	[ ]	
Apr	[30400]	Aug	[ ]	Dec	[ ]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[100800]	Gallons
					.3	Acre-feet

Remarks: [ ]

Seller Code: [ ] Metered/Est: [3] Activity Code: [ ]

If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 5

Outside conn: Pop served: 10 % Connections metered: 80.0

% Connections: RES 100 COMM IND ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================

TWDB CODE: [267900] | BEXAR

* * YEAR [1985] | SOURCE COUNTY [015]

ENCINO PARK M.U.D. #1 | SOURCE BASIN [19]

| AQUIFER -[ ]

P.O. BOX 34715 | NUMBER WELLS [ ]

| RESERVOIR [ ]

SAN ANTONIO, TEXAS 78265-4715 | STATUS = 1

Jan	[ ]	May	[ ]	Sep	[ ]
Feb	[ ]	Jun	[ ]	Oct	[ ]
Mar	[ ]	Jul	[ ]	Nov	[ ]
Apr	[ ]	Aug	[ ]	Dec	[ ]

WATER TYPE [PG] ANNUAL TOTAL [ ]

Units: Gallons Acre-feet

Remarks: [ANNEXED BY SAN ANTONIO CITY WB]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections:
Outside conn: Pop served: % Connections metered:
% Connections: RES COMM IND ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ===================

TWDB CODE: [866053] | BEXAR

* * YEAR [1990] |SOURCE COUNTY [015]

THE ESTATES UTILITY CO. |SOURCE BASIN [19]
STONEGATE |AQUIFER 28 -[000]
ATTN: RONALD MAY, GEN MGR. |NUMBER WELLS [1]
P.O. BOX 791325 |RESERVOIR [ ]
SAN ANTONIO, TEXAS 78279-1325 |STATUS = 0

Jan	[ ]	May	[ ]	Sep	[ ]	
Feb	[ ]	Jun	[ ]	Oct	[ ]	
Mar	[ ]	Jul	[ ]	Nov	[ ]	
Apr	[ ]	Aug	[ ]	Dec	[ ]	Units:

WATER TYPE [SG] ANNUAL TOTAL [13226000] Gallons
40.6 Acre-feet

Remarks: [EST BY TWDB]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 53
Outside conn: Pop served: % Connections metered:
% Connections: RES COMM IND ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ==================

TWDB CODE: [866053] | BEXAR

* * YEAR [1992] |SOURCE COUNTY [015]

THE ESTATES UTILITY CO. |SOURCE BASIN [19]

STONEGATE |AQUIFER 28 -[000]

ATTN: RONALD MAY, GEN MGR. |NUMBER WELLS [1]

P.O. BOX 791325 |RESERVOIR [ ]

SAN ANTONIO, TEXAS 78279-1325 |STATUS = 0

Jan	[553000]	May	[1147000]	Sep	[2132000]	
Feb	[430000]	Jun	[1523000]	Oct	[2756000]	
Mar	[903000]	Jul	[2731000]	Nov	[936000]	
Apr	[946000]	Aug	[2219000]	Dec	[719000]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[16995000]	Gallons
					52.2	Acre-feet

Remarks: [ ]

Seller Code: [ ] Metered/Est: [2] Activity Code: [ ]

If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 68

Outside conn: Pop served: % Connections metered: 100

% Connections: RES 100 COMM IND ; EFFLUENT(gal)

==================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================

TWDB CODE: [277575] | BEXAR

* * YEAR [1980] | SOURCE COUNTY [015]

FAIRCO WATER CO | SOURCE BASIN [19]

FAIR OAKS RANCH SYSTEM | AQUIFER 28 -[334]

P. O. BOX 4495 | NUMBER WELLS [8]

| RESERVOIR [ ]

BOERNE, TEXAS 78006 | STATUS = 0

Jan	[1868450]	May	[2643300]	Sep	[5011900]
Feb	[1842150]	Jun	[7767600]	Oct	[3740500]
Mar	[2851100]	Jul	[10210500]	Nov	[3023300]
Apr	[2819600]	Aug	[6306100]	Dec	[2970500]

Units:

WATER TYPE [SG] ANNUAL TOTAL [51055000] Gallons

156.7 Acre-feet

Remarks: [ ]

Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]

If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 269

Outside conn: Pop served: % Connections metered:

% Connections: RES COMM IND ; EFFLUENT(gal)

TWDB WATER USE SURVEY - MUNICIPAL USERS

TWDB CODE: [277575] | BEXAR

* * YEAR [1990] | SOURCE COUNTY [015]

FAIRCO WATER CO | SOURCE BASIN [19]

FAIR OAKS RANCH SYSTEM | AQUIFER 28 -[334]

P. O. BOX 4495 | NUMBER WELLS [21]

| RESERVOIR [ ]

BOERNE, TEXAS 78006 | STATUS = 0

Jan	[12543900]	May	[21270000]	Sep	[22083800]	
Feb	[11922100]	Jun	[39516300]	Oct	[19401100]	
Mar	[11597100]	Jul	[27399400]	Nov	[13503500]	
Apr	[12578500]	Aug	[27058000]	Dec	[15496900]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[234370600]	Gallons
					719.3	Acre-feet

Remarks: [WELLS IN BEXAR (15) KENDALL (5)]

Seller Code: [ ] Metered/Est: [4] Activity Code: [ ]

If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 811

Outside conn: 22 Pop served: 2000 % Connections metered: 100

% Connections: RES COMM IND ; EFFLUENT(gal) 21053060

================= TWDB WATER USE SURVEY - MUNICIPAL USERS ===================

TWDB CODE: [277575] | BEXAR

* * YEAR [1991] |SOURCE COUNTY [015]

FAIRCO WATER CO |SOURCE BASIN [19]
FAIR OAKS RANCH SYSTEM |AQUIFER 28 -[334]
P. O. BOX 4495 |NUMBER WELLS [23]
|RESERVOIR [ ]
BOERNE, TEXAS 78006 |STATUS = 0

Jan	[10012000]	May	[16601100]	Sep	[14136700]	
Feb	[9644800]	Jun	[19988700]	Oct	[22160800]	
Mar	[16518300]	Jul	[19509800]	Nov	[13343100]	
Apr	[15101900]	Aug	[30436600]	Dec	[11968200]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[199422000]	Gallons
					612.0	Acre-feet

Remarks: [WELLS IN BEXAR (16) KENDALL(7)]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 856
Outside conn: Pop served: 2100 % Connections metered: 100
% Connections: RES 99 COMM 1.0 IND ; EFFLUENT(gal) 2 35038170

=================== TWDB WATER USE SURVEY - MUNICIPAL USERS ===================

TWDB CODE: [293128] | BEXAR

* * YEAR [1988] |SOURCE COUNTY [015]

FOREST GLEN WATER CO |SOURCE BASIN [19]
C/O ROYAL SERVICES, INC. |AQUIFER -[ ]
P.O. BOX 28067 |NUMBER WELLS [ ]
|RESERVOIR [ ]
SAN ANTONIO, TEXAS 78228 |STATUS = 1

Jan	[4252000]	May	[7972000]	Sep	[8084000]	
Feb	[5532000]	Jun	[13399000]	Oct	[6954000]	
Mar	[5321000]	Jul	[8123000]	Nov	[7167000]	
Apr	[6890000]	Aug	[9327000]	Dec	[5508000]	Units:
	WATER TYPE [PG]		ANNUAL TOTAL		[88529000]	Gallons
					271.7	Acre-feet

Remarks: [DROP-ANNEXED BY SAN ANTONIO]
Seller Code: [866750] Metered/Est: [1] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 579
Outside conn: 579 Pop served: 2123 % Connections metered: 100
% Connections: RES 99 COMM 1.0 IND ; EFFLUENT(gal)

TWDB WATER USE SURVEY - MUNICIPAL USERS

TWDB CODE: [491820] | BEXAR

* * YEAR [1980] |SOURCE COUNTY [015]

LEON SPRINGS WATER SYSTEM |SOURCE BASIN [19]
BULVERDE UTILITY CO. |AQUIFER 28 -[334]
C/O JERRY BUCHER |NUMBER WELLS [4]
P.O. BOX 680099 |RESERVOIR [ ]
SAN ANTONIO, TEXAS 78268-0099 |STATUS = 0

Jan	[1236500]	May	[1307100]	Sep	[2657000]	
Feb	[1093000]	Jun	[3062000]	Oct	[1616000]	
Mar	[1715600]	Jul	[5240000]	Nov	[1418000]	
Apr	[1758000]	Aug	[3470000]	Dec	[1122700]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[25695900]	Gallons
					78.9	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 230
Outside conn: Pop served: % Connections metered:
% Connections: RES COMM IND ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================

```
    TWDB CODE:  [491820]                                     | BEXAR
                                          * * YEAR  [1990 ]|SOURCE COUNTY  [015]
     LEON SPRINGS WATER SYSTEM                              |SOURCE BASIN    [19]
     BULVERDE UTILITY CO.                                   |AQUIFER    28 -[334]
     C/O JERRY BUCHER                                       |NUMBER WELLS   [  4]
     P.O. BOX 680099                                        |RESERVOIR    [     ]
     SAN ANTONIO, TEXAS                   78268-0099        |STATUS =  0
     ______________________________________________________________
     Jan  [            ]  May  [            ]  Sep  [            ]
     Feb  [            ]  Jun  [            ]  Oct  [            ]
     Mar  [            ]  Jul  [            ]  Nov  [            ]
     Apr  [            ]  Aug  [            ]  Dec  [            ]   Units:
                WATER TYPE [SG ]     ANNUAL TOTAL  [    21212000]   Gallons
                                                         65.1       Acre-feet
Remarks:  [EST BY TWDB                               ]
Seller Code:  [      ]      Metered/Est:  [    ]     Activity Code: [    ]
If purchased, % RAW =[    ], % TREATED =[    ];      Connections:      239
Outside conn:             Pop served:           % Connections metered:
% Connections: RES       COMM       IND       ; EFFLUENT(gal)
```

```
================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================
    TWDB CODE:  [491820]                                      | BEXAR
                                         * * YEAR  [1991 ]|SOURCE COUNTY  [015]
     LEON SPRINGS WATER SYSTEM                                |SOURCE BASIN    [19]
     BULVERDE UTILITY CO.                                     |AQUIFER    28 -[334]
     C/O JERRY BUCHER                                         |NUMBER WELLS   [  4]
     P.O. BOX 680099                                          |RESERVOIR    [     ]
     SAN ANTONIO, TEXAS                  78268-0099           |STATUS =  0

     Jan  [             ]  May  [            ]  Sep  [            ]
     Feb  [             ]  Jun  [            ]  Oct  [            ]
     Mar  [             ]  Jul  [            ]  Nov  [            ]
     Apr  [             ]  Aug  [            ]  Dec  [            ]  Units:
                 WATER TYPE [SG ]      ANNUAL TOTAL  [     21286800]  Gallons
                                                             65.3     Acre-feet
Remarks:  [NO REPORT-TWDB EST                          ]
Seller Code:  [      ]      Metered/Est:  [     ]     Activity Code: [    ]
If purchased, % RAW =[     ], % TREATED =[     ];        Connections:      240
Outside conn:              Pop served:           % Connections metered:
% Connections: RES        COMM        IND       ; EFFLUENT(gal)
```

irrigation

==================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================

TWDB CODE: [572850] | BEXAR

* * YEAR [1970] | SOURCE COUNTY [015]

MISSION CEMETERY CO. | SOURCE BASIN [19]
MISSION BURIAL PARKS | AQUIFER 28 -[080]
C/O CEMETARY GROUNDS MANAGER | NUMBER WELLS [3]
1700 SO. EAST MILITARY DR. | RESERVOIR [ ]
SAN ANTONIO, TEXAS 78214 | STATUS = 0

Jan	[86100]	May	[167700]	Sep	[167700]	
Feb	[86100]	Jun	[330900]	Oct	[167700]	
Mar	[86100]	Jul	[330900]	Nov	[86100]	
Apr	[167700]	Aug	[330900]	Dec	[86100]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[2094000]	Gallons
					6.4	Acre-feet

Remarks: [CITY OF SAN ANTONIO ALSO]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections:
Outside conn: Pop served: % Connections metered:
% Connections: RES COMM IND ; EFFLUENT(gal)

irrigation

------------------ TWDB WATER USE SURVEY - MUNICIPAL USERS --------------------

TWDB CODE: [572850] | BEXAR

* * YEAR [1990] |SOURCE COUNTY [015]

MISSION CEMETERY CO. |SOURCE BASIN [19] Trinity

MISSION BURIAL PARKS |AQUIFER 28 -[080]

C/O CEMETARY GROUNDS MANAGER |NUMBER WELLS [3]

1700 SO. EAST MILITARY DR. |RESERVOIR [ ]

SAN ANTONIO, TEXAS 78214 |STATUS = 0

Jan	[861300]	May	[3756400]	Sep	[2989900]	
Feb	[992800]	Jun	[4795600]	Oct	[2224700]	
Mar	[1681800]	Jul	[5998700]	Nov	[1288000]	
Apr	[2394500]	Aug	[4324900]	Dec	[801800]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[32110400]	Gallons
					98.5	Acre-feet

surface water

Remarks: [OWN SW ALSO]

Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]

If purchased, % RAW =[ ], % TREATED =[ ]; Connections:

Outside conn: Pop served: % Connections metered:

% Connections: RES COMM IND ; EFFLUENT(gal)

```
================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================
    TWDB CODE:  [572850]                                    | BEXAR
                                        * * YEAR  [1992 ]|SOURCE COUNTY  [015]
     MISSION CEMETERY CO.                                  |SOURCE BASIN    [19]
     MISSION BURIAL PARKS                                  |AQUIFER    28 -[080]
     C/O CEMETARY GROUNDS MANAGER                          |NUMBER WELLS   [   ]
     1700 SO. EAST MILITARY DR.                            |RESERVOIR     [     ]
     SAN ANTONIO, TEXAS                      78214         |STATUS =  0
     ______________________________________________________________
     Jan  [             ]  May  [      1440000]  Sep  [      1440000]
     Feb  [             ]  Jun  [      1440000]  Oct  [      1440000]
     Mar  [             ]  Jul  [      1440000]  Nov  [      1440000]
     Apr  [             ]  Aug  [      1440000]  Dec  [      1440000]   Units:
                 WATER TYPE [SG ]     ANNUAL TOTAL  [     11520000]   Gallons
                                                            35.4     Acre-feet
Remarks:  [OWN SURFACE WATER ALSO                    ]
Seller Code:  [      ]       Metered/Est:  [    ]     Activity Code: [    ]
If purchased, % RAW =[    ], % TREATED =[    ];          Connections:
Outside conn:            Pop served:            % Connections metered:
% Connections: RES        COMM       IND       ; EFFLUENT(gal)
```

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================

TWDB CODE: [578053] | BEXAR

* * YEAR [1990] |SOURCE COUNTY [015]

MOORE'S MOBILE HOME PARK |SOURCE BASIN [19]
ATTN: BOB MOORE, OWNER |AQUIFER 28 -[000]
28075 AQUEDUCT |NUMBER WELLS [1]
|RESERVOIR [ ]
BOERNE, TEXAS 78006 |STATUS = 0

Jan	[ ]	May	[ ]	Sep	[ ]	
Feb	[ ]	Jun	[ ]	Oct	[ ]	
Mar	[ ]	Jul	[ ]	Nov	[ ]	
Apr	[ ]	Aug	[ ]	Dec	[ ]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[876000]	Gallons
					2.7	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [2] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 25
Outside conn: Pop served: 40 % Connections metered:
% Connections: RES 100 COMM IND ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ===================

TWDB CODE: [578053] | BEXAR

* * YEAR [1991] | SOURCE COUNTY [015]

MOORE'S MOBILE HOME PARK | SOURCE BASIN [19]
ATTN: BOB MOORE, OWNER | AQUIFER 28 -[000]
28075 AQUEDUCT | NUMBER WELLS [1]
| RESERVOIR [ ]
BOERNE, TEXAS 78006 | STATUS = 0

Jan	[ ]	May	[ ]	Sep	[ ]	
Feb	[ ]	Jun	[ ]	Oct	[ ]	
Mar	[ ]	Jul	[ ]	Nov	[ ]	
Apr	[ ]	Aug	[ ]	Dec	[ ]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[840960]	Gallons
					2.6	Acre-feet

Remarks: [NO REPORT-TWDB EST]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 24
Outside conn: Pop served: % Connections metered:
% Connections: RES COMM IND ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================

TWDB CODE: [611067] | BEXAR

* * YEAR [1990] | SOURCE COUNTY [015]

NORTHWOOD HILLS UTILITIES, INC. | SOURCE BASIN [19]

| AQUIFER 28 -[080]

ATTN: STEPHEN GROVE | NUMBER WELLS [ ]

ROUTE 7, BOX 777B | RESERVOIR [ ]

CANYON LAKE, TEXAS 78133-4905 | STATUS = 1

Jan	[ ]	May	[ ]	Sep	[ ]
Feb	[ ]	Jun	[ ]	Oct	[ ]
Mar	[ ]	Jul	[ ]	Nov	[ ]
Apr	[ ]	Aug	[ ]	Dec	[ ]

WATER TYPE [SG] ANNUAL TOTAL [ ]

Units: Gallons Acre-feet

Remarks: [DROP-NO LONGER IN SERVICE]

Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]

If purchased, % RAW =[ ], % TREATED =[ ]; Connections:

Outside conn: Pop served: % Connections metered:

% Connections: RES COMM IND ; EFFLUENT(gal)

```
================== TWDB WATER USE SURVEY - MUNICIPAL USERS ===================
    TWDB CODE:  [617510]                                   | BEXAR
                                         * * YEAR  [1990 ]|SOURCE COUNTY  [015]
     OAK HILL ACRES MH SUBD.                              |SOURCE BASIN    [19]
     C/O B & E  WSC                                       |AQUIFER    28 -[284]
     ATTN: DOROTHY A. ESSEX                               |NUMBER WELLS   [   ]
     8800 STARCREST # 53                                  |RESERVOIR    [     ]
     SAN ANTONIO, TEXAS                 78217             |STATUS =  0
     _____________________________________________________________
     Jan  [       125700]   May  [       199700]  Sep  [       165100]
     Feb  [       132800]   Jun  [       197000]  Oct  [       136300]
     Mar  [       139600]   Jul  [       238100]  Nov  [       136300]
     Apr  [       186700]   Aug  [       183200]  Dec  [       117600]   Units:
                WATER TYPE [SG ]      ANNUAL TOTAL  [      1958100]   Gallons
                                                           6.0     Acre-feet
Remarks:  [                                                  ]
Seller Code:  [      ]       Metered/Est:  [    ]     Activity Code: [    ]
If purchased, % RAW =[    ], % TREATED =[    ];        Connections:       20
Outside conn:            Pop served:       60   % Connections metered:  100
% Connections: RES  95   COMM  5.0  IND      ; EFFLUENT(gal)
```

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ==================

TWDB CODE: [617510] | BEXAR

* * YEAR [1992] | SOURCE COUNTY [015]

OAK HILL ACRES MH SUBD. | SOURCE BASIN [19]
C/O B & E WSC | AQUIFER 28 -[000]
ATTN: DOROTHY A. ESSEX | NUMBER WELLS [1]
8800 STARCREST # 53 | RESERVOIR [ ]
SAN ANTONIO, TEXAS 78217 | STATUS = 0

Jan	[104100]	May	[118900]	Sep	[141400]	
Feb	[113800]	Jun	[126300]	Oct	[125100]	
Mar	[99300]	Jul	[157300]	Nov	[3882400]	
Apr	[103900]	Aug	[165700]	Dec	[3993100]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[9131300]	Gallons
					28.0	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [1] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 20
Outside conn: Pop served: 30 % Connections metered: 100
% Connections: RES 95 COMM 5.0 IND ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ==================

TWDB CODE: [374803] | BEXAR

* * YEAR [1980] | SOURCE COUNTY [015]

HASKIN WATER SUPPLY. INC. | SOURCE BASIN [19]
OAKS NORTH MOBIL ESTATES | AQUIFER 28 -[286]
C/O RONALD MAY | NUMBER WELLS [5]
P.O. BOX 791325 | RESERVOIR [ ]
SAN ANTONIO, TEXAS 78279-1325 | STATUS = 0

Jan	[853000]	May	[1441000]	Sep	[2443000]	
Feb	[844000]	Jun	[1066000]	Oct	[864000]	
Mar	[763000]	Jul	[2069000]	Nov	[834000]	
Apr	[1038000]	Aug	[2003000]	Dec	[1011000]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[15229000]	Gallons
					46.7	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 148
Outside conn: Pop served: % Connections metered:
% Connections: RES COMM IND ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================

TWDB CODE: [374803] | BEXAR

* * YEAR [1990] | SOURCE COUNTY [015]

HASKIN WATER SUPPLY. INC. | SOURCE BASIN [19]
OAKS NORTH MOBIL ESTATES | AQUIFER 28 -[286]
C/O RONALD MAY | NUMBER WELLS [5]
P.O. BOX 791325 | RESERVOIR [ ]
SAN ANTONIO, TEXAS 78279-1325 | STATUS = 0

Jan	[2008000]	May	[2329000]	Sep	[1930000]	
Feb	[1503000]	Jun	[3058000]	Oct	[1952000]	
Mar	[1455000]	Jul	[2547000]	Nov	[1477000]	
Apr	[1676000]	Aug	[2616000]	Dec	[1688000]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[24239000]	Gallons
					74.4	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [1] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 256
Outside conn: Pop served: % Connections metered: 100
% Connections: RES 100 COMM IND ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================

TWDB CODE: [374803] | BEXAR

* * YEAR [1992] | SOURCE COUNTY [015]

HASKIN WATER SUPPLY. INC. | SOURCE BASIN [19]
OAKS NORTH MOBIL ESTATES | AQUIFER 28 -[286]
C/O RONALD MAY | NUMBER WELLS [5]
P.O. BOX 791325 | RESERVOIR [ ]
SAN ANTONIO, TEXAS 78279-1325 | STATUS = 0

Jan	[1591000]	May	[1705000]	Sep	[2772000]	
Feb	[1309000]	Jun	[2336000]	Oct	[2313000]	
Mar	[1579000]	Jul	[3096000]	Nov	[1683000]	
Apr	[1593000]	Aug	[2394000]	Dec	[1706000]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[24077000]	Gallons
					73.9	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [2] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 262
Outside conn: Pop served: % Connections metered: 100
% Connections: RES 100 COMM IND ; EFFLUENT(gal)

```
================== TWDB WATER USE SURVEY - MUNICIPAL USERS ===================
    TWDB CODE:  [374815]                                  | BEXAR
                                             * * YEAR  [1980 ]|SOURCE COUNTY  [015]
     SCENIC HILLS WATER SUPPLY                                |SOURCE BASIN    [19]
                                                              |AQUIFER    28 -[319]
     ATTN: MIKE STARK                                         |NUMBER WELLS   [  1]
     9818 SCENIC HILLS DRIVE                                  |RESERVOIR    [     ]
     SAN ANTONIO, TEXAS                      78255            |STATUS =  0
     ______________________________________________________________
     Jan  [        84000]   May  [       142000]  Sep  [       177000]
     Feb  [        77000]   Jun  [       119000]  Oct  [        69000]
     Mar  [        85000]   Jul  [       211000]  Nov  [        62000]
     Apr  [        73000]   Aug  [       206000]  Dec  [        65000]   Units:
                 WATER TYPE [SG ]       ANNUAL TOTAL  [      1370000]   Gallons
                                                               4.2     Acre-feet
Remarks:  [                                         ]
Seller Code:  [       ]       Metered/Est:  [    ]      Activity Code: [     ]
If purchased, % RAW =[    ], % TREATED =[     ];          Connections:       11
Outside conn:            Pop served:            % Connections metered:
% Connections: RES       COMM       IND       ; EFFLUENT(gal)
```

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================

```
    TWDB CODE:  [374815]                                    | BEXAR
                                     * * YEAR  [1990 ]|SOURCE COUNTY  [015]
     SCENIC HILLS WATER SUPPLY                             |SOURCE BASIN    [19]
                                                           |AQUIFER    28 -[319]
     ATTN: MIKE STARK                                      |NUMBER WELLS   [  2]
     9818 SCENIC HILLS DRIVE                               |RESERVOIR    [     ]
     SAN ANTONIO, TEXAS                  78255             |STATUS =  0

     Jan  [             ]  May  [             ]  Sep  [             ]
     Feb  [             ]  Jun  [             ]  Oct  [             ]
     Mar  [             ]  Jul  [             ]  Nov  [             ]
     Apr  [             ]  Aug  [             ]  Dec  [             ]  Units:
             WATER TYPE [SG ]     ANNUAL TOTAL  [       2511800]  Gallons
                                                            7.7   Acre-feet
Remarks:  [EST BY TWDB                              ]
Seller Code:  [      ]       Metered/Est:  [    ]      Activity Code: [    ]
If purchased, % RAW =[    ], % TREATED =[    ];         Connections:       20
Outside conn:            Pop served:            % Connections metered:
% Connections: RES       COMM       IND      ; EFFLUENT(gal)
```

```
================= TWDB WATER USE SURVEY - MUNICIPAL USERS ===================
    TWDB CODE:  [374815]                                        | BEXAR
                                               * * YEAR  [1991 ]|SOURCE COUNTY  [015]
     SCENIC HILLS WATER SUPPLY                                  |SOURCE BASIN    [19]
                                                                |AQUIFER    28 -[319]
     ATTN: MIKE STARK                                           |NUMBER WELLS   [  2]
     9818 SCENIC HILLS DRIVE                                    |RESERVOIR    [     ]
     SAN ANTONIO, TEXAS                          78255          |STATUS =  0
     ________________________________________________________________
     Jan  [             ]  May  [            ]  Sep  [            ]
     Feb  [             ]  Jun  [            ]  Oct  [            ]
     Mar  [             ]  Jul  [            ]  Nov  [            ]
     Apr  [             ]  Aug  [            ]  Dec  [            ]  Units:
                 WATER TYPE [SG ]     ANNUAL TOTAL  [      1883400]  Gallons
                                                              5.8    Acre-feet
Remarks:  [NO REPORT-TWDB EST                                 ]
Seller Code:  [      ]      Metered/Est:  [    ]     Activity Code: [    ]
If purchased, % RAW =[    ], % TREATED =[     ];        Connections:       15
Outside conn:              Pop served:            % Connections metered:
% Connections: RES       COMM       IND       ; EFFLUENT(gal)
```

==================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================

TWDB CODE: [783600] | BEXAR

* * YEAR [1980] |SOURCE COUNTY [015]

SERENE HILLS SUBDIVISION |SOURCE BASIN [19]
WATER SERVICES II |AQUIFER 28 -[319]
C/O RON MAY, PRES. |NUMBER WELLS [1]
P.O. BOX 791325 |RESERVOIR [ ]
SAN ANTONIO, TEXAS 78279-1325 |STATUS = 0

Jan	[360000]	May	[720000]	Sep	[360000]	
Feb	[360000]	Jun	[720000]	Oct	[360000]	
Mar	[360000]	Jul	[720000]	Nov	[360000]	
Apr	[360000]	Aug	[720000]	Dec	[360000]	Units:
	WATER TYPE [SG]			ANNUAL TOTAL	[5760000]	Gallons
					17.7	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 30
Outside conn: Pop served: % Connections metered:
% Connections: RES COMM IND ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ===================

TWDB CODE: [783600] | BEXAR

* * YEAR [1990] | SOURCE COUNTY [015]

SERENE HILLS SUBDIVISION | SOURCE BASIN [19]
WATER SERVICES II | AQUIFER 28 -[319]
C/O RON MAY, PRES. | NUMBER WELLS [1]
P.O. BOX 791325 | RESERVOIR [ ]
SAN ANTONIO, TEXAS 78279-1325 | STATUS = 0

Jan	[249000]	May	[223000]	Sep	[198000]	
Feb	[165000]	Jun	[250000]	Oct	[164000]	
Mar	[157000]	Jul	[179000]	Nov	[150000]	
Apr	[167000]	Aug	[188000]	Dec	[150000]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[2240000]	Gallons
					6.9	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [2] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 30
Outside conn: Pop served: % Connections metered: 100
% Connections: RES 100 COMM IND ; EFFLUENT(gal)

```
================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================
    TWDB CODE:  [783600]                                     | BEXAR
                                           * * YEAR  [1992 ]|SOURCE COUNTY  [015]
     SERENE HILLS SUBDIVISION                               |SOURCE BASIN    [19]
     WATER SERVICES II                                      |AQUIFER    28 -[319]
     C/O RON MAY, PRES.                                     |NUMBER WELLS   [  1]
     P.O. BOX 791325                                        |RESERVOIR    [     ]
     SAN ANTONIO, TEXAS                    78279-1325       |STATUS =  0
     _______________________________________________________________
     Jan  [      188000]   May  [      184000]  Sep  [       359000]
     Feb  [      129000]   Jun  [      230000]  Oct  [       294000]
     Mar  [      172000]   Jul  [      216000]  Nov  [       269000]
     Apr  [      169000]   Aug  [      181000]  Dec  [       221000]   Units:
                WATER TYPE [SG ]       ANNUAL TOTAL  [      2612000]   Gallons
                                                               8.0     Acre-feet
Remarks:  [                                            ]
Seller Code:  [       ]       Metered/Est:  [2   ]      Activity Code: [    ]
If purchased, % RAW =[    ], % TREATED =[     ];          Connections:       47
Outside conn:            Pop served:              % Connections metered:  100
% Connections: RES  100  COMM      IND       ; EFFLUENT(gal)
```

TWDB WATER USE SURVEY - MUNICIPAL USERS

TWDB CODE: [374820] | BEXAR

* * YEAR [1970] | SOURCE COUNTY [015]

HASKIN WATER SUPPLY. INC. | SOURCE BASIN [19]
STAGE COACH HILLS SUBDIV. | AQUIFER 28 -[286]
C/O RONALD MAY | NUMBER WELLS [4]
P.O. BOX 791325 | RESERVOIR [ ]
SAN ANTONIO, TEXAS 78279-1325 | STATUS = 0

Jan	[609750]	May	[750890]	Sep	[956530]	
Feb	[398810]	Jun	[1271862]	Oct	[599670]	
Mar	[523350]	Jul	[1574070]	Nov	[634430]	
Apr	[670560]	Aug	[2067257]	Dec	[594640]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[10651819]	Gallons
					32.7	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 73
Outside conn: Pop served: % Connections metered:
% Connections: RES COMM IND ; EFFLUENT(gal)

==================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================

TWDB CODE: [374820] | BEXAR

* * YEAR [1980] |SOURCE COUNTY [015]

HASKIN WATER SUPPLY. INC. |SOURCE BASIN [19]
STAGE COACH HILLS SUBDIV. |AQUIFER 28 -[286]
C/O RONALD MAY |NUMBER WELLS [3]
P.O. BOX 791325 |RESERVOIR [ ]
SAN ANTONIO, TEXAS 78279-1325 |STATUS = 0

Jan	[970000]	May	[1767000]	Sep	[2862000]	
Feb	[893000]	Jun	[1182000]	Oct	[1101000]	
Mar	[983000]	Jul	[3272000]	Nov	[821000]	
Apr	[985000]	Aug	[3809000]	Dec	[905000]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[19550000]	Gallons
					60.0	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 110
Outside conn: Pop served: % Connections metered:
% Connections: RES COMM IND ; EFFLUENT(gal)

```
================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================
   TWDB CODE:  [374820]                                    | BEXAR
                                        * * YEAR  [1990 ]|SOURCE COUNTY  [015]
    HASKIN WATER SUPPLY. INC.                            |SOURCE BASIN    [19]
    STAGE COACH HILLS SUBDIV.                            |AQUIFER    28 -[286]
    C/O RONALD MAY                                       |NUMBER WELLS   [  3]
    P.O. BOX 791325                                      |RESERVOIR    [     ]
    SAN ANTONIO, TEXAS                    78279-1325     |STATUS =  0
    ______________________________________________________________
    Jan  [       898000]   May  [      1763000]  Sep  [      1615000]
    Feb  [       947000]   Jun  [      3273000]  Oct  [      1525000]
    Mar  [       899000]   Jul  [      2463000]  Nov  [      1057000]
    Apr  [       952000]   Aug  [      2669000]  Dec  [      1337000]   Units:
                WATER TYPE [SG ]     ANNUAL TOTAL  [     19398000]   Gallons
                                                           59.5      Acre-feet
Remarks:  [                                                  ]
Seller Code:  [      ]       Metered/Est:  [1   ]      Activity Code: [    ]
If purchased, % RAW =[    ], % TREATED =[     ];          Connections:      122
Outside conn:             Pop served:            % Connections metered:  100
% Connections: RES  100  COMM       IND       ; EFFLUENT(gal)
```

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================

TWDB CODE: [374820] | BEXAR

* * YEAR [1992] |SOURCE COUNTY [015]

HASKIN WATER SUPPLY. INC. |SOURCE BASIN [19]

STAGE COACH HILLS SUBDIV. |AQUIFER 28 -[286]

C/O RONALD MAY |NUMBER WELLS [3]

P.O. BOX 791325 |RESERVOIR [ ]

SAN ANTONIO, TEXAS 78279-1325 |STATUS = 0

Jan	[944000]	May	[1190000]	Sep	[2330000]
Feb	[741000]	Jun	[1578000]	Oct	[2074000]
Mar	[1182000]	Jul	[2358000]	Nov	[1152000]
Apr	[1348000]	Aug	[1798000]	Dec	[893000]

WATER TYPE [SG] ANNUAL TOTAL [17588000] Units: Gallons

54.0 Acre-feet

Remarks: [ ]

Seller Code: [ ] Metered/Est: [2] Activity Code: [ ]

If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 128

Outside conn: Pop served: % Connections metered: 100

% Connections: RES 100 COMM IND ; EFFLUENT(gal)

TWDB WATER USE SURVEY - MUNICIPAL USERS

TWDB CODE: [374810] | BEXAR

* * YEAR [1980] | SOURCE COUNTY [015]

HASKIN WATER UTIL. INC. | SOURCE BASIN [19]
TIMBER WOOD PARK SUBDIV. | AQUIFER 28 -[319]
C/O EVELYN MILLER, BKPR. | NUMBER WELLS [1]
15403 CAPITOL PORT | RESERVOIR [ ]
SAN ANTONIO, TEXAS 78249 | STATUS = 0

Jan	[164711]	May	[392796]	Sep	[488030]	
Feb	[173490]	Jun	[898312]	Oct	[387868]	
Mar	[318790]	Jul	[1101010]	Nov	[266250]	
Apr	[518342]	Aug	[878023]	Dec	[212140]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[5799762]	Gallons
					17.8	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 35
Outside conn: Pop served: % Connections metered:
% Connections: RES COMM IND ; EFFLUENT(gal)

```
================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================
    TWDB CODE:  [374810]                                    | BEXAR
                                        * * YEAR  [1990 ]|SOURCE COUNTY  [015]
     HASKIN WATER UTIL. INC.                             |SOURCE BASIN    [19]
     TIMBER WOOD PARK SUBDIV.                            |AQUIFER     28 -[319]
     C/O EVELYN MILLER, BKPR.                            |NUMBER WELLS    [  5]
     15403 CAPITOL PORT                                  |RESERVOIR    [      ]
     SAN ANTONIO, TEXAS                  78249           |STATUS =  0
     ______________________________________________________________
     Jan  [      2884000]   May  [      5690000]  Sep  [      4850000]
     Feb  [      2856000]   Jun  [      9542000]  Oct  [      4318000]
     Mar  [      3273000]   Jul  [      5102000]  Nov  [      3348000]
     Apr  [      3440000]   Aug  [      7548000]  Dec  [      4316000]   Units:
                WATER TYPE [SG ]      ANNUAL TOTAL  [     57167000]   Gallons
                                                         175.4      Acre-feet
Remarks:  [                                          ]
Seller Code:  [       ]       Metered/Est:  [1    ]      Activity Code: [    ]
If purchased, % RAW =[     ], % TREATED =[     ];          Connections:      316
Outside conn:              Pop served:       948   % Connections metered:  100
% Connections: RES  98   COMM  2.0  IND       ; EFFLUENT(gal)
```

```
================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================
    TWDB CODE:  [374810]                                        | BEXAR
                                            * * YEAR  [1992 ]|SOURCE COUNTY  [015]
     HASKIN WATER UTIL. INC.                                  |SOURCE BASIN    [19]
     TIMBER WOOD PARK SUBDIV.                                 |AQUIFER    28 -[319]
     C/O EVELYN MILLER, BKPR.                                 |NUMBER WELLS   [  5]
     15403 CAPITOL PORT                                       |RESERVOIR    [     ]
     SAN ANTONIO, TEXAS                     78249             |STATUS =  0
     ______________________________________________________________
     Jan  [      3543000]   May  [      4396000]  Sep  [      9891000]
     Feb  [      3919000]   Jun  [      3172000]  Oct  [      7916000]
     Mar  [      3927000]   Jul  [      9016000]  Nov  [      3947000]
     Apr  [      4126000]   Aug  [      5630000]  Dec  [      4341000]   Units:
                 WATER TYPE [SG ]      ANNUAL TOTAL  [     63824000]   Gallons
                                                            195.9     Acre-feet
Remarks:  [                                          ]
Seller Code:  [      ]       Metered/Est:  [1    ]      Activity Code: [    ]
If purchased, % RAW =[     ], % TREATED =[     ];        Connections:      435
Outside conn:              Pop served:     1305   % Connections metered:  100
% Connections: RES  98   COMM  2.0  IND       ; EFFLUENT(gal)
```

TWDB WATER USE SURVEY - MUNICIPAL USERS

TWDB CODE: [889163] | BEXAR

* * YEAR [1980] |SOURCE COUNTY [015]

U.S. ARMY/FORT SAM HOUSTON |SOURCE BASIN [19]
CAMP BULLIS WELLS |AQUIFER 28 -[319]
AFZG-DE-EM--ENVIRONMENTAL OFFICE |NUMBER WELLS [2]
ATTN: JERRY AGUIRRE |RESERVOIR [ ]
FORT SAM HOUSTON, TEXAS 78234 |STATUS = 0

Jan	[2907000]	May	[4791000]	Sep	[3667000]	
Feb	[2633000]	Jun	[6261000]	Oct	[3117000]	
Mar	[2954000]	Jul	[5120000]	Nov	[3296000]	
Apr	[2894000]	Aug	[3841000]	Dec	[2688000]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[44169000]	Gallons
					135.5	Acre-feet

Remarks: [MILITARY INSTALLATION]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections:
Outside conn: Pop served: % Connections metered:
% Connections: RES COMM IND ; EFFLUENT(gal)

TWDB WATER USE SURVEY - MUNICIPAL USERS

TWDB CODE: [889163] | BEXAR

* * YEAR [1990] | SOURCE COUNTY [015]

U.S. ARMY/FORT SAM HOUSTON | SOURCE BASIN [19]
CAMP BULLIS WELLS | AQUIFER 28 -[319]
AFZG-DE-EM--ENVIRONMENTAL OFFICE | NUMBER WELLS [2]
ATTN: JERRY AGUIRRE | RESERVOIR [ ]
FORT SAM HOUSTON, TEXAS 78234 | STATUS = 0

Jan	[1764000]	May	[2184000]	Sep	[2121000]	
Feb	[1806000]	Jun	[2645000]	Oct	[2268000]	
Mar	[2499000]	Jul	[2541000]	Nov	[2213000]	
Apr	[2352000]	Aug	[2352000]	Dec	[2174000]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[26919000]	Gallons
					82.6	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [1] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections:
Outside conn: Pop served: % Connections metered:
% Connections: RES COMM IND ; EFFLUENT(gal)

TWDB WATER USE SURVEY - MUNICIPAL USERS

TWDB CODE: [889163] | BEXAR

* * YEAR [1991] | SOURCE COUNTY [015]

U.S. ARMY/FORT SAM HOUSTON | SOURCE BASIN [19]
CAMP BULLIS WELLS | AQUIFER 28 -[319]
AFZG-DE-EM--ENVIRONMENTAL OFFICE | NUMBER WELLS [2]
ATTN: JERRY AGUIRRE | RESERVOIR [ ]
FORT SAM HOUSTON, TEXAS 78234 | STATUS = 0

Jan	[1932000]	May	[3843000]	Sep	[5019000]	
Feb	[1931000]	Jun	[5229000]	Oct	[5418000]	
Mar	[2100000]	Jul	[5277000]	Nov	[5670000]	
Apr	[2540000]	Aug	[5124000]	Dec	[5819000]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[49902000]	Gallons
					153.1	Acre-feet

Remarks: [ ]
Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]
If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 300
Outside conn: Pop served: 1000 % Connections metered:
% Connections: RES 1.0 COMM 80 IND 19 ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ====================

TWDB CODE: [889165] | BEXAR

* * YEAR [1980] |SOURCE COUNTY [015]

U.S. ARMY |SOURCE BASIN [19]

CAMP STANLEY-STORAGE ACT. RRAD |AQUIFER 28 -[286]

P.O. BOX 690627 |NUMBER WELLS [5]

|RESERVOIR [ ]

SAN ANTONIO, TEXAS 78269 |STATUS = 0

Jan	[1811000]	May	[1765000]	Sep	[1557000]	
Feb	[1771000]	Jun	[1799000]	Oct	[1487000]	
Mar	[1715000]	Jul	[2430000]	Nov	[1422000]	
Apr	[1505000]	Aug	[1888000]	Dec	[1768000]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[20918000]	Gallons
					64.2	Acre-feet

Remarks: [MILITARY INSTALLATION]

Seller Code: [ ] Metered/Est: [ ] Activity Code: [ ]

If purchased, % RAW =[ ], % TREATED =[ ]; Connections:

Outside conn: Pop served: % Connections metered:

% Connections: RES COMM IND ; EFFLUENT(gal)

TWDB WATER USE SURVEY - MUNICIPAL USERS

TWDB CODE: [889165] | BEXAR

* * YEAR [1990] | SOURCE COUNTY [015]

U.S. ARMY | SOURCE BASIN [19]

CAMP STANLEY-STORAGE ACT. RRAD | AQUIFER 28 -[286]

P.O. BOX 690627 | NUMBER WELLS [5]

| RESERVOIR [ ]

SAN ANTONIO, TEXAS 78269 | STATUS = 0

Jan	[1100300]	May	[1102600]	Sep	[1522600]
Feb	[880900]	Jun	[1932500]	Oct	[1334200]
Mar	[1138200]	Jul	[1755700]	Nov	[1135500]
Apr	[1116000]	Aug	[1236100]	Dec	[1065200]

Units:

WATER TYPE [SG] ANNUAL TOTAL [15319800] Gallons

47.0 Acre-feet

Remarks: [ ]

Seller Code: [ ] Metered/Est: [4] Activity Code: [ ]

If purchased, % RAW =[ ], % TREATED =[ ]; Connections:

Outside conn: Pop served: % Connections metered:

% Connections: RES COMM IND ; EFFLUENT(gal)

================== TWDB WATER USE SURVEY - MUNICIPAL USERS ===================

TWDB CODE: [889165] | BEXAR

* * YEAR [1992] |SOURCE COUNTY [015]

U.S. ARMY |SOURCE BASIN [19]

CAMP STANLEY-STORAGE ACT. RRAD |AQUIFER 28 -[286]

P.O. BOX 690627 |NUMBER WELLS [5]

|RESERVOIR [ ]

SAN ANTONIO, TEXAS 78269 |STATUS = 0

Jan	[3209500]	May	[813400]	Sep	[1394300]	
Feb	[930200]	Jun	[1297100]	Oct	[1988900]	
Mar	[896800]	Jul	[1303600]	Nov	[1386400]	
Apr	[943700]	Aug	[1454100]	Dec	[1366100]	Units:
	WATER TYPE [SG]		ANNUAL TOTAL		[16984100]	Gallons
					52.1	Acre-feet

Remarks: [ ]

Seller Code: [ ] Metered/Est: [1] Activity Code: [ ]

If purchased, % RAW =[ ], % TREATED =[ ]; Connections: 15

Outside conn: Pop served: 150 % Connections metered:

% Connections: RES 50 COMM IND 50 ; EFFLUENT(gal)

B. Surface Water Quality Records

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
GUADALUPE RIVER BASIN
DISTRICT 08

SEGMENT - CANYON LAKE
COUNTY - COMAL

STATION NO.	STATION LOCATION	USGS GAGE NO	RIVER MILE	LATITUDE /	INACTIVE LONGITUDE
1805.0050	CANYON LAKE AT CANYON DAM WEST OF SAN MARCOS			29 52 18	098 12 12

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

SEGMENT - CANYON LAKE
COUNTY - COMAL
USGS GAGE NO
RIVER MILE

STATION NO. 1805.0100
STATION LOCATION: CANYON LAKE SOUTH OF JACOBS CREEK PARK 500 YARDS EAST OF PENINSULA
LATITUDE / LONGITUDE: 29 52 30 098 13 09

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
03/09/88	1520	1.0	TEXAS	SMN	13.7 / 00010	108. / 00077	430. / 00094	10.4 / 00300	8.0 / 00400	182. / 00410	14. / 00530	2. / 00535
					< .02 / 00610	.4 / 00620	.3 / 00625	.02 / 00665	< .01 / 00671	2. / 00680	16. / 00940	20. / 00945
					< 2. / 31616	< 2. / 32211	< 2. / 32218					
03/09/88	1520	5.0	TEXAS	SMN	13.6 / 00010	429. / 00094	10.2 / 00300	8.2 / 00400				
03/09/88	1520	10.0	TEXAS	SMN	13.4 / 00010	429. / 00094	10.2 / 00300	8.2 / 00400				
03/09/88	1520	20.0	TEXAS	SMN	13.3 / 00010	429. / 00094	10.2 / 00300	8.3 / 00400				
03/09/88	1520	30.0	TEXAS	SMN	13.2 / 00010	429. / 00094	10.2 / 00300	8.3 / 00400				
03/09/88	1520	40.0	TEXAS	SMN	13.0 / 00010	429. / 00094	10.2 / 00300	8.3 / 00400				
03/09/88	1520	50.0	TEXAS	SMN	13.0 / 00010	429. / 00094	10.2 / 00300	8.3 / 00400				
03/09/88	1520	60.0	TEXAS	SMN	13.0 / 00010	429. / 00094	10.2 / 00300	8.3 / 00400				
03/09/88	1520	65.0	TEXAS	SMN	13.0 / 00010	428. / 00094	10.2 / 00300	8.4 / 00400				
03/09/88	1520	100.0	TEXAS	SMN	187. / 00410	14. / 00530	2. / 00535	.02 / 00610	.43 / 00620	.3 / 00625	.02 / 00665	.01 / 00671
					1. / 00680	15. / 00940	20. / 00945	< 2. / 31616				
08/01/89	1100	1.0	TEXAS	SMN	WATER CLARITY GOOD SURFACE SAMPLE							
					28.0 / 00010	362. / 00094	8.0 / 00300	8.0 / 00400	138. / 00410	6. / 00530	5. / 00535	.12 / 00610
					< .01 / 00615	.02 / 00620	.2 / 00625	.019 / 00665	.011 / 00671	6. / 00680	15. / 00940	24. / 00945

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

```
1805.0100                    STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
                                  PERIOD OF REPORT: 01/01/88 TO 06/01/93
                                         GUADALUPE RIVER BASIN
                                            DISTRICT    08

           SEGMENT -   CANYON LAKE
           COUNTY  -   COMAL                       USGS GAGE NO                       RIVER MILE
STATION NO.   STATION LOCATION                                                                         LATITUDE / LONGITUDE
 1805.0100 CANYON LAKE SOUTH OF JACOBS CREEK PARK 500                                                  29 52 30   098 13 09
           YARDS EAST OF PENINSULA

 SAMPLE          DEPTH SOURCE SYSTEM PARAMETER MEASUREMENTS:   VALUE/   ---------------------------------------------------------
  DATE     TIME   (FT) AGENCY  CODE  ----------------------      /CODE  ---------------------------------------------------------

08/01/89   1100    1.0 TEXAS  SMN    <       1.         1.8
                                         32211       32218

08/01/89   1100    5.0 TEXAS  SMN          28.0        363.         8.1         8.1
                                          00010       00094       00300       00400

08/01/89   1100   10.0 TEXAS  SMN          28.0        363.         7.8         8.1
                                          00010       00094       00300       00400

08/01/89   1100   20.0 TEXAS  SMN          27.9        362.         8.0         8.1
                                          00010       00094       00300       00400

08/01/89   1100   30.0 TEXAS  SMN          27.7        361.         7.8         8.1
                                          00010       00094       00300       00400

08/01/89   1100   40.0 TEXAS  SMN          25.0        380.         1.8         7.9
                                          00010       00094      *00300       00400

08/01/89   1100   50.0 TEXAS  SMN          17.3        399.         2.2         7.8
                                          00010       00094      *00300       00400

08/01/89   1100   60.0 TEXAS  SMN          15.2        397.         2.9         7.8
                                          00010       00094      *00300       00400

08/01/89   1100   65.0 TEXAS  SMN          14.6        395.         3.4         7.8
                                          00010       00094      *00300       00400

08/01/89   1100   80.0 TEXAS  SMN       WATER SAMPLE COLLECTED WITH VAN DORAN SAMPLER  .AT 80 FT OF WATER NEAR BOTTOM
                                         .

                                           164.          5.          2.         .07         .01         .28          .4        .033
                                          00410       00530       00535       00610       00615       00620       00625       00665

                                           .024          4.         10.         22.
                                          00671       00680       00940       00945

08/20/90   1041     .7 TEXAS  SMN          28.5        378.         7.6         8.1
                                          00010       00094       00300       00400

08/20/90   1041    1.0 TEXAS  SMN       WATER CLARITY GOOD WATER COLOR LIGHT BLUE GREEN TOTAL DEPTH 118 FT

                                           3.50        142.          3.          2.         .04  <      .01  <      .01        .027
                                          00078       00410       00530       00535       00610       00615       00620       00665

                                           .010          2.         15.         19.          4.
                                          00671       00680       00940       00945       31616

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.
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STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
GUADALUPE RIVER BASIN
DISTRICT 08

SEGMENT - CANYON LAKE
COUNTY - COMAL

STATION NO.	STATION LOCATION	USGS GAGE NO	RIVER MILE	LATITUDE / LONGITUDE
1805.0100	CANYON LAKE SOUTH OF JACOBS CREEK PARK 500 YARDS EAST OF PENINSULA			29 52 30 098 13 09

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/20/90	1041	6.6	TEXAS	SMN	378. 00094	7.1 00300	8.1 00400					
08/20/90	1041	9.8	TEXAS	SMN	28.5 00010	378. 00094	7.1 00300	8.1 00400				
08/20/90	1041	16.4	TEXAS	SMN	28.3 00010	378. 00094	7.0 00300	8.1 00400				
08/20/90	1041	23.0	TEXAS	SMN	28.1 00010	379. 00094	6.9 00300	8.1 00400				
08/20/90	1041	29.5	TEXAS	SMN	27.8 00010	382. 00094	5.7 00300	8.0 00400				
08/20/90	1041	36.1	TEXAS	SMN	27.6 00010	386. 00094	4.7 •00300	7.9 00400				
08/20/90	1041	42.7	TEXAS	SMN	26.8 00010	389. 00094	2.3 •00300	7.8 00400				
08/20/90	1041	49.2	TEXAS	SMN	25.7 00010	397. 00094	.4 •00300	7.6 00400				
08/20/90	1041	55.8	TEXAS	SMN	24.5 00010	404. 00094	.1 •00300	7.6 00400				
08/20/90	1041	62.3	TEXAS	SMN	22.0 00010	402. 00094	.1 •00300	7.5 00400				
08/20/90	1041	68.9	TEXAS	SMN	20.7 00010	394. 00094	.0 •00300	7.5 00400				
08/20/90	1041	75.5	TEXAS	SMN	19.8 00010	394. 00094	.0 •00300	7.5 00400				
08/20/90	1041	116.0	TEXAS	SMN	144. 00410	7. 00530	2. 00535	.04 00610	< .01 00615	.09 00620	.034 00665	.010 00671
					3. 00680	14. 00940	17. 00945					

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1805.0100

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
GUADALUPE RIVER BASIN
DISTRICT 08

SEGMENT - CANYON LAKE
COUNTY - COMAL

USGS GAGE NO | RIVER MILE

STATION NO. STATION LOCATION
1805.0100 CANYON LAKE SOUTH OF JACOBS CREEK PARK 500 YARDS EAST OF PENINSULA

LATITUDE / LONGITUDE
29 52 30 098 13 09

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00077	TRANSPARENCY, SECCHI DISC (INCHES)
00078	TRANSPARENCY, SECCHI DISC (METERS)	00094	SPECIFIC CONDUCTANCE,FIELD (UMHOS/CM @ 25C)
00300	OXYGEN, DISSOLVED (MG/L)	00400	PH (STANDARD UNITS)
00410	ALKALINITY, TOTAL (MG/L AS CACO3)	00530	RESIDUE, TOTAL NONFILTRABLE (MG/L)
00535	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	00610	NITROGEN, AMMONIA, TOTAL (MG/L AS N)
00615	NITRITE NITROGEN, TOTAL (MG/L AS N)	00620	NITRATE NITROGEN, TOTAL (MG/L AS N)
00625	NITROGEN, KJELDAHL, TOTAL, (MG/L AS N)	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)
00671	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)	00680	CARBON, TOTAL ORGANIC (MG/L AS C)
00940	CHLORIDE (MG/L AS CL)	00945	SULFATE (MG/L AS SO4)
31616	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH
32218	PHEOPHYTIN-A UG/L SPECTROPHOTOMETRIC ACID. METH.		

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	655.74 00095H	5. 00299L	5. 00300L	9. 00400H	6.5 00400L	40. 00940H
			40. 00945H	200. 31616H	400. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1805.0200

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
GUADALUPE RIVER BASIN
DISTRICT 08

SEGMENT - CANYON LAKE
COUNTY - COMAL USGS GAGE NO RIVER MILE INACTIVE

STATION NO.	STATION LOCATION	LATITUDE / LONGITUDE
1805.0200	CANYON LAKE MID-LAKE SOUTH OF CANYON PARK IN NARROWEST PORTION OF LAKE	29 53 12 / 098 14 51

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
GUADALUPE RIVER BASIN
DISTRICT 08

SEGMENT - CANYON LAKE
COUNTY - COMAL
USGS GAGE NO
RIVER MILE

STATION NO. STATION LOCATION
1805.0300 CANYON LAKE MID-LAKE SOUTH OF POTTERS CREEK PARK AT WEST END OF PARK

LATITUDE / LONGITUDE
29 53 45 098 16 57

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
03/09/88	1440	1.0	TEXAS	SMN	14.7	53.	438.	10.0	186.	19.	5.	.03
					00010	00077	00094	00300	00410	00530	00535	00610
					.48	.2	.03	.01	2.	16.	21.	2.
					00620	00625	00665	00671	00680	00940	00945	32211
					< 2.							
					32218							
03/09/88	1440	5.0	TEXAS	SMN	14.6	438.	9.9					
					00010	00094	00300					
03/09/88	1440	10.0	TEXAS	SMN	14.5	440.	9.9	7.9				
					00010	00094	00300	00400				
03/09/88	1440	20.0	TEXAS	SMN	14.3	439.	10.0	8.0				
					00010	00094	00300	00400				
03/09/88	1440	30.0	TEXAS	SMN	12.1	432.	9.6	8.2				
					00010	00094	00300	00400				
03/09/88	1440	40.0	TEXAS	SMN	11.6	434.	9.3	8.2				
					00010	00094	00300	00400				
03/09/88	1440	50.0	TEXAS	SMN	11.4	434.	9.1	8.2	187.	17.	5.	< .02
					00010	00094	00300	00400	00410	00530	00535	00610
					.42	.3	.03	< .01	2.	16.	20.	< 2.
					00620	00625	00665	00671	00680	00940	00945	31616
08/01/89	1300	1.0	TEXAS	SMN	SURFACE SAMPLE WATER CLARITY GOOD							
					29.0	363.	8.0	8.1	140.	6.	5.	.12
					00010	00094	00300	00400	00410	00530	00535	00610
					.01	.2	.018	.012	3.	13.	27.	< 1.
					00615	00625	00665	00671	00680	00940	00945	32211
					1.2							
					32218							
08/01/89	1300	5.0	TEXAS	SMN	29.0	363.	7.8	8.1				
					00010	00094	00300	00400				
08/01/89	1300	10.0	TEXAS	SMN	29.0	363.	7.7	8.1				
					00010	00094	00300	00400				

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1805.0300

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
GUADALUPE RIVER BASIN
DISTRICT 08

SEGMENT - CANYON LAKE
COUNTY - COMAL
USGS GAGE NO
RIVER MILE

STATION NO. STATION LOCATION
1805.0300 CANYON LAKE MID-LAKE SOUTH OF POTTERS CREEK PARK AT WEST END OF PARK

LATITUDE / LONGITUDE
29 53 45 098 16 57

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/01/89	1300	20.0	TEXAS	SMN	28.7	365.	7.2	8.1				
					00010	00094	00300	00400				
08/01/89	1300	30.0	TEXAS	SMN	28.1	372.	5.0	8.0				
					00010	00094	*00300	00400				
08/01/89	1300	40.0	TEXAS	SMN	27.0	378.	2.1	7.8				
					00010	00094	*00300	00400				
08/01/89	1300	50.0	TEXAS	SMN	22.4	386.	.1	7.8				
					00010	00094	*00300	00400				
08/01/89	1300	60.0	TEXAS	SMN	BOTTOM SAMLE AT 60 FEET COLLECTED WITH VAN DO .ORAN SAMPLER							
					16.6	403.	.1	7.8	170.	15.	6.	.11
					00010	00094	*00300	00400	00410	00530	00535	00610
					.02	.05	.3	.021	.014	3.	13.	20.
					00615	00620	00625	00665	00671	00680	00940	00945
08/20/90	1000	3.0	TWCIS	SMN	ROTENONE OF COVE BY TP&W METHOD OF CAPTURE 2 CHANNEL CATFISH							
					< .2	.73	< .002	< .01	< .006	< .004	< .002	< .002
					01004	01149	34680	34682	34685	34686	34687	34688
					< .1	< .002	< .01	< .006	< .04	V .066	< 1.0	.46
					34691	39075	39376	39406	39515	71930	71936	71937
					< .4	< .2	16.	59.	2.	1.	< .03	.03
					71939	71940	74990	74995	81614	81615	81644	81896
					< .01	2.						
					81897	98561						
08/20/90	1001	3.0	TWCIS	SMN	CAPTURED DURING ROTENONE SAMPLING OF COVE BY TP&W PERSONNEL ONE CYPRINVS CARPIO							
					3.2	20.5	< .02	.84	< .002	< .01	< .006	< .004
					00023	00024	01004	01149	34680	34682	34685	34686
					< .002	< .002	< .1	< .002	< .01	< .006	< .04	.120
					34687	34688	34691	39075	39376	39406	39515	71930
					< 1.0	< .64	< .4	< .2	12.	59.	1.	1.
					71936	71937	71939	71940	74990	74995	81614	81615

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
GUADALUPE RIVER BASIN
DISTRICT 08

SEGMENT - CANYON LAKE
COUNTY - COMAL
USGS GAGE NO
RIVER MILE

STATION NO. 1805.0300
STATION LOCATION: CANYON LAKE MID-LAKE SOUTH OF POTTERS CREEK PARK AT WEST END OF PARK
LATITUDE / LONGITUDE: 29 53 45 098 16 57

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/CODE							
08/20/90	1001	3.0	TWCIS	SMN	< .03 81644	.01 81896	< .01 81897	905. 84008	1. 98437			
08/20/90	1204	.7	TEXAS	SMN	29.6 00010	369. 00094	7.1 00300	8.1 00400				
08/20/90	1204	1.0	TEXAS	SMN	TOTAL DEPTH 90 FT WATER CLARITY GOOD							
					1.75 00078	122. 00410	4. 00530	2. 00535	.20 00610	< .01 00620	.029 00665	.020 00671
					2. 00680	17. 00940	6. 31616	1.8 32211	0. 32218			
08/20/90	1204	3.3	TEXAS	SMN	29.4 00010	371. 00094	7.1 00300	8.2 00400				
08/20/90	1204	6.6	TEXAS	SMN	29.3 00010	372. 00094	7.0 00300	8.2 00400				
08/20/90	1204	9.8	TEXAS	SMN	29.2 00010	371. 00094	7.0 00300	8.2 00400				
08/20/90	1204	13.1	TEXAS	SMN	29.1 00010	372. 00094	6.9 00300	8.2 00400				
08/20/90	1204	16.4	TEXAS	SMN	28.9 00010	374. 00094	6.6 00300	8.1 00400				
08/20/90	1204	23.0	TEXAS	SMN	28.8 00010	374. 00094	6.7 00300	8.1 00400				
08/20/90	1204	29.5	TEXAS	SMN	28.6 00010	376. 00094	5.9 00300	8.1 00400				
08/20/90	1204	36.1	TEXAS	SMN	27.6 00010	413. 00094	.8 *00300	7.8 00400				
08/20/90	1204	42.7	TEXAS	SMN	26.6 00010	404. 00094	.1 *00300	7.6 00400				
08/20/90	1204	49.2	TEXAS	SMN	25.5 00010	400. 00094	.1 *00300	7.6 00400				
08/20/90	1204	55.8	TEXAS	SMN	23.7 00010	421. 00094	.0 *00300	7.5 00400				

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
GUADALUPE RIVER BASIN
DISTRICT 08

SEGMENT - CANYON LAKE
COUNTY - COMAL
USGS GAGE NO
RIVER MILE

STATION NO. 1805.0300
STATION LOCATION: CANYON LAKE MID-LAKE SOUTH OF POTTERS CREEK PARK AT WEST END OF PARK
LATITUDE / LONGITUDE: 29 53 45 098 16 57

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	VALUE/ /CODE							
08/20/90	1204	62.3	TEXAS	SMN	21.6 00010	495. 00094	.0 *00300	7.3 00400				
08/20/90	1204	68.9	TEXAS	SMN	20.5 00010	475. 00094	.0 *00300	7.3 00400				
08/20/90	1204	85.0	TEXAS	SMN	185. 00410	24. 00530	7. 00535	.55 00610	< .01 00615	.01 00620	.037 00665	.020 00671
					3. 00680	15. 00940						

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1805.0300

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
GUADALUPE RIVER BASIN
DISTRICT 08

SEGMENT - CANYON LAKE
COUNTY - COMAL   USGS GAGE NO   RIVER MILE

STATION NO. STATION LOCATION   LATITUDE / LONGITUDE
1805.0300 CANYON LAKE MID-LAKE SOUTH OF POTTERS CREEK PARK AT WEST END OF PARK   29 53 45   098 16 57

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00023	SAMPLE WEIGHT IN POUNDS
00024	SAMPLE LENGTH IN INCHES	00077	TRANSPARENCY, SECCHI DISC (INCHES)
00078	TRANSPARENCY, SECCHI DISC (METERS)	00094	SPECIFIC CONDUCTANCE,FIELD (UMHOS/CM @ 25C)
00300	OXYGEN, DISSOLVED (MG/L)	00400	PH (STANDARD UNITS)
00410	ALKALINITY, TOTAL (MG/L AS CACO3)	00530	RESIDUE, TOTAL NONFILTRABLE (MG/L)
00535	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	00610	NITROGEN, AMMONIA, TOTAL (MG/L AS N)
00615	NITRITE NITROGEN, TOTAL (MG/L AS N)	00620	NITRATE NITROGEN, TOTAL (MG/L AS N)
00625	NITROGEN, KJELDAHL, TOTAL, (MG/L AS N)	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)
00671	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)	00680	CARBON, TOTAL ORGANIC (MG/L AS C)
00940	CHLORIDE (MG/L AS CL)	00945	SULFATE (MG/L AS SO4)
01004	ARSENIC TOTAL IN FISH OR ANIMAL WET WGT (MG/KG)	01149	SELENIUM, TOTAL IN FISH OR ANIMALS WET WGT MG/KG
31616	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH
32218	PHEOPHYTIN-A UG/L SPECTROPHOTOMETRIC ACID. METH.	34680	ALDRIN IN FISH TISSUE WET WT UG/G
34682	CHLORDANE TOT (TECH MIX & METABS) TISS WET UG/G	34685	ENDRIN IN TISSUE, WET WEIGHT (MG/KG)
34686	HEPTACHLOR EPOXIDE TISSUE WET WT UG/G	34687	HEPTACHLOR IN FISH TISSUE, UG/G WET WT
34688	HEXACHLOROBENZENE IN TISSUE, WET WEIGHT (MG/KG)	34691	TOXAPHENE IN FISH TISSUE,UG/G WET WT
39075	BHC-GAMMA ISOMER, TISSUE WET WGT (UG/G)	39376	DDT SUM ANALOGS IN TISSUE WET WT BASIS (UG/G)
39406	DIELDRIN IN AQ ORGANISMS WT WT BASIS (UG/G)	39515	PCBS FISH TISSUE WET UG/G
71930	MERCURY,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	71936	LEAD,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS
71937	COPPER,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71939	CHROMIUM,TOT IN FISH OR ANIMALS-WET WEIGHT BASIS
71940	CADMIUM,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	74990	FISH SPECIES, USE EPA STORET NUMERIC CODE
74995	ANATOMICAL PART, USE EPA STORET NUMERIC CODE	81614	NUMBER OF INDIVIDUALS IN COMPOSITE TISSUE SAMPLE
81615	NUMBER OF SPECIES IN COMPOSITE TISSUE SAMPLE	81644	METHOXYCHLOR IN FISH TISSUE, UG/G WET WEIGHT
81896	DDE TOTAL IN TISSUE WET WT UG/G	81897	DDD TOTAL IN TISSUE WET WT UG/G
84008	LIFE CYCLE/HABITAT, USE EPA STORET NUMERIC CODE	98437	CYPRINUS CARPIO (#/SAMPLE)
98561	ICTALURUS PUNCTATUS (#/SAMPLE)		

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	655.74 00095H	5. 00299L	5. 00300L	9. 00400H	6.5 00400L	40. 00940H
			40. 00945H	200. 31616H	400. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1805.0400

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
GUADALUPE RIVER BASIN
DISTRICT 08

SEGMENT - CANYON LAKE
COUNTY - COMAL
USGS GAGE NO
RIVER MILE

STATION NO. 1805.0400
STATION LOCATION: CANYON LAKE HEADWATERS ABOVE CRANES MILL PARK
LATITUDE / LONGITUDE: 29 54 33 098 19 54

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	VALUE/ /CODE	VALUE/ /CODE	VALUE/ /CODE	VALUE/ /CODE	VALUE/ /CODE	VALUE/ /CODE	VALUE/ /CODE	VALUE/ /CODE
03/09/88	1239	1.0	TEXAS	SMN	16.1 / 00010	24. / 00077	482. / 00094	9.3 / 00300	200. / 00410	38. / 00530	5. / 00535	.02 / 00610
					.68 / 00620	.3 / 00625	.03 / 00665	< .01 / 00671	2. / 00680	19. / 00940	22. / 00945	< 2. / 31616
					3. / 32211	< 2. / 32218						
03/09/88	1239	5.0	TEXAS	SMN	15.9 / 00010	481. / 00094	9.3 / 00300					
03/09/88	1239	10.0	TEXAS	SMN	15.9 / 00010	482. / 00094	9.3 / 00300					
03/09/88	1239	15.0	TEXAS	SMN	15.8 / 00010	480. / 00094	9.3 / 00300					
03/09/88	1239	20.0	TEXAS	SMN	14.3 / 00010	462. / 00094	9.1 / 00300	7.8 / 00400				
03/09/88	1239	30.0	TEXAS	SMN	13.2 / 00010	466. / 00094	8.1 / 00300	7.8 / 00400				
03/09/88	1239	34.0	TEXAS	SMN	15.2 / 00010	455. / 00094	6.6 / 00300	7.7 / 00400	200. / 00410	51. / 00530	6. / 00535	.05 / 00610
					.62 / 00620	.4 / 00625	.05 / 00665	< .01 / 00671	2. / 00680	17. / 00940	21. / 00945	< 2. / 31616
03/09/88	1239	41.0	TEXAS	SMN	72600. / 00496	1950. / 00626	470. / 00668	3.2 / 01003	62. / 01008	< .8 / 01028	8.0 / 01029	7.2 / 01043
					11. / 01052	300. / 01053	8.3 / 01068	< .8 / 01078	31. / 01093	< 1.1 / 01148	< 5.0 / 39061	< 3.0 / 39064
					< 3.0 / 39067	< 3.0 / 39073	< 1.0 / 39076	< 3.0 / 39301	< 3.0 / 39306	< 3.0 / 39311	< 3.0 / 39316	< 1.5 / 39321
					< 1.5 / 39328	< 1.0 / 39333	< 6.0 / 39351	< 6.0 / 39363	< 3.0 / 39368	< 6.0 / 39373	< 2.0 / 39383	3.0 / 39393
					< 50. / 39403	< .5 / 39413	< 1.0 / 39423	< 10. / 39481	< 20. / 39519	< 5.0 / 39531	< 3.0 / 39541	< 5.0 / 39571
					< 3.0 / 39601	< 1.0 / 39701	< 50. / 39731	< 10. / 39741	< 10. / 39761	< 1.0 / 39783	.024 / 71921	

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1805.0400

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
GUADALUPE RIVER BASIN
DISTRICT 08

SEGMENT - CANYON LAKE
COUNTY - COMAL
USGS GAGE NO
RIVER MILE

STATION NO. 1805.0400
STATION LOCATION: CANYON LAKE HEADWATERS ABOVE CRANES MILL PARK
LATITUDE / LONGITUDE: 29 54 33 / 098 19 54

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/01/89	1200	1.0	TEXAS	SMN	SURFACE SAMPLE WATER TURBID							
					29.3 00010	367. 00094	7.8 00300	7.9 00400	146. 00410	7. 00530	3. 00535	.06 00610
					.01 00615	< .01 00620	.2 00625	.022 00665	.014 00671	3. 00680	13. 00940	25. 00945
					< 1. 32211	1.2 32218						
08/01/89	1200	5.0	TEXAS	SMN	29.3 00010	367. 00094	7.6 00300	8.0 00400				
08/01/89	1200	10.0	TEXAS	SMN	29.3 00010	367. 00094	7.6 00300	8.0 00400				
08/01/89	1200	20.0	TEXAS	SMN	29.0 00010	373. 00094	6.5 00300	8.0 00400				
08/01/89	1200	30.0	TEXAS	SMN	28.3 00010	403. 00094	1.0 *00300	7.8 00400				
08/01/89	1200	40.0	TEXAS	SMN	26.8 00010	397. 00094	1.0 *00300	7.7 00400				
08/01/89	1200	45.0	TEXAS	SMN	BOTTOM SAMPLE TAKEN WITH VAN DORAN SAMPLER							
					184. 00410	12. 00530	4. 00535	.30 00610	.02 00615	.01 00620	.5 00625	.028 00665
					.023 00671	4. 00680	15. 00940	17. 00945				
08/20/90	1119	.7	TEXAS	SMN	29.6 00010	393. 00094	5.8 00300	7.9 00400				
08/20/90	1119	1.0	TEXAS	SMN	WATER CLARITY FAIR SUSPENDED SOLIDS PRESENT AND CAUSING TURBIDITY							
					.75 00078	152. 00410	8. 00530	3. 00535	.03 00610	< .01 00615	.03 00620	.034 00665
					.020 00671	3. 00680	9. 00940	18. 00945	11. 31616	2.9 32211	0. 32218	

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

*** T E X A S W A T E R C O M M I S S I O N ***
STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
GUADALUPE RIVER BASIN
DISTRICT 08

SEGMENT - CANYON LAKE
COUNTY - COMAL
USGS GAGE NO
RIVER MILE
STATION NO. STATION LOCATION
1805.0400 CANYON LAKE HEADWATERS ABOVE CRANES MILL PARK
LATITUDE / LONGITUDE
29 54 33 098 19 54

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/20/90	1119	3.3	TEXAS	SMN	29.3 00010	390. 00094	6.1 00300	8.0 00400				
08/20/90	1119	6.6	TEXAS	SMN	29.0 00010	386. 00094	6.2 00300	8.0 00400				
08/20/90	1119	9.8	TEXAS	SMN	28.9 00010	382. 00094	6.2 00300	8.0 00400				
08/20/90	1119	13.1	TEXAS	SMN	28.7 00010	381. 00094	5.9 00300	8.0 00400				
08/20/90	1119	16.4	TEXAS	SMN	28.7 00010	381. 00094	5.9 00300	8.0 00400				
08/20/90	1119	23.0	TEXAS	SMN	28.7 00010	381. 00094	5.9 00300	8.0 00400				
08/20/90	1119	29.5	TEXAS	SMN	28.7 00010	384. 00094	5.5 00300	8.0 00400				
08/20/90	1119	36.1	TEXAS	SMN	28.0 00010	467. 00094	.5 *00300	7.6 00400				
08/20/90	1119	42.7	TEXAS	SMN	26.8 00010	458. 00094	.1 *00300	7.5 00400				
08/20/90	1119	45.0	TEXAS	SMN	200. 00410	22. 00530	4. 00535	.23 00610	.03 00615	.38 00620	.034 00665	.010 00671
					3. 00680	9. 00940	12. 00945					
08/20/90	1119	49.2	TEXAS	SMN	24.6 00010	465. 00094	.0 *00300	7.4 00400				

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
GUADALUPE RIVER BASIN
DISTRICT 08

1805.0400

SEGMENT - CANYON LAKE
COUNTY - COMAL
USGS GAGE NO
RIVER MILE

STATION NO. STATION LOCATION
1805.0400 CANYON LAKE HEADWATERS ABOVE CRANES MILL PARK

LATITUDE / LONGITUDE
29 54 33 098 19 54

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00077	TRANSPARENCY, SECCHI DISC (INCHES)
00078	TRANSPARENCY, SECCHI DISC (METERS)	00094	SPECIFIC CONDUCTANCE,FIELD (UMHOS/CM @ 25C)
00300	OXYGEN, DISSOLVED (MG/L)	00400	PH (STANDARD UNITS)
00410	ALKALINITY, TOTAL (MG/L AS CACO3)	00496	LOSS ON IGNITION, BOTTOM DEPOSITS (MG/KG)
00530	RESIDUE, TOTAL NONFILTRABLE (MG/L)	00535	RESIDUE, VOLATILE NONFILTRABLE (MG/L)
00610	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	00615	NITRITE NITROGEN, TOTAL (MG/L AS N)
00620	NITRATE NITROGEN, TOTAL (MG/L AS N)	00625	NITROGEN, KJELDAHL, TOTAL, (MG/L AS N)
00626	NITROGEN,ORG. KJEL.,BOT. DEPOS. (MG/KG-N DRY WGT	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)
00668	PHOSPHORUS,TOTAL, BOTTOM DEPOSIT (MG/KG DRY WGT)	00671	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)
00680	CARBON, TOTAL ORGANIC (MG/L AS C)	00940	CHLORIDE (MG/L AS CL)
00945	SULFATE (MG/L AS SO4)	01003	ARSENIC IN BOTTOM DEPOSITS (MG/KG AS AS DRY WGT)
01008	BARIUM IN BOTTOM DEPOSITS (MG/KG AS BA DRY WGT)	01028	CADMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)
01029	CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT	01043	COPPER IN BOTTOM DEPOSITS (MG/KG AS CU DRY WGT)
01052	LEAD IN BOTTOM DEPOSITS (MG/KG AS PB DRY WGT)	01053	MANGANESE IN BOTTOM DEPOSITS (MG/KG AS MN DRY WG
01068	NICKEL, TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	01078	SILVER IN BOTTOM DEPOSITS (MG/KG AS AG DRY WGT)
01093	ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)	01148	SELENIUM IN BOTTOM DEPOSITS (MG/KG AS SE DRY WT)
31616	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH
32218	PHEOPHYTIN-A UG/L SPECTROPHOTOMETRIC ACID. METH.	39061	PENTACHLOROPHENOL IN BOT. DEPOS. UG/KG DRY SOL.
39064	CHLORDANE CIS ISOMER BOTTOM DEPOSITS(UG/KG DRY)	39067	CHLORDANE TRANS ISOMER BOTTOM DEPOSITS UG/KG DRY
39073	CHLORDANE NONACHLOR,TRANS ISO BOT. DEPOS.(UG/KG)	39076	BHC ALPHA ISOMER, BOTTOM DEPOS UG/KG DRY SOLIDS
39301	P,P' DDT IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39306	O,P' DDT IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)
39311	P,P DDD IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39316	O,P DDD IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)
39321	P,P DDE IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39328	O,P' DDE IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)
39333	ALDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39351	CHLORDANE IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS
39363	DDD IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39368	DDE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)
39373	DDT IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39383	DIELDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)
39393	ENDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39403	TOXAPHENE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.
39413	HEPTACHLOR IN BOT. DEP. (UG/KILOGRAM DRY SOLIDS)	39423	HEPTACHLOR EPOXIDE IN BOT. DEP. (UG/KG DRY SOL.)
39481	METHOXYCHLOR IN BOTTOM DEPOSITS (UG/KG DRY SOL.)	39519	PCBS IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)
39531	MALATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS	39541	PARATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS
39571	DIAZINON IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39601	METHYL PARATHION IN BOT. DEPOS.(UG/KG DRY SOLIDS
39701	HEXACHLOROBENZENE IN BOT DEPOS. UG/KG DRY SOLIDS	39731	2,4-D IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)
39741	2,4,5-T IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39761	SILVEX IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)
39783	LINDANE IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	71921	MERCURY,TOT. IN BOT. DEPOS. (MG/KG AS HG DRY WGT

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	655.74 00095H	5. 00299L	5. 00300L	9. 00400H	6.5 00400L	40. 00940H
			40. 00945H	200. 31616H	400. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1904.0050

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - MEDINA LAKE
COUNTY - MEDINA USGS GAGE NO RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1904.0050 MEDINA LAKE AT MEDINA LAKE DAM, WEST OF SAN ANTONIO 29 32 15 098 56 00

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1904.0100

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - MEDINA LAKE
COUNTY - MEDINA
USGS GAGE NO
RIVER MILE

STATION NO. STATION LOCATION
1904.0100 MEDINA LAKE NEAR RED COVE

LATITUDE / LONGITUDE
29 33 32 098 55 30

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/18/88	1231	1.0	TEXAS	SMN	PERCENT SATURATION 108.3							
					30.0 00010	385. 00094	8.24 00300	8.48 00400	123. 00410	< 5. 00530	< 5. 00535	< .02 00610
					.01 00620	.01 00665	< .01 00671	4. 00680	12. 00940	44. 00945	4. 31616	2. 32211
					< 2. 32218							
08/02/89	1015	1.0	TEXAS	SMN	28.5 00010	393. 00094	7.6 00300	7.8 00400	128. 00410	4. 00530	2. 00535	.15 00610
					.05 00615	< .01 00620	.2 00625	.022 00665	.018 00671	7. 00680	16. 00940	52. 00945
					1. 31616	2.0 32211	3.6 32218	237. 70300				
08/02/89	1015	5.0	TEXAS	SMN	28.6 00010	394. 00094	7.6 00300	7.8 00400				
08/02/89	1015	10.0	TEXAS	SMN	28.5 00010	394. 00094	7.6 00300	7.8 00400				
08/02/89	1015	20.0	TEXAS	SMN	28.1 00010	395. 00094	7.3 00300	7.8 00400				
08/02/89	1015	30.0	TEXAS	SMN	27.5 00010	397. 00094	5.6 00300	7.8 00400				
08/02/89	1015	40.0	TEXAS	SMN	24.3 00010	409. 00094	.9 *00300	7.6 00400				
08/02/89	1015	50.0	TEXAS	SMN	17.3 00010	418. 00094	2.4 *00300	7.7 00400				
08/02/89	1015	60.0	TEXAS	SMN	15.4 00010	419. 00094	1.1 *00300	7.7 00400				
08/02/89	1015	65.0	TEXAS	SMN	14.6 00010	422. 00094	.2 *00300	7.6 00400				
08/13/90	1515	.7	TEXAS	SMN	28.7 00010	406. 00094	8.6 00300	8.2 00400				

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - MEDINA LAKE
COUNTY - MEDINA
USGS GAGE NO
RIVER MILE

STATION NO. STATION LOCATION
1904.0100 MEDINA LAKE NEAR RED COVE

LATITUDE / LONGITUDE
29 33 32 098 55 30

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/13/90	1515	1.0	TEXAS	SMN	100. 00410	3. 00530	2. 00535	.04 00610	< .01 00615	< .01 00620	.01 00665	.01 00671
					2. 00680	9. 00940	60. 00945	< 2. 31616	< 1. 32211	< 1. 32218		
08/13/90	1515	3.3	TEXAS	SMN	28.7 00010	404. 00094	8.5 00300	8.2 00400				
08/13/90	1515	6.6	TEXAS	SMN	28.5 00010	405. 00094	8.6 00300	8.2 00400				
08/13/90	1515	9.8	TEXAS	SMN	28.4 00010	405. 00094	8.6 00300	8.2 00400				
08/13/90	1515	16.4	TEXAS	SMN	28.2 00010	407. 00094	8.0 00300	8.2 00400				
08/13/90	1515	23.0	TEXAS	SMN	27.6 00010	421. 00094	5.1 00300	8.0 00400				
08/13/90	1515	29.5	TEXAS	SMN	27.2 00010	426. 00094	3.2 *00300	7.9 00400				
08/13/90	1515	36.1	TEXAS	SMN	26.3 00010	431. 00094	.6 *00300	7.7 00400				
08/13/90	1515	42.7	TEXAS	SMN	25.5 00010	437. 00094	.1 *00300	7.6 00400				
08/13/90	1515	52.5	TEXAS	SMN	24.0 00010	438. 00094	.0 *00300	7.5 00400				
08/13/90	1515	62.3	TEXAS	SMN	20.1 00010	445. 00094	.0 *00300	7.5 00400				
08/13/90	1515	72.2	TEXAS	SMN	18.5 00010	454. 00094	.0 *00300	7.4 00400				
08/13/90	1800	4.0	TWCIS	SMN	CAPTURED TWO CARP USING 150 FT EXPERIMENTAL GILL NETS CYPRINUS CARPIO							
					18. 00024	< .2 01004	.74 01149	< .002 34680	< .01 34682	< .006 34685	< .004 34686	< .002 34687
					< .002 34688	< .1 34691	< .002 39075	< .01 39376	< .008 39406	< .04 39515	.126 71930	< 1.0 71936

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - MEDINA LAKE
COUNTY - MEDINA

USGS GAGE NO

RIVER MILE

STATION NO.	STATION LOCATION	LATITUDE / LONGITUDE
1904.0100	MEDINA LAKE NEAR RED COVE	29 33 32 098 55 30

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/13/90	1800	4.0	TWCIS	SMN	.51	< .4	< .2	12.	59.	1.	1.	< .03
					71937	71939	71940	74990	74995	81614	81615	81644
					.05	< .01	905.	1.				
					81896	81897	84008	98437				

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

1904.0100

SEGMENT - MEDINA LAKE
COUNTY - MEDINA
USGS GAGE NO
RIVER MILE

STATION NO.	STATION LOCATION	LATITUDE / LONGITUDE
1904.0100	MEDINA LAKE NEAR RED COVE	29 33 32 098 55 30

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00024	SAMPLE LENGTH IN INCHES
00094	SPECIFIC CONDUCTANCE,FIELD (UMHOS/CM @ 25C)	00300	OXYGEN, DISSOLVED (MG/L)
00400	PH (STANDARD UNITS)	00410	ALKALINITY, TOTAL (MG/L AS CACO3)
00530	RESIDUE, TOTAL NONFILTRABLE (MG/L)	00535	RESIDUE, VOLATILE NONFILTRABLE (MG/L)
00610	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	00615	NITRITE NITROGEN, TOTAL (MG/L AS N)
00620	NITRATE NITROGEN, TOTAL (MG/L AS N)	00625	NITROGEN, KJELDAHL, TOTAL, (MG/L AS N)
00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	00671	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)
00680	CARBON, TOTAL ORGANIC (MG/L AS C)	00940	CHLORIDE (MG/L AS CL)
00945	SULFATE (MG/L AS SO4)	01004	ARSENIC TOTAL IN FISH OR ANIMAL WET WGT (MG/KG)
01149	SELENIUM, TOTAL IN FISH OR ANIMALS WET WGT MG/KG	31616	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML
32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	32218	PHEOPHYTIN-A UG/L SPECTROPHOTOMETRIC ACID. METH.
34680	ALDRIN IN FISH TISSUE WET WT UG/G	34682	CHLORDANE TOT (TECH MIX & METABS) TISS WET UG/G
34685	ENDRIN IN TISSUE, WET WEIGHT (MG/KG)	34686	HEPTACHLOR EPOXIDE TISSUE WET WT UG/G
34687	HEPTACHLOR IN FISH TISSUE, UG/G WET WT	34688	HEXACHLOROBENZENE IN TISSUE, WET WEIGHT (MG/KG)
34691	TOXAPHENE IN FISH TISSUE,UG/G WET WT	39075	BHC-GAMMA ISOMER, TISSUE WET WGT (UG/G)
39376	DDT SUM ANALOGS IN TISSUE WET WT BASIS (UG/G)	39406	DIELDRIN IN AQ ORGANISMS WT WT BASIS (UG/G)
39515	PCBS FISH TISSUE WET UG/G	70300	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C),MG/L
71930	MERCURY,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	71936	LEAD,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS
71937	COPPER,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71939	CHROMIUM,TOT IN FISH OR ANIMALS-WET WEIGHT BASIS
71940	CADMIUM,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	74990	FISH SPECIES, USE EPA STORET NUMERIC CODE
74995	ANATOMICAL PART, USE EPA STORET NUMERIC CODE	81614	NUMBER OF INDIVIDUALS IN COMPOSITE TISSUE SAMPLE
81615	NUMBER OF SPECIES IN COMPOSITE TISSUE SAMPLE	81644	METHOXYCHLOR IN FISH TISSUE, UG/G WET WEIGHT
81896	DDE TOTAL IN TISSUE WET WT UG/G	81897	DDD TOTAL IN TISSUE WET WT UG/G
84008	LIFE CYCLE/HABITAT, USE EPA STORET NUMERIC CODE	98437	CYPRINUS CARPIO (#/SAMPLE)

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	31. 00010H	88. 00011H	655.74 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			75. 00945H	200. 31616H	400. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

* * * T E X A S W A T E R C O M M I S S I O N * * *
STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - MEDINA LAKE
COUNTY - MEDINA

USGS GAGE NO

RIVER MILE

STATION NO. 1904.0200
STATION LOCATION: MEDINA LAKE AT MORMON BLUFF
LATITUDE / LONGITUDE: 29 33 32 098 57 45

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/18/88	1156	1.0	TEXAS	SMN	PERCENT SATURATION 98.6							
					30.4 00010	395. 00094	7.60 00300	8.42 00400	127. 00410	< 5. 00530	< 5. 00535	.03 00610
					.02 00620	.01 00665	< .01 00671	5. 00680	13. 00940	45. 00945	< 10. 31616	< 2. 32211
					< 2. 32218							
08/02/89	1130	1.0	TEXAS	SMN	WATER CLARITY GOOD SLIGHT TURBIDITY SURFACE S .AMPLE							
					28.8 00010	400. 00094	7.6 00300	8.0 00400	124. 00410	4. 00530	3. 00535	.03 00610
					.05 00615	< .01 00620	.3 00625	.040 00665	.036 00671	4. 00680	16. 00940	62. 00945
					2. 31616	< 1. 32211	2.1 32218	245. 70300				
08/02/89	1130	5.0	TEXAS	SMN	29.1 00010	401. 00094	7.6 00300	8.0 00400				
08/02/89	1130	10.0	TEXAS	SMN	29.0 00010	400. 00094	7.5 00300	8.0 00400				
08/02/89	1130	20.0	TEXAS	SMN	28.0 00010	407. 00094	4.6 •00300	8.0 00400				
08/02/89	1130	30.0	TEXAS	SMN	26.9 00010	409. 00094	1.0 •00300	7.8 00400				
08/02/89	1130	40.0	TEXAS	SMN	24.4 00010	414. 00094	.1 •00300	7.7 00400				
08/02/89	1130	50.0	TEXAS	SMN	18.4 00010	433. 00094	.1 •00300	7.7 00400				
08/02/89	1130	60.0	TEXAS	SMN	16.0 00010	439. 00094	.1 •00300	7.6 00400				
08/02/89	1130	65.0	TEXAS	SMN	15.7 00010	440. 00094	.1 •00300	7.6 00400				

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - MEDINA LAKE
COUNTY - MEDINA
USGS GAGE NO
RIVER MILE
STATION NO. STATION LOCATION
1904.0200 MEDINA LAKE AT MORMON BLUFF
LATITUDE / LONGITUDE
29 33 32 098 57 45

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/13/90	1426	.7	TEXAS	SMN	29.6	407.	7.9	8.2				
					00010	00094	00300	00400				
08/13/90	1426	1.0	TEXAS	SMN	110.	4.	2.	.06	< .01	< .01	.02	.01
					00410	00530	00535	00610	00615	00620	00665	00671
					2.	8.	60.	2.	< 1.	< 1.		
					00680	00940	00945	31616	32211	32218		
08/13/90	1426	3.3	TEXAS	SMN	29.3	408.	8.0	8.2				
					00010	00094	00300	00400				
08/13/90	1426	6.6	TEXAS	SMN	29.1	408.	8.1	8.2				
					00010	00094	00300	00400				
08/13/90	1426	9.8	TEXAS	SMN	29.0	408.	8.0	8.2				
					00010	00094	00300	00400				
08/13/90	1426	16.4	TEXAS	SMN	28.8	412.	7.5	8.2				
					00010	00094	00300	00400				
08/13/90	1426	19.7	TEXAS	SMN	28.7	417.	7.2	8.0				
					00010	00094	00300	00400				
08/13/90	1426	23.0	TEXAS	SMN	28.4	441.	4.8	8.0				
					00010	00094	*00300	00400				
08/13/90	1426	26.2	TEXAS	SMN	27.7	475.	2.3	7.8				
					00010	00094	*00300	00400				
08/13/90	1426	29.5	TEXAS	SMN	27.3	467.	.4	7.6				
					00010	00094	*00300	00400				
08/13/90	1426	36.1	TEXAS	SMN	26.1	433.	.0	7.6				
					00010	00094	*00300	00400				
08/13/90	1426	42.7	TEXAS	SMN	25.2	430.	.0	7.5				
					00010	00094	*00300	00400				
08/13/90	1426	46.6	TEXAS	SMN	24.6	427.	.0	7.5				
					00010	00094	*00300	00400				

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1904.0200

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - MEDINA LAKE
COUNTY - MEDINA

STATION NO.	STATION LOCATION	USGS GAGE NO	RIVER MILE	LATITUDE / LONGITUDE
1904.0200	MEDINA LAKE AT MORMON BLUFF			29 33 32 098 57 45

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010 --	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00094 --	SPECIFIC CONDUCTANCE,FIELD (UMHOS/CM @ 25C)
00300 --	OXYGEN, DISSOLVED (MG/L)	00400 --	PH (STANDARD UNITS)
00410 --	ALKALINITY, TOTAL (MG/L AS CACO3)	00530 --	RESIDUE, TOTAL NONFILTRABLE (MG/L)
00535 --	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	00610 --	NITROGEN, AMMONIA, TOTAL (MG/L AS N)
00615 --	NITRITE NITROGEN, TOTAL (MG/L AS N)	00620 --	NITRATE NITROGEN, TOTAL (MG/L AS N)
00625 --	NITROGEN, KJELDAHL, TOTAL, (MG/L AS N)	00665 --	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)
00671 --	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)	00680 --	CARBON, TOTAL ORGANIC (MG/L AS C)
00940 --	CHLORIDE (MG/L AS CL)	00945 --	SULFATE (MG/L AS SO4)
31616 --	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML	32211 --	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH
32218 --	PHEOPHYTIN-A UG/L SPECTROPHOTOMETRIC ACID. METH.	70300 --	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C),MG/L

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/CODE							
10/01/67	1.0	TDWR	31. 00010H	88. 00011H	655.74 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			75. 00945H	200. 31616H	400. 70300H					

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1904.0300

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - MEDINA LAKE
COUNTY - MEDINA
USGS GAGE NO
RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1904.0300 MEDINA LAKE BETWEEN CYPRESS AND SPETTEL COVES 29 35 00 098 59 06

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/18/88	1132	1.0	TEXAS	SMN	PERCENT SATURATION 97.6							
					30.4 00010	405. 00094	7.40 00300	8.39 00400	130. 00410	< 5. 00530	3. 00535	.04 00610
					.02 00620	.01 00665	< .01 00671	3. 00680	12. 00940	46. 00945	< 2. 31616	< 2. 32211
					< 2. 32218							
08/02/89	1230	1.0	TEXAS	SMN	28.8 00010	407. 00094	7.1 00300	8.0 00400	134. 00410	10. 00530	4. 00535	< .01 00610
					.05 00615	< .01 00620	.4 00625	.030 00665	.023 00671	4. 00680	15. 00940	64. 00945
					< 10. 31616	1.7 32211	2.5 32218	268. 70300				
08/02/89	1230	5.0	TEXAS	SMN	28.8 00010	408. 00094	6.9 00300	8.0 00400				
08/02/89	1230	10.0	TEXAS	SMN	28.8 00010	407. 00094	6.6 00300	8.0 00400				
08/02/89	1230	20.0	TEXAS	SMN	28.8 00010	408. 00094	6.6 00300	8.0 00400				
08/02/89	1230	30.0	TEXAS	SMN	28.0 00010	413. 00094	2.6 •00300	7.8 00400				
08/13/90	1401	.7	TEXAS	SMN	30.1 00010	427. 00094	7.7 00300	8.2 00400				
08/13/90	1401	1.0	TEXAS	SMN	127. 00410	12. 00530	2. 00535	.12 00610	< .01 00615	< .01 00620	.02 00665	.02 00671
					2. 00680	9. 00940	58. 00945	< 2. 31616	1.9 32211	0. 32218		
08/13/90	1401	3.3	TEXAS	SMN	30.0 00010	427. 00094	7.6 00300	8.2 00400				
08/13/90	1401	6.6	TEXAS	SMN	30.0 00010	428. 00094	7.3 00300	8.1 00400				

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - MEDINA LAKE
COUNTY - MEDINA
USGS GAGE NO
RIVER MILE

STATION NO.	STATION LOCATION	LATITUDE / LONGITUDE
1904.0300	MEDINA LAKE BETWEEN CYPRESS AND SPETTEL COVES	29 35 00 098 59 06

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE			
08/13/90	1401	9.8	TEXAS	SMN	29.6 00010	427. 00094	7.3 00300	8.1 00400
08/13/90	1401	13.1	TEXAS	SMN	29.4 00010	426. 00094	7.1 00300	8.1 00400
08/13/90	1401	16.4	TEXAS	SMN	29.4 00010	426. 00094	7.0 00300	8.1 00400
08/13/90	1401	19.7	TEXAS	SMN	29.2 00010	429. 00094	6.7 00300	8.1 00400
08/13/90	1401	21.3	TEXAS	SMN	29.1 00010	431. 00094	6.4 00300	8.0 00400

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - MEDINA LAKE
COUNTY - MEDINA
USGS GAGE NO
RIVER MILE

STATION NO. STATION LOCATION
1904.0300 MEDINA LAKE BETWEEN CYPRESS AND SPETTEL COVES

LATITUDE / LONGITUDE
29 35 00 098 59 06

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00094	SPECIFIC CONDUCTANCE,FIELD (UMHOS/CM @ 25C)
00300	OXYGEN, DISSOLVED (MG/L)	00400	PH (STANDARD UNITS)
00410	ALKALINITY, TOTAL (MG/L AS CACO3)	00530	RESIDUE, TOTAL NONFILTRABLE (MG/L)
00535	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	00610	NITROGEN, AMMONIA, TOTAL (MG/L AS N)
00615	NITRITE NITROGEN, TOTAL (MG/L AS N)	00620	NITRATE NITROGEN, TOTAL (MG/L AS N)
00625	NITROGEN, KJELDAHL, TOTAL, (MG/L AS N)	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)
00671	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)	00680	CARBON, TOTAL ORGANIC (MG/L AS C)
00940	CHLORIDE (MG/L AS CL)	00945	SULFATE (MG/L AS SO4)
31616	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH
32218	PHEOPHYTIN-A UG/L SPECTROPHOTOMETRIC ACID. METH.	70300	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C),MG/L

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	31. 00010H	88. 00011H	655.74 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			75. 00945H	200. 31616H	400. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1904.0400

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - MEDINA LAKE
COUNTY - MEDINA
USGS GAGE NO
RIVER MILE

STATION NO. 1904.0400
STATION LOCATION: MEDINA LAKE MID-LAKE NEAR HEADWATER
LATITUDE / LONGITUDE: 29 37 48 098 59 06

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/18/88	1108	1.0	TEXAS	SMN	PERCENT SATURATION 96.8							
					31.4 *00010	435. 00094	7.40 00300	8.36 00400	136. 00410	9. 00530	3. 00535	< .02 00610
					.01 00620	.01 00665	< .01 00671	4. 00680	12. 00940	49. 00945	2. 31616	4. 32211
					< 2. 32218							
08/18/88	1108	9.0	TEXAS	SMN	70300. 00496	790. 00557	1800. 00626	280. 00668	2.4 01003	32. 01008	< .4 01028	7.1 01029
					10. 01043	6.4 01052	170. 01053	4.8 01068	< .4 01078	16. 01093	.59 01148	< 5.0 39061
					< 3.0 39064	< 3.0 39067	< 3.0 39073	< 1.0 39076	< 3.0 39301	< 3.0 39306	< 3.0 39311	< 3.0 39316
					< 1.5 39321	< 1.5 39328	< 1.0 39333	< 6.0 39351	< 6.0 39363	< 3.0 39368	< 6.0 39373	< 2.0 39383
					< 3.0 39393	< 50. 39403	< .5 39413	< 1.0 39423	< 10. 39481	< 20. 39519	< 1.0 39701	< 1.0 39783
					.024 71921							
08/03/89	1330	1.0	TEXAS	SMN	28.6 00010	441. 00094	4.8 *00300	7.7 00400	156. 00410	57. 00530	7. 00535	18. 00610
					.05 00615	< .01 00620	.5 00625	.025 00665	.022 00671	4. 00680	16. 00940	44. 00945
					< 10. 31616	2.5 32211	< 1. 32218	289. 70300				
08/03/89	1330	5.0	TEXAS	SMN	28.6 00010	442. 00094	4.7 *00300	7.7 00400				
08/13/90	1325	.7	TEXAS	SMN	28.9 00010	492. 00094	6.7 00300	8.0 00400				
08/13/90	1325	1.0	TEXAS	SMN	LAKE LEVEL LOWER THAN NORMAL SAMPLES TAKEN NEAR LEOBOLDS CAMPGROUNDS							

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

1904.0400

SEGMENT - MEDINA LAKE
COUNTY - MEDINA
USGS GAGE NO
RIVER MILE

STATION NO. STATION LOCATION
1904.0400 MEDINA LAKE MID-LAKE NEAR HEADWATER

LATITUDE / LONGITUDE
29 37 48 098 59 06

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/13/90	1325	1.0	TEXAS	SMN	168. 00410	12. 00530	2. 00535	.07 00610	< .01 00615	.23 00620	.02 00665	.01 00671
					1. 00680	8. 00940	64. 00945	6. 31616	< 1. 32211	< 1. 32218		
08/13/90	1325	3.3	TEXAS	SMN	28.3 00010	497. 00094	6.5 00300	8.0 00400				
08/13/90	1325	6.6	TEXAS	SMN	26.9 00010	514. 00094	6.1 00300	7.9 00400				
08/13/90	1325	9.2	TEXAS	SMN	26.3 00010	518. 00094	5.9 00300	7.9 00400				

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1904.0400

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - MEDINA LAKE
COUNTY - MEDINA
USGS GAGE NO
RIVER MILE

STATION NO.	STATION LOCATION	LATITUDE / LONGITUDE
1904.0400	MEDINA LAKE MID-LAKE NEAR HEADWATER	29 37 48 098 59 06

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010 --	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00094 --	SPECIFIC CONDUCTANCE,FIELD (UMHOS/CM @ 25C)
00300 --	OXYGEN, DISSOLVED (MG/L)	00400 --	PH (STANDARD UNITS)
00410 --	ALKALINITY, TOTAL (MG/L AS CACO3)	00496 --	LOSS ON IGNITION, BOTTOM DEPOSITS (MG/KG)
00530 --	RESIDUE, TOTAL NONFILTRABLE (MG/L)	00535 --	RESIDUE, VOLATILE NONFILTRABLE (MG/L)
00557 --	OIL & GREASE (FREON EXTR.-GRAV METH).BOT. DEPOS.	00610 --	NITROGEN, AMMONIA, TOTAL (MG/L AS N)
00615 --	NITRITE NITROGEN, TOTAL (MG/L AS N)	00620 --	NITRATE NITROGEN, TOTAL (MG/L AS N)
00625 --	NITROGEN, KJELDAHL, TOTAL, (MG/L AS N)	00626 --	NITROGEN,ORG. KJEL.,BOT. DEPOS. (MG/KG-N DRY WGT
00665 --	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	00668 --	PHOSPHORUS,TOTAL, BOTTOM DEPOSIT (MG/KG DRY WGT)
00671 --	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)	00680 --	CARBON, TOTAL ORGANIC (MG/L AS C)
00940 --	CHLORIDE (MG/L AS CL)	00945 --	SULFATE (MG/L AS SO4)
01003 --	ARSENIC IN BOTTOM DEPOSITS (MG/KG AS AS DRY WGT)	01008 --	BARIUM IN BOTTOM DEPOSITS (MG/KG AS BA DRY WGT)
01028 --	CADMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	01029 --	CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT
01043 --	COPPER IN BOTTOM DEPOSITS (MG/KG AS CU DRY WGT)	01052 --	LEAD IN BOTTOM DEPOSITS (MG/KG AS PB DRY WGT)
01053 --	MANGANESE IN BOTTOM DEPOSITS (MG/KG AS MN DRY WG	01068 --	NICKEL, TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)
01078 --	SILVER IN BOTTOM DEPOSITS (MG/KG AS AG DRY WGT)	01093 --	ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)
01148 --	SELENIUM IN BOTTOM DEPOSITS (MG/KG AS SE DRY WT)	31616 --	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML
32211 --	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	32218 --	PHEOPHYTIN-A UG/L SPECTROPHOTOMETRIC ACID. METH.
39061 --	PENTACHLOROPHENOL IN BOT. DEPOS. UG/KG DRY SOL.	39064 --	CHLORDANE CIS ISOMER BOTTOM DEPOSITS(UG/KG DRY)
39067 --	CHLORDANE TRANS ISOMER BOTTOM DEPOSITS UG/KG DRY	39073 --	CHLORDANE NONACHLOR,TRANS ISO BOT. DEPOS.(UG/KG)
39076 --	BHC ALPHA ISOMER, BOTTOM DEPOS UG/KG DRY SOLIDS	39301 --	P,P' DDT IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)
39306 --	O,P' DDT IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39311 --	P,P DDD IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)
39316 --	O,P DDD IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39321 --	P,P DDE IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)
39328 --	O,P' DDE IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39333 --	ALDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)
39351 --	CHLORDANE IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS	39363 --	DDD IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)
39368 --	DDE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39373 --	DDT IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)
39383 --	DIELDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39393 --	ENDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)
39403 --	TOXAPHENE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.	39413 --	HEPTACHLOR IN BOT. DEP. (UG/KILOGRAM DRY SOLIDS)
39423 --	HEPTACHLOR EPOXIDE IN BOT. DEP. (UG/KG DRY SOL.)	39481 --	METHOXYCHLOR IN BOTTOM DEPOSITS (UG/KG DRY SOL.)
39519 --	PCBS IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39701 --	HEXACHLOROBENZENE IN BOT DEPOS. UG/KG DRY SOLIDS
39783 --	LINDANE IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	70300 --	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C),MG/L
71921 --	MERCURY,TOT. IN BOT. DEPOS. (MG/KG AS HG DRY WGT		

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/CODE							
10/01/67	1.0	TDWR	31. 00010H	88. 00011H	655.74 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			75. 00945H	200. 31616H	400. 70300H					

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

* * * T E X A S W A T E R C O M M I S S I O N * * *
STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - UPPER LEON CREEK
COUNTY - BEXAR
USGS GAGE NO
RIVER MILE

STATION NO.	STATION LOCATION	LATITUDE / LONGITUDE
1907.0200	LEON CREEK AT NORTH FM 1604 IN SAN ANTONIO	29 35 10 098 36 00

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - UPPER LEON CREEK
COUNTY - BEXAR . USGS GAGE NO RIVER MILE INACTIVE
STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1907.0300 LEON CREEK UPSTREAM SIDE OF BRIDGE ON CAMP 29 37 30 098 36 00
BULLIS ROAD AND MILITARY HWY

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - UPPER LEON CREEK
COUNTY - BEXAR
USGS GAGE NO
RIVER MILE

STATION NO.	STATION LOCATION	LATITUDE / LONGITUDE
1907.0330	LEON CREEK IN RAYMOND RUSSELL PARK AT LOW WATER BRIDGE	29 37 55 098 36 32

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
01/12/88	0900	1.0	TEXAS	SMN	NO FLOW							
					0. / 00061	1. / 01351						
08/02/88	0830	1.0	TEXAS	SMN	NO FLOW. NO SAMPLES COLLECTED.							
					0. / 00061	1. / 01351						
02/23/89	0847	UNSP	TEXAS	SMN	NO FLOW. NO SAMPLE TAKEN.							
					1. / 01351	0. / 74069						
05/09/90	1500	1.0	TEXAS	SMN	25.5 / 00010	13. / 00061	600. / 00094	10.6 / 00300	7.8 / 00400	204. / 00410	5. / 00530	2. / 00535
					.01 / 00610	< .01 / 00615	.20 / 00620	.050 / 00665	.034 / 00671	4. / 00680	17. / 00940	56. / 00945
					3. / 01351	12. / 31616	5.2 / 32211	2.1 / 32218	3.0 / 74069			
06/05/91	1530	.5	TEXAS	SMN	WATER CLEAR - THICK GROWTH OF FILAMENTOUS ALGAE - MINNOWS PRESENT							
					31.5 / 00010	.67 / 00061	850. / 00094	12.0 / 00300	8.0 / 00400	243. / 00410	1. / 00530	1. / 00535
					.06 / 00610	.01 / 00615	.01 / 00620	.01 / 00665	.01 / 00671	2. / 00680	23. / 00940	158. / *00945
					2. / 01351	30. / 31616	1.0 / 32211	1.0 / 32218	30. / 72053	.02 / 74069		
01/15/92	1500	1.0	TEXAS	SMN	WATER CLEAR -FLOW HIGH DUE TO MONTH OF HEAVY RAINS							
					14.2 / 00010	15. / 00061	500. / 00094	12.5 / 00300	7.5 / 00400	280. / 00410	< 1. / 00530	< 1. / 00535
					.02 / 00610	.01 / 00615	1.67 / 00620	.04 / 00665	.02 / 00671	3. / 00680	21. / 00940	44. / 00945
					5. / 01351	4. / 31616	< 1.0 / 32211	2.8 / 32218	7. / 72053			

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1907.0330

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - UPPER LEON CREEK
COUNTY - BEXAR USGS GAGE NO RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1907.0330 LEON CREEK IN RAYMOND RUSSELL PARK AT LOW WATER BRIDGE 29 37 55 098 36 32

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00061	FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)
00094	SPECIFIC CONDUCTANCE,FIELD (UMHOS/CM @ 25C)	00300	OXYGEN, DISSOLVED (MG/L)
00400	PH (STANDARD UNITS)	00410	ALKALINITY, TOTAL (MG/L AS CACO3)
00530	RESIDUE, TOTAL NONFILTRABLE (MG/L)	00535	RESIDUE, VOLATILE NONFILTRABLE (MG/L)
00610	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	00615	NITRITE NITROGEN, TOTAL (MG/L AS N)
00620	NITRATE NITROGEN, TOTAL (MG/L AS N)	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)
00671	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)	00680	CARBON, TOTAL ORGANIC (MG/L AS C)
00940	CHLORIDE (MG/L AS CL)	00945	SULFATE (MG/L AS SO4)
01351	FLOW:1=DRY,2=LOW,3=NORMAL,4=FLOOD,5=ABOVE NORMAL	31616	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML
32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	32218	PHEOPHYTIN-A UG/L SPECTROPHOTOMETRIC ACID. METH.
72053	DAYS SINCE PRECIPITATION EVENT (DAYS)	74069	STREAM FLOW ESTIMATE (CFS)

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	35. 00010H	95. 00011H	655.74 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	40. 00940H
			75. 00945H	200. 31616H	400. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

SEGMENT - UPPER LEON CREEK
COUNTY - BEXAR
USGS GAGE NO
RIVER MILE
LATITUDE / LONGITUDE

STATION NO. STATION LOCATION
1907.0400 LEON CREEK AT THE DOMINION, 1 MI NORTH OF CAMP BULLIS RD EXIT OF IH 10W
29 38 35 098 37 01

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1908.0100

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - UPPER CIBOLO CREEK
COUNTY - KENDALL USGS GAGE NO 08183900 RIVER MILE

STATION NO. 1908.0100 — STATION LOCATION: CIBOLO CREEK 2.5 MILES SOUTHEAST OF BOERNE — LATITUDE / LONGITUDE: 29 46 26 098 41 50

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/CODE
01/12/88	0950	1.0	TEXAS	SMN	WATER CLARITY EXCELLENT. FILIMENTEOUS GROWTH NOTICABLY DECREASED FROM PREVIOUS QUARTER.

9.	1.00	> 36.	556.	556.	8.6	8.07	206.
00010	00061	00077	00094	00095	00300	00400	00410
< 5.	< 5.	.02	.19	.31	.28	2.	22.
00530	00535	00610	00620	00665	00671	00680	00940
35.	2.	33.	< 2.	< 2.			
00945	01351	31616	32211	32218			

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/CODE
05/17/88	0910	1.0	TEXAS	SMN	ABUNDANT YELLOW AND GREEN FILIMENTEOUS GROWTH OBSERVED SMALL MINNOWS.

22.9	560.	6.4	7.65	212.	11.	2.	.13
00010	00094	00300	00400	00410	00530	00535	00610
.13	1.38	1.28	4.	33.	50.	2.	< 2.
00620	00665	00671	00680	00940	00945	01351	32211
3.							
32218							

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/CODE
08/02/88	1030	1.0	TEXAS	SMN	ALGAL GROWTH GONE FROM SURFACE. SOME ALGAL GROWTH ON BOTTOM. SEVERAL VARIETIES OF FISH. CL ARITY OF WATER EXCELLENT.

26.3	.232	> 20.	726.	6.5	8.1	221.	10.
00010	00061	00077	00094	00300	00400	00410	00530
2.	.15	4.92	1.98	1.88	4.	43.	71.
00535	00610	00620	00665	00671	00680	*00940	00945
2.	194.	12.	< 2.				
01351	31616	32211	32218				

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/CODE
10/18/88	0900	1.0	TEXAS	SMN	CLARITY OF WATER EXCELLENT. SMALL AMOUNT OF DUCKWEED ALONG BANK. FISH NOTICED.

20.	1.71	< 12.	9.0	8.44	246.	8.	2.
00010	00061	00077	00300	00400	00410	00530	00535
.02	< .01	1.15	1.09	3.	44.	60.	2.
00610	00620	00665	00671	00680	*00940	00945	01351
48.	< 2.	< 2.					
31616	32211	32218					

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/CODE
02/23/89	0930	1.0	TEXAS	SMN	SOME TURBIDITY. LEVEL DROPPING. BROWISH COLOR.

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - UPPER CIBOLO CREEK
COUNTY - KENDALL USGS GAGE NO 08183900 RIVER MILE
STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1908.0100 CIBOLO CREEK 2.5 MILES SOUTHEAST OF BOERNE 29 46 26 098 41 50

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
02/23/89	0930	1.0	TEXAS	SMN	11.2 00010	.01 00061	625. 00094	11. 00300	8.03 00400	184. 00410	8. 00530	4. 00535
					1.40 00610	.33 00615	.20 00620	1.48 00665	1.42 00671	7. 00680	27. 00940	53. 00945
					2. 01351	3. 32211	0. 32218					
08/29/89	0945	1.0	TEXAS	SMN	WATER TURBID-MURKY. LOT OF ALGAL GROWTH. SURF .ACE COVERED WITH DUCKWEED							
					26. 00010	.34 00061	750. 00094	13. 00300	9.43 •00400	326. 00410	37. 00530	20. 00535
					.04 00610	.01 00615	.01 00620	.733 00665	.330 00671	12. 00680	69. •00940	78. •00945
					2. 01351							
11/30/89	1100	1.0	TEXAS	SMN	NUMEROUS DUCKS IN WATER UPSTREAM OF SAMPLE .POINT							
					9.1 00010	.5 00061	500. 00094	12.4 00300	8.7 00400	185. 00410	3. 00530	1. 00535
					.14 00610	.08 00615	6.0 00620	3.20 00665	2.92 00671	5. 00680	59. •00940	62. 00945
					2. 01351	990. •31616	21.6 32211	14.1 32218				
05/09/90	1100	1.0	TEXAS	SMN	22. 00010	28. 00061	500. 00094	9.2 00300	8.2 00400	200. 00410	3. 00530	2. 00535
					.02 00610	< .01 00615	.66 00620	.110 00665	.109 00671	3. 00680	16. 00940	40. 00945
					3. 01351	44. 31616	1.6 32211	< 1. 32218				
08/29/90	1730	1.0	TEXAS	SMN	WATER CLEAR - SUBSTRATE COVERED WITH THICK GROWTH OF PERIPHYTON - NUMEROUS SUNFISH OBSERVE D							

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - UPPER CIBOLO CREEK
COUNTY - KENDALL USGS GAGE NO 08183900 RIVER MILE
STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1908.0100 CIBOLO CREEK 2.5 MILES SOUTHEAST OF BOERNE 29 46 26 098 41 50

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/29/90	1730	1.0	TEXAS	SMN	28.1 00010	5.87 00061	.46 00078	375. 00094	10.1 00300	8.0 00400	156. 00410	1. 00530
					< 1. 00535	.09 00610	< .01 00615	.43 00620	.404 00665	1. 00680	27. 00940	38. 00945
					3. 01351	60. 31616	< 1. 32211	< 1. 32218				
01/23/91	1120	1.0	TEXAS	SMN	9.1 00010	330. 00094	11.8 00300	7.0 00400	204. 00410	1. 00530	< 1. 00535	.02 00610
					< .01 00615	.37 00620	.147 00665	.137 00671	5. 00680	17. 00940	24. 00945	3. 01351
					8. 31616	1.0 32211	0. 32218	4. 74069				
04/30/91	1030	1.0	TEXAS	SMN	WATER TURBID AND GREEN - LARGE QUANTITIES OF ATTACHED ALGAL GROWTH ON ROCKS - NUMEROUS SUN FISH AND TOPMINNOWS PRESENT							
					19.6 00010	475. 00094	7.0 00300	8.0 00400	212. 00410	2. 00530	2. 00535	.04 00610
					.01 00615	.95 00620	.331 00665	.324 00671	9. 00680	21. 00940	18. 00945	3. 01351
					< 1. 31616	< 1. 32211	3.7 32218	10. 74069				
11/12/91	1300	1.0	TEXAS	SMN	WATER CLEAR-HEAVY GROWTH OF CHARA ON SUBSTRATE-WATERFOWL SUNFISH BASS NUMEROUS							
					14.1 00010	3.2 00061	470. 00094	13.0 00300	8.2 00400	214. 00410	2. 00530	< 1. 00535
					.05 00610	< .01 00615	.03 00620	5.71 00665	.69 00671	5. 00680	30. 00940	43. 00945
					2. 01351	26. 31616	1.1 32211	1.6 32218				

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - UPPER CIBOLO CREEK
COUNTY - KENDALL USGS GAGE NO 08183900 RIVER MILE

STATION NO.	STATION LOCATION	LATITUDE / LONGITUDE
1908.0100	CIBOLO CREEK 2.5 MILES SOUTHEAST OF BOERNE	29 46 26 098 41 50

PARAMETER	DESCRIPTION:	PARAMETER	DESCRIPTION:
00010 --	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00061 --	FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)
00077 --	TRANSPARENCY, SECCHI DISC (INCHES)	00078 --	TRANSPARENCY, SECCHI DISC (METERS)
00094 --	SPECIFIC CONDUCTANCE,FIELD (UMHOS/CM @ 25C)	00095 --	SPECIFIC CONDUCTANCE (UMHOS/CM @ 25C)
00300 --	OXYGEN, DISSOLVED (MG/L)	00400 --	PH (STANDARD UNITS)
00410 --	ALKALINITY, TOTAL (MG/L AS CACO3)	00530 --	RESIDUE, TOTAL NONFILTRABLE (MG/L)
00535 --	RESIDUE, VOLATILE NONFILTRABLE (MG/L)	00610 --	NITROGEN, AMMONIA, TOTAL (MG/L AS N)
00615 --	NITRITE NITROGEN, TOTAL (MG/L AS N)	00620 --	NITRATE NITROGEN, TOTAL (MG/L AS N)
00665 --	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	00671 --	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)
00680 --	CARBON, TOTAL ORGANIC (MG/L AS C)	00940 --	CHLORIDE (MG/L AS CL)
00945 --	SULFATE (MG/L AS SO4)	01351 --	FLOW:1=DRY,2=LOW,3=NORMAL,4=FLOOD,5=ABOVE NORMAL
31616 --	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML	32211 --	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH
32218 --	PHEOPHYTIN-A UG/L SPECTROPHOTOMETRIC ACID. METH.	74069 --	STREAM FLOW ESTIMATE (CFS)

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	655.74 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	40. 00940H
			75. 00945H	200. 31616H	400. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - UPPER CIBOLO CREEK
COUNTY - KENDALL USGS GAGE NO 08183900 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1908.0200 CIBOLO CREEK AT HERFF ROAD IN BOERNE 29 46 40 098 43 00

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1908.0250

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - UPPER CIBOLO CREEK
COUNTY - KENDALL USGS GAGE NO 08183900 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1908.0250 CIBOLO CREEK AT BOERNE CITY PARK 29 47 00 098 43 00

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - UPPER CIBOLO CREEK
COUNTY - KENDALL USGS GAGE NO 08183900 RIVER MILE

STATION NO.	STATION LOCATION	LATITUDE / LONGITUDE
1908.0300	CIBOLO CREEK AT SPARKLING SPRINGS IN BOERNE	29 47 05 098 43 30

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - UPPER CIBOLO CREEK
COUNTY - KENDALL USGS GAGE NO 08183900 RIVER MILE

STATION NO.	STATION LOCATION	LATITUDE / LONGITUDE
1908.0400	CIBOLO CREEK AT IH 10 - US 87 NORTHWEST OF BOERNE	29 49 00 098 45 15

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

1908.0500

SEGMENT - UPPER CIBOLO CREEK
COUNTY - KENDALL USGS GAGE NO 08183900 RIVER MILE

STATION NO.	STATION LOCATION	LATITUDE / LONGITUDE
1908.0500	CIBOLO CREEK AT BOERNE CITY LAKE DISCHARGE	29 49 06 098 45 56

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

1910.0020

SEGMENT - SALADO CREEK
COUNTY - BEXAR
USGS GAGE NO
RIVER MILE

STATION NO. STATION LOCATION
1910.0020 SALADO CREEK 100 METERS
UPSTREAM OF THE SAN ANTONIO RIVER CONFLUENCE

LATITUDE / LONGITUDE
29 16 55 098 26 02

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1910.0050

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR

USGS GAGE NO

RIVER MILE

STATION NO. 1910.0050
STATION LOCATION: SALADO CREEK AT SOUTHTON ROAD IN SAN ANTONIO

LATITUDE / LONGITUDE: 29 17 52 098 25 15

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
02/22/88	1035	1.0	S ANT	SMN	WATER SLIGHTLY TURBID SOME FOAMING SKY CLEAR							
					15.6 00010	680. 00095	9.1 00389	8.0 00403	.2 00620	.01 00660	55. *00940	73. 00945
					3. 01351	70. 31616						
03/30/88	1050	1.0	S ANT	SMN	WATER SLIGHTLY TURBID SKY PARTLY CLOUDY							
					17.8 00010	890. 00095	8.7 00389	8.1 00403	.5 00620	.16 00660	80. *00940	91. 00945
					3. 01351	1100. 31616						
04/27/88	0820	1.0	S ANT	SMN	SKY CLEAR WATER SLIGHTLY TURBID							
					21.1 00010	830. 00095	7.8 00389	7.7 00403	.4 00620	.09 00660	73. *00940	102. 00945
					3. 01351	80. 31616						
06/27/88	1010	1.0	S ANT	SMN	SKY PARTLY CLOUDY WATER TURBULENT							
					26.7 00010	620. 00095	7.30 00389	7.9 00403	.4 00620	.16 00660	44. 00940	64. 00945
					5. 01351	2100. *31616						
08/29/88	0830	1.0	S ANT	SMN	LITTLE FLOW, PARTLY CLOUDY							
					27.8 00010	750. 00095	8.2 00389	8.0 00403	.30 00620	.10 00660	66. *00940	63. 00945
					60. 31616							
10/24/88	0840	1.0	S ANT	SMN	CLOUDY							
					20.6 00010	740. 00095	8.4 00389	8.0 00403	.17 00620	66. *00940	65. 00945	2. 01351
					70. 31616							

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO RIVER MILE
STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0050 SALADO CREEK AT SOUTHTON ROAD 29 17 52 098 25 15
IN SAN ANTONIO

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
11/28/88	0830	1.0	S ANT	SMN	PARTLY CLOUDY							
					11.7 00010	760. 00095	8.9 00389	7.7 00403	.09 00620	.02 00660	41. 00940	60. 00945
					3. 01351	10. 31616						
04/24/89	1045	1.0	S ANT	SMN	PARTLY CLOUDY							
					22.2 00010	540. 00095	8.3 00389	8.0 00403	.36 00620	.22 00660	18. 00940	50. 00945
					3. 01351	660. 31616						
05/22/89	0905	1.0	S ANT	SMN	25.0 00010	740. 00095	8.6 00389	8.6 00403	.22 00620	.03 00660	68. *00940	51. 00945
					2. 01351	60. 31616	312. 70300					
06/26/89	1000	1.0	S ANT	SMN	25.0 00010	730. 00095	8.4 00389	8.4 00403	.25 00620	.07 00660	67. *00940	78. 00945
					2. 01351	10. 31616	307. 70300					
07/24/89	0925	1.0	S ANT	SMN	27.2 00010	880. 00095	8.2 00389	8.5 00403	.02 00620	.03 00660	110. *00940	88. 00945
					2. 01351	50. 31616	371. 70300					
08/28/89	0900	1.0	S ANT	SMN	27.2 00010	850. 00095	9.5 00389	8.3 00403	.02 00620	.07 00660	97. *00940	58. 00945
					2. 01351	520. 31616	358. 70300					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1910.0050

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0050 SALADO CREEK AT SOUTHTON ROAD 29 17 52 098 25 15
IN SAN ANTONIO

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010 --	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00095 --	SPECIFIC CONDUCTANCE (UMHOS/CM @ 25C)
00389 --	OXYGEN,DISS., LAB ANAL BY PROBE OF FIELD SAMPLE	00403 --	PH (STANDARD UNITS) LAB
00620 --	NITRATE NITROGEN, TOTAL (MG/L AS N)	00660 --	PHOSPHATE, ORTHO (MG/L AS PO4)
00940 --	CHLORIDE (MG/L AS CL)	00945 --	SULFATE (MG/L AS SO4)
01351 --	FLOW:1=DRY,2=LOW,3=NORMAL,4=FLOOD,5=ABOVE NORMAL	31616 --	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML
70300 --	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C),MG/L		

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	901.64 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			200. 00945H	2000. 31616H	550. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR
USGS GAGE NO
RIVER MILE

STATION NO. STATION LOCATION
1910.0055 SALADO CREEK AT GOLIAD ROAD
(OLD CORPUS CHRISTI HIGHWAY)

LATITUDE / LONGITUDE
29 19 10 098 24 25

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
09/13/90	1107	1.0	SARA	SMN	FLOW SEVERITY 5							
					25.	470.	7.5	7.2	< .01	< .0100	2.580	.110
					00010	00095	00300	00400	00610	00615	00620	00665
					.075	10.6	32.8	37.4	60.			
					00671	00680	00940	00945	31616			

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1910.0055

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR

STATION NO.	STATION LOCATION	USGS GAGE NO	RIVER MILE	LATITUDE / LONGITUDE
1910.0055	SALADO CREEK AT GOLIAD ROAD (OLD CORPUS CHRISTI HIGHWAY)			29 19 10 098 24 25

PARAMETER	DESCRIPTION:	PARAMETER	DESCRIPTION:
00010 --	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00095 --	SPECIFIC CONDUCTANCE (UMHOS/CM @ 25C)
00300 --	OXYGEN, DISSOLVED (MG/L)	00400 --	PH (STANDARD UNITS)
00610 --	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	00615 --	NITRITE NITROGEN, TOTAL (MG/L AS N)
00620 --	NITRATE NITROGEN, TOTAL (MG/L AS N)	00665 --	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)
00671 --	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)	00680 --	CARBON, TOTAL ORGANIC (MG/L AS C)
00940 --	CHLORIDE (MG/L AS CL)	00945 --	SULFATE (MG/L AS SO4)
31616 --	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML		

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	901.64 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			200. 00945H	2000. 31616H	550. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR
USGS GAGE NO
RIVER MILE
INACTIVE

STATION NO.	STATION LOCATION	LATITUDE / LONGITUDE
1910.0060	SALADO CREEK AT LOOP 410 SOUTH IN SAN ANTONIO	29 19 50 / 098 24 42

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1910.0100

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR
USGS GAGE NO 08178800 RIVER MILE

STATION NO. STATION LOCATION
1910.0100 SALADO CREEK AT LOOP 13 IN SOUTH SAN ANTONIO

LATITUDE / LONGITUDE
29 21 25 098 24 45

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/CODE
08/10/88	1650	1.0	TEXAS	SMN	USGS 6.90 WATER MURKY LIGHT BROWN GREEN IN COLORDISSOLVED OXYGEN AT 80.6 PERCENT SATURATIO N

28.6	15.0	710.	6.10	215.	71500.	16.	2.
00010	00061	00094	00300	00410	00496	00530	00535
1300.	< .02	.7	1020.	.07	525.	.03	5.
00557	00610	00620	00626	00665	00668	00671	00680
56.	49.	6.7	79.	< .4	13.	12.	21.
•00940	00945	01003	01008	01028	01029	01043	01052
170.	10.	< .2	51.	.60	3.	440.	< 2.
01053	01068	01078	01093	01148	01351	31616	32211
< 2.	< 5.0	< 3.0	< 3.0	< 3.0	< 1.0	< 3.0	< 3.0
32218	39061	39064	39067	39073	39076	39301	39306
< 3.0	< 3.0	< 1.5	< 1.5	< 1.0	< 6.0	< 6.0	< 3.0
39311	39316	39321	39328	39333	39351	39363	39368
< 6.0	< 2.0	< 3.0	< 50.	< .5	< 1.0	< 10.	< 20.
39373	39383	39393	39403	39413	39423	39481	39519
< 5.0	< 3.0	< 5.0	< 3.0	< 1.0	< 50.	< 10.	< 10.
39531	39541	39571	39601	39701	39731	39741	39761
< 1.0	.034						
39783	71921						

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/CODE
08/09/89	1300	1.0	TEXAS	SMN	PARTLY CLOUDY SUNNY WATER OLIVE BROWN IN COLO .R

25.4	67.4	643.	6.2	7.7	206.	24.	4.
00010	00061	00094	00300	00400	00410	00530	00535
.05	.01	< .01	.138	.130	6.	118.	56.
00610	00615	00620	00665	00671	00680	•00940	00945
3.							
01351							

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/CODE
08/15/90	1420	1.0	TEXAS	SMN	WATER COLOR LIGHT GREEN USGS 7.95

27.8	63.90	> 1.00	672.	8.3	7.4	230.	14.
00010	00061	00078	00094	00300	00400	00410	00530

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR
USGS GAGE NO 08178800 RIVER MILE

STATION NO. 1910.0100
STATION LOCATION: SALADO CREEK AT LOOP 13 IN SOUTH SAN ANTONIO
LATITUDE / LONGITUDE: 29 21 25 098 24 45

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/15/90	1420	1.0	TEXAS	SMN	7. 00535	.32 00610	< .01 00615	.86 00620	.04 00665	.03 00671	1. 00680	42. 00940
					38. 00945	3. 01351	47. 31616	< 1. 32211	< 1. 32218			
09/13/90	1120	1.0	SARA	SMN	FLOW SEVERITY 5							
					25. 00010	410. 00095	7.0 00300	6.9 00400	.02 00610	< .0100 00615	.850 00620	.260 00665
					.095 00671	13.8 00680	23.7 00940	29.4 00945	1850. 31616			
07/22/91	1542	1.0	TEXAS	SMN	DAY OVERCAST SLIGHT DRIZZLE PHYTOPANKTON GREEN IN COLOR							
					27.5 00010	12. 00061	.50 00078	285. 00090	659. 00094	10.5 00300	84. 00301	7.9 00400
					246. 00410	V .3 00480	14. 00530	2. 00535	.03 00610	< .01 00615	.54 00620	.06 00665
					.04 00671	4. 00680	50. •00940	14. 00945	3. 01351	180. 31616	< 1. 32211	4.0 32218

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
1910.0100 PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - . SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178800 RIVER MILE
STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0100 SALADO CREEK AT LOOP 13 IN 29 21 25 098 24 45
SOUTH SAN ANTONIO

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010 --	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00061 --	FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)
00078 --	TRANSPARENCY, SECCHI DISC (METERS)	00090 --	OXIDATION REDUCTION POTENTIAL (MILLIVOLTS)
00094 --	SPECIFIC CONDUCTANCE,FIELD (UMHOS/CM @ 25C)	00095 --	SPECIFIC CONDUCTANCE (UMHOS/CM @ 25C)
00300 --	OXYGEN, DISSOLVED (MG/L)	00301 --	OXYGEN, DISSOLVED (PERCENT OF SATURATION)
00400 --	PH (STANDARD UNITS)	00410 --	ALKALINITY, TOTAL (MG/L AS CACO3)
00480 --	SALINITY - PARTS PER THOUSAND	00496 --	LOSS ON IGNITION, BOTTOM DEPOSITS (MG/KG)
00530 --	RESIDUE, TOTAL NONFILTRABLE (MG/L)	00535 --	RESIDUE, VOLATILE NONFILTRABLE (MG/L)
00557 --	OIL & GREASE (FREON EXTR.-GRAV METH),BOT. DEPOS.	00610 --	NITROGEN, AMMONIA, TOTAL (MG/L AS N)
00615 --	NITRITE NITROGEN, TOTAL (MG/L AS N)	00620 --	NITRATE NITROGEN, TOTAL (MG/L AS N)
00626 --	NITROGEN,ORG. KJEL.,BOT. DEPOS. (MG/KG-N DRY WGT	00665 --	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)
00668 --	PHOSPHORUS,TOTAL, BOTTOM DEPOSIT (MG/KG DRY WGT)	00671 --	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)
00680 --	CARBON, TOTAL ORGANIC (MG/L AS C)	00940 --	CHLORIDE (MG/L AS CL)
00945 --	SULFATE (MG/L AS SO4)	01003 --	ARSENIC IN BOTTOM DEPOSITS (MG/KG AS AS DRY WGT)
01008 --	BARIUM IN BOTTOM DEPOSITS (MG/KG AS BA DRY WGT)	01028 --	CADMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)
01029 --	CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT	01043 --	COPPER IN BOTTOM DEPOSITS (MG/KG AS CU DRY WGT)
01052 --	LEAD IN BOTTOM DEPOSITS (MG/KG AS PB DRY WGT)	01053 --	MANGANESE IN BOTTOM DEPOSITS (MG/KG AS MN DRY WG
01068 --	NICKEL, TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	01078 --	SILVER IN BOTTOM DEPOSITS (MG/KG AS AG DRY WGT)
01093 --	ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)	01148 --	SELENIUM IN BOTTOM DEPOSITS (MG/KG AS SE DRY WT)
01351 --	FLOW:1=DRY,2=LOW,3=NORMAL,4=FLOOD,5=ABOVE NORMAL	31616 --	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML
32211 --	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	32218 --	PHEOPHYTIN-A UG/L SPECTROPHOTOMETRIC ACID. METH.
39061 --	PENTACHLOROPHENOL IN BOT. DEPOS. UG/KG DRY SOL.	39064 --	CHLORDANE CIS ISOMER BOTTOM DEPOSITS(UG/KG DRY)
39067 --	CHLORDANE TRANS ISOMER BOTTOM DEPOSITS UG/KG DRY	39073 --	CHLORDANE NONACHLOR,TRANS ISO BOT. DEPOS.(UG/KG)
39076 --	BHC ALPHA ISOMER, BOTTOM DEPOS UG/KG DRY SOLIDS	39301 --	P,P' DDT IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)
39306 --	O,P' DDT IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39311 --	P,P DDD IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)
39316 --	O,P DDD IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39321 --	P,P DDE IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)
39328 --	O,P' DDE IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39333 --	ALDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)
39351 --	CHLORDANE IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS	39363 --	DDD IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)
39368 --	DDE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39373 --	DDT IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)
39383 --	DIELDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39393 --	ENDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)
39403 --	TOXAPHENE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.	39413 --	HEPTACHLOR IN BOT. DEP. (UG/KILOGRAM DRY SOLIDS)
39423 --	HEPTACHLOR EPOXIDE IN BOT. DEP. (UG/KG DRY SOL.)	39481 --	METHOXYCHLOR IN BOTTOM DEPOSITS (UG/KG DRY SOL.)
39519 --	PCBS IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39531 --	MALATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS
39541 --	PARATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS	39571 --	DIAZINON IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)
39601 --	METHYL PARATHION IN BOT. DEPOS.(UG/KG DRY SOLIDS	39701 --	HEXACHLOROBENZENE IN BOT DEPOS. UG/KG DRY SOLIDS
39731 --	2,4-D IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39741 --	2,4,5-T IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)
39761 --	SILVEX IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39783 --	LINDANE IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)
71921 --	MERCURY,TOT. IN BOT. DEPOS. (MG/KG AS HG DRY WGT		

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	901.64 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			200. 00945H	2000. 31616H	550. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

SEGMENT - SALADO CREEK
COUNTY - BEXAR   USGS GAGE NO 08178800   RIVER MILE
STATION NO. STATION LOCATION   LATITUDE / LONGITUDE
1910.0110 SALADO CREEK AT SOUTHSIDE LIONS PARK   29 23 02 098 25 37
IMMEDIATELY UPSTREAM FROM THE LAKE DISCHARGE

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
09/13/90	1215	1.0	SARA	SMN	FLOW SEVERITY 3							
					28. 00010	321. 00095	10.0 00300	8.0 00400	< .01 00610	< .0100 00615	.080 00620	.130 00665
					< .010 00671	22.4 00680	17.5 00940	22.7 00945	6. 31616			

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178800 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0110 SALADO CREEK AT SOUTHSIDE LIONS PARK 29 23 02 098 25 37
IMMEDIATELY UPSTREAM FROM THE LAKE DISCHARGE

PARAMETER	DESCRIPTION:	PARAMETER	DESCRIPTION:
00010 --	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00095 --	SPECIFIC CONDUCTANCE (UMHOS/CM @ 25C)
00300 --	OXYGEN, DISSOLVED (MG/L)	00400 --	PH (STANDARD UNITS)
00610 --	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	00615 --	NITRITE NITROGEN, TOTAL (MG/L AS N)
00620 --	NITRATE NITROGEN, TOTAL (MG/L AS N)	00665 --	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)
00671 --	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)	00680 --	CARBON, TOTAL ORGANIC (MG/L AS C)
00940 --	CHLORIDE (MG/L AS CL)	00945 --	SULFATE (MG/L AS SO4)
31616 --	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML		

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	901.64 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			200. 00945H	2000. 31616H	550. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

* * * T E X A S W A T E R C O M M I S S I O N * * *
STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178800 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0115 SALADO CREEK WEST CHANNEL OF SALADO CREEK IN 29 23 13 098 25 28
SOUTHSIDE LIONS PARK 304 MET RS ABOVE THE
CONFLUENCE WITH EAST CHANNEL SALAD

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178800 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0120 SALADO CREEK EAST CHANNEL OF SALADO CREEK IN 29 23 02 098 25 31
SOUTHSIDE LIONS PARK 15 METE RS ABOVE THE
CONFLUENCE WITH WEST CHANNEL SALAD

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178800 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0130 SALADO CREEK AT RIGSBY AVE (US 87) 29 23 53 098 25 34

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
09/13/90	1230	1.0	SARA	SMN	FLOW SEVERITY 5							
					25. 00010	240. 00095	6.4 00300	6.7 00400	.02 00610	.0700 00615	1.430 00620	.490 00665
					.280 00671	10.3 00680	8.2 00940	18.8 00945	450. 31616			
12/20/90	1115	1.0	SARA	SMN	FLOW SEVERITY 3							
					16. 00010	621. 00095	8.3 00300	6.9 00400				

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178800 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0130 SALADO CREEK AT RIGSBY AVE (US 87) 29 23 53 098 25 34

PARAMETER	DESCRIPTION:	PARAMETER	DESCRIPTION:
00010 --	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00095 --	SPECIFIC CONDUCTANCE (UMHOS/CM @ 25C)
00300 --	OXYGEN, DISSOLVED (MG/L)	00400 --	PH (STANDARD UNITS)
00610 --	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	00615 --	NITRITE NITROGEN, TOTAL (MG/L AS N)
00620 --	NITRATE NITROGEN, TOTAL (MG/L AS N)	00665 --	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)
00671 --	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)	00680 --	CARBON, TOTAL ORGANIC (MG/L AS C)
00940 --	CHLORIDE (MG/L AS CL)	00945 --	SULFATE (MG/L AS SO4)
31616 --	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML		

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	901.64 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			200. 00945H	2000. 31616H	550. 70300H					

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178800 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0135 SALADO CREEK AT IH-10 29 25 04 098 25 35

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR
USGS GAGE NO 08178800 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0137 SALADO CREEK AT GEMBLER RD 29 26 07 098 25 09

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
09/13/90	1245	1.0	SARA	SMN	FLOW SEVERITY 5							
					24. 00010	224. 00095	7.2 00300	6.9 00400	< .01 00610	.0500 00615	2.440 00620	.440 00665
					.280 00671	6.5 00680	7.6 00940	17.4 00945	3100. •31616			

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178800 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0137 SALADO CREEK AT GEMBLER RD 29 26 07 098 25 09

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00095	SPECIFIC CONDUCTANCE (UMHOS/CM @ 25C)
00300	OXYGEN, DISSOLVED (MG/L)	00400	PH (STANDARD UNITS)
00610	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	00615	NITRITE NITROGEN, TOTAL (MG/L AS N)
00620	NITRATE NITROGEN, TOTAL (MG/L AS N)	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)
00671	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)	00680	CARBON, TOTAL ORGANIC (MG/L AS C)
00940	CHLORIDE (MG/L AS CL)	00945	SULFATE (MG/L AS SO4)
31616	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML		

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	901.64 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			200. 00945H	2000. 31616H	550. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1910.0140

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178800 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0140 SALADO CREEK AT IH 35 IN SAN ANTONIO 29 26 58 098 25 20

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
01/14/88	0925	1.0	S ANT	SMN	WATER SLIGHTLY TURBID SKY OVERCAST.							
					600. 00095	8.6 00389	7.5 00403	.8 00620	35. 00940	18. 00945	3. 01351	50. 31616
02/08/88	1010	1.0	S ANT	SMN	WATER TURBID SKY OVERCAST							
					15.6 00010	570. 00095	8.6 00389	7.7 00403	.7 00620	.8 00660	32. 00940	54. 00945
					3. 01351	1300. 31616						
03/14/88	1000	1.0	S ANT	SMN	WATER SLIGHTLY TURBID ALGAE PRESENT SKY CLEAR							
					20.0 00010	530. 00095	8.5 00389	7.8 00403	.4 00620	.07 00660	26. 00940	38. 00945
					3. 01351	110. 31616						
04/13/88	0900	1.0	S ANT	SMN	CLEAR SKY							
					22.2 00010	520. 00095	8.0 00389	7.5 00403	.6 00620	.07 00660	27. 00940	34. 00945
					3. 01351	70. 31616						
05/09/88	1055	1.0	S ANT	SMN	LOW FLOW							
					24.4 00010	520. 00095	8.2 00389	7.7 00403	.5 00620	.04 00660	22. 00940	28. 00945
					40. 31616							
06/13/88	1012	1.0	S ANT	SMN	CLOUDY							
					25.5 00010	550. 00095	7.8 00389	7.2 00403	.6 00620	.18 00660	28. 00940	36. 00945
					5. 01351	300. 31616						
07/11/88	1153	1.0	S ANT	SMN	CLOUDY							

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR
USGS GAGE NO 08178800 RIVER MILE

STATION NO. 1910.0140
STATION LOCATION: SALADO CREEK AT IH 35 IN SAN ANTONIO
LATITUDE / LONGITUDE: 29 26 58 098 25 20

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
07/11/88	1153	1.0	S ANT	SMN	26.7 00010	500. 00095	8.9 00389	7.8 00403	.7 00620	.05 00660	23. 00940	21. 00945
					3. 01351	1050. 31616						
08/15/88	0955	1.0	S ANT	SMN	WATER CLEAR SKY PARTLY CLOUDY ALGAE PRESENT MINNOWS OBSERVED							
					23.9 00010	510. 00095	8.0 00389	7.7 00403	.6 00620	.02 00660	28. 00940	24. 00945
					3. 01351	150. 31616						
10/10/88	0855	1.0	S ANT	SMN	22.2 00010	490. 00095	8.6 00389	8.1 00403	.77 00620	21. 00940	16. 00945	3. 01351
					100. 31616							
11/14/88	0850	1.0	S ANT	SMN	CLOUDY							
					22.8 00010	480. 00095	8.5 00389	8.0 00403	.79 00620	21. 00940	16. 00945	3. 01351
					40. 31616							
02/20/89	1030	1.0	S ANT	SMN	CLOUDY							
					20.0 00010	520. 00095	8.6 00389	8.1 00403	.68 00620	24. 00940	24. 00945	3. 01351
					120. 31616							
03/20/89	0840	1.0	S ANT	SMN	PARTLY CLOUDY							
					21.1 00010	600. 00095	8.6 00389	8.2 00403	.80 00620	.12 00660	36. 00940	52. 00945
					3. 01351	25000. *31616						
04/10/89	0910	1.0	S ANT	SMN	CLOUDY							

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

SEGMENT - SALADO CREEK
COUNTY - BEXAR
USGS GAGE NO 08178800 RIVER MILE

STATION NO. 1910.0140
STATION LOCATION: SALADO CREEK AT IH 35 IN SAN ANTONIO
LATITUDE / LONGITUDE: 29 26 58 098 25 20

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
04/10/89	0910	1.0	S ANT	SMN	18.3 00010	520. 00095	8.8 00389	8.2 00403	2.67 00620	.24 00660	21. 00940	20. 00945
					3. 01351	12000. •31616						
05/01/89	0855	1.0	S ANT	SMN	21.1 00010	370. 00095	8.3 00389	8.2 00403	.90 00620	.24 00660	7. 00940	28. 00945
					3. 01351	660. 31616	154. 70300					
06/12/89	0940	1.0	S ANT	SMN	25.0 00010	270. 00095	8.4 00389	7.8 00403	.83 00620	.60 00660	7. 00940	38. 00945
					2. 01351	16000. •31616	109. 70300					
07/17/89	1000	1.0	S ANT	SMN	27.2 00010	520. 00095	8.1 00389	8.1 00403	.51 00620	.05 00660	24. 00940	31. 00945
					2. 01351	90. 31616	219. 70300					
08/14/89	0910	1.0	S ANT	SMN	25.0 00010	530. 00095	8.1 00389	8.2 00403	.82 00620	.06 00660	23. 00940	29. 00945
					2. 01351	30. 31616	223. 70300					

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178800 RIVER MILE
STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0140 SALADO CREEK AT IH 35 IN SAN ANTONIO 29 26 58 098 25 20

PARAMETER	DESCRIPTION:	PARAMETER	DESCRIPTION:
00010 --	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00095 --	SPECIFIC CONDUCTANCE (UMHOS/CM @ 25C)
00389 --	OXYGEN,DISS., LAB ANAL BY PROBE OF FIELD SAMPLE	00403 --	PH (STANDARD UNITS) LAB
00620 --	NITRATE NITROGEN, TOTAL (MG/L AS N)	00660 --	PHOSPHATE, ORTHO (MG/L AS PO4)
00940 --	CHLORIDE (MG/L AS CL)	00945 --	SULFATE (MG/L AS SO4)
01351 --	FLOW:1=DRY,2=LOW,3=NORMAL,4=FLOOD,5=ABOVE NORMAL	31616 --	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML
70300 --	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C),MG/L		

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	901.64 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			200. 00945H	2000. 31616H	550. 70300H					

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

*** TEXAS WATER COMMISSION ***
STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR
USGS GAGE NO 08178800
RIVER MILE

STATION NO. 1910.0145
STATION LOCATION: SALADO CREEK AT PERSHING RD. FT SAM HOUSTON ARMY BASE
LATITUDE / LONGITUDE: 29 27 52 / 098 25 36

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE			
11/30/90	1100	1.0	SARA	SMN	FLOW SEVERITY 3			
					15.	679.	12.0	7.2
					00010	00095	00300	00400
12/11/90	1340	1.0	SARA	SMN	FLOW SEVERITY 2			
					15.	728.	7.9	7.3
					00010	00095	00300	00400

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178800 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0145 SALADO CREEK AT PERSHING RD, FT SAM HOUSTON ARMY BASE 29 27 52 098 25 36

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010 --	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00095 --	SPECIFIC CONDUCTANCE (UMHOS/CM @ 25C)
00300 --	OXYGEN, DISSOLVED (MG/L)	00400 --	PH (STANDARD UNITS)

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	901.64 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			200. 00945H	2000. 31616H	550. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

* * * T E X A S   W A T E R   C O M M I S S I O N * * *
STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR
USGS GAGE NO 08178800
RIVER MILE

STATION NO.	STATION LOCATION	LATITUDE / LONGITUDE
1910.0148	SALADO CREEK AT EAST END OF WINANS ROAD	29 28 36 / 098 24 34

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR
USGS GAGE NO 08178800 RIVER MILE
INACTIVE

STATION NO. STATION LOCATION
1910.0150 SALADO CREEK AT RITTIMAN ROAD
IN SAN ANTONIO

LATITUDE / LONGITUDE
29 29 05 098 24 57

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR
USGS GAGE NO 08178800 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0160 SALADO CREEK AT EISENHAUER ROAD 29 29 47 098 25 12
IN SAN ANTONIO

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
09/13/90	1330	1.0	SARA	SMN	FLOW SEVERITY 5							
					24. 00010	199. 00095	7.2 00300	6.9 00400	< .01 00610	.0100 00615	1.230 00620	.310 00665
					.200 00671	9.9 00680	4.3 00940	8.6 00945	2320. •31616			

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178800 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0160 SALADO CREEK AT EISENHAUER ROAD 29 29 47 098 25 12
IN SAN ANTONIO

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010 --	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00095 --	SPECIFIC CONDUCTANCE (UMHOS/CM @ 25C)
00300 --	OXYGEN, DISSOLVED (MG/L)	00400 --	PH (STANDARD UNITS)
00610 --	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	00615 --	NITRITE NITROGEN, TOTAL (MG/L AS N)
00620 --	NITRATE NITROGEN, TOTAL (MG/L AS N)	00665 --	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)
00671 --	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)	00680 --	CARBON, TOTAL ORGANIC (MG/L AS C)
00940 --	CHLORIDE (MG/L AS CL)	00945 --	SULFATE (MG/L AS SO4)
31616 --	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML		

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	901.64 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			200. 00945H	2000. 31616H	550. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1910.0161

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178800 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0161 SALADO CREEK AT AUSTIN HIGHWAY (SH 368) 29 30 00 098 25 16

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS:	VALUE/ /CODE

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR   USGS GAGE NO 08178700   RIVER MILE

STATION NO. 1910.0162
STATION LOCATION: SALADO CREEK AT NORTHEAST LOOP 410 IN SAN ANTONIO
LATITUDE / LONGITUDE: 29 30 57 / 098 25 47

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/CODE							
02/22/88	0935	1.0	S ANT	SMN	WATER TURBID NO ALGAE OR MINNOWS PRESENT SKY CLEAR							
					15.6 / 00010	600. / 00095	12.1 / 00389	7.9 / 00403	.1 / 00620	.05 / 00660	56. / *00940	64. / 00945
					5. / 01351	20. / 31616						
03/30/88	0915	1.0	S ANT	SMN	WATER TURBID SKY PARTLY CLOUDY							
					17.2 / 00010	600. / 00095	8.6 / 00389	7.8 / 00403	.6 / 00620	.08 / 00660	25. / 00940	52. / 00945
					3. / 01351	400. / 31616						
04/27/88	0950	1.0	S ANT	SMN	WATER SLIGHTLY TURBID ALGAE PRESENT MINNOWS OBSERVED SKY CLEAR							
					22.2 / 00010	540. / 00095	7.4 / 00389	7.6 / 00403	.1 / 00620	.02 / 00660	32. / 00940	60. / 00945
					3. / 01351	340. / 31616						
05/23/88	1030	1.0	S ANT	SMN	SKY SUNNY WATER CLEAR ALGAE PRESENT							
					21.7 / 00010	390. / 00095	9.0 / 00389	7.7 / 00403	.1 / 00620	.05 / 00660	28. / 00940	57. / 00945
					2. / 01351	150. / 31616						
06/27/88	0910	1.0	S ANT	SMN	WATER TURBID SKY CLOUDY							
					27.2 / 00010	340. / 00095	6.2 / 00389	7.4 / 00403	.4 / 00620	.12 / 00660	18. / 00940	64. / 00945
					3. / 01351	500. / 31616						
07/25/88	0955	1.0	S ANT	SMN	SKY SUNNY WATER CLEAR MINNOWS PRESENT							
					27.2 / 00010	420. / 00095	10.3 / 00389	7.8 / 00403	.2 / 00620	.06 / 00660	14. / 00940	64. / 00945
					3. / 01351	940. / 31616						

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR
USGS GAGE NO 08178700 RIVER MILE
STATION NO. STATION LOCATION
1910.0162 SALADO CREEK AT NORTHEAST LOOP 410 IN SAN ANTONIO
LATITUDE / LONGITUDE 29 30 57 098 25 47

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/ /CODE							
08/29/88	1035	1.0	S ANT	SMN	FLOW GOOD, PARTLY CLOUDY							
					26.7 00010	760. 00095	8.2 00389	7.7 00403	.07 00620	.02 00660	36. 00940	154. 00945
					60. 31616							
10/24/88	0945	1.0	S ANT	SMN	CLOUDY							
					19.4 00010	570. 00095	8.1 00389	7.8 00403	.05 00620	34. 00940	80. 00945	3. 01351
					70. 31616							
11/28/88	1005	1.0	S ANT	SMN	PARTLY CLOUDY							
					10.6 00010	650. 00095	8.8 00389	7.7 00403	.01 00620	.01 00660	37. 00940	82. 00945
					3. 01351	< 10. 31616						
04/24/89	0830	1.0	S ANT	SMN	PARTLY CLOUDY							
					22.2 00010	330. 00095	8.8 00389	8.0 00403	6. 00940	24. 00945	3. 01351	20. 31616
07/24/89	1025	1.0	S ANT	SMN	27.2 00010	410. 00095	8.2 00389	8.2 00403	.03 00620	.03 00660	16. 00940	51. 00945
					2. 01351	80. 31616	171. 70300					

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

1910.0162

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178700 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0162 SALADO CREEK AT NORTHEAST LOOP 410 IN SAN ANTONIO 29 30 57 098 25 47

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010 --	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00095 --	SPECIFIC CONDUCTANCE (UMHOS/CM @ 25C)
00389 --	OXYGEN,DISS., LAB ANAL BY PROBE OF FIELD SAMPLE	00403 --	PH (STANDARD UNITS) LAB
00620 --	NITRATE NITROGEN, TOTAL (MG/L AS N)	00660 --	PHOSPHATE, ORTHO (MG/L AS PO4)
00940 --	CHLORIDE (MG/L AS CL)	00945 --	SULFATE (MG/L AS SO4)
01351 --	FLOW:1=DRY,2=LOW,3=NORMAL,4=FLOOD,5=ABOVE NORMAL	31616 --	FECAL COLIFORM,MEMBR FILTER,M-FC BROTH, #/100ML
70300 --	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C),MG/L		

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	901.64 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			200. 00945H	2000. 31616H	550. 70300H					

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - . SALADO CREEK
COUNTY - BEXAR   USGS GAGE NO 08178700   RIVER MILE

STATION NO. 1910.0168
STATION LOCATION: SALADO CREEK AT LOS PATIOS(LOOP 410 NORTH)
LATITUDE / LONGITUDE: 29 31 00   098 25 40

SAMPLE DATE	TIME	DEPTH (FT)	SOURCE AGENCY	SYSTEM CODE	PARAMETER MEASUREMENTS: VALUE/CODE							
04/04/89	1030	1.0	TEXAS	SMN	STANDING WATER ONLY NO FLOW							
04/04/89	1030	1.0	TWCIS	SMN	22.8 / 00010	430. / 00094	5.0 / *00300	7.6 / 00400	119. / 00410	5. / 00530	2. / 00535	< .02 / 00610
					< .01 / 00620	.1 / 00665	< .01 / 00671	8. / 00680	23. / 00940	59. / 00945	1. / 01351	2. / 32211
					< 2. / 32218	0. / 74069						
09/13/90	1400	1.0	SARA	SMN	FLOW SEVERITY 5							
					24. / 00010	184. / 00095	5.7 / 00300	6.9 / 00400	< .01 / 00610	.0200 / 00615	.850 / 00620	.240 / 00665
					.160 / 00671	9.9 / 00680	2.9 / 00940	2.2 / 00945				

SYMBOL (*) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

STATEWIDE MONITORING NETWORK -- SAMPLING DATA INVENTORY
PERIOD OF REPORT: 01/01/88 TO 06/01/93
SAN ANTONIO RIVER BASIN
DISTRICT 08

SEGMENT - SALADO CREEK
COUNTY - BEXAR USGS GAGE NO 08178700 RIVER MILE

STATION NO. STATION LOCATION LATITUDE / LONGITUDE
1910.0168 SALADO CREEK AT LOS PATIOS(LOOP 410 NORTH) 29 31 00 098 25 40

PARAMETER	DESCRIPTION	PARAMETER	DESCRIPTION
00010 --	TEMPERATURE, WATER (DEGREES CENTIGRADE)	00094 --	SPECIFIC CONDUCTANCE,FIELD (UMHOS/CM @ 25C)
00095 --	SPECIFIC CONDUCTANCE (UMHOS/CM @ 25C)	00300 --	OXYGEN, DISSOLVED (MG/L)
00400 --	PH (STANDARD UNITS)	00410 --	ALKALINITY, TOTAL (MG/L AS CACO3)
00530 --	RESIDUE, TOTAL NONFILTRABLE (MG/L)	00535 --	RESIDUE, VOLATILE NONFILTRABLE (MG/L)
00610 --	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	00615 --	NITRITE NITROGEN, TOTAL (MG/L AS N)
00620 --	NITRATE NITROGEN, TOTAL (MG/L AS N)	00665 --	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)
00671 --	PHOSPHORUS, DISSOLVED ORTHOPHOSPHORUS(MG/L AS P)	00680 --	CARBON, TOTAL ORGANIC (MG/L AS C)
00940 --	CHLORIDE (MG/L AS CL)	00945 --	SULFATE (MG/L AS SO4)
01351 --	FLOW:1=DRY,2=LOW,3=NORMAL,4=FLOOD,5=ABOVE NORMAL	32211 --	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH
32218 --	PHEOPHYTIN-A UG/L SPECTROPHOTOMETRIC ACID. METH.	74069 --	STREAM FLOW ESTIMATE (CFS)

EFFECTIVE DATE	DEPTH (FT)	SOURCE AGENCY	SEGMENT STANDARDS: VALUE/ /CODE							
10/01/67	1.0	TDWR	32. 00010H	90. 00011H	901.64 00095H	5.0 00299L	5.0 00300L	9.0 00400H	6.5 00400L	50. 00940H
			200. 00945H	2000. 31616H	550. 70300H					

SYMBOL (•) DENOTES MEASUREMENT LESS THAN 'L' STANDARD OR GREATER THAN 'H' STANDARD.

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (210) 340-0343

REPORT OF SAMPLE ANALYSIS

To: David Givler
Gaddis Simpson Engineers
7073 San Pedro
San Antonio, TX 78216

CLIENT INFORMATION	*LABORATORY INFORMATION*
Project Name:	**PCS Sample #:** 28721
Sample ID: SAN GERONIMO CREEK	**Date Rec'd:** 5/25/93
Date Taken: 5/24/93	**Time Rec'd:** 0800
Time Taken: 1700	**Report Date:** 6/1/93

TEST DESCRIPTION	SAMPLE RESULT	UNITS	DATE ANALYZED	METHOD USED
pH	8.3	S.U.	5/25/93	4500-H+ B
BOD5	1	mg/L	5/25/93	5210 B
TSS	16	mg/L	5/25/93	2540 D
Ammonia-N	<0.1	mg/L	5/25/93	4500-NH3 B/E
Phosphate, Ortho	0.050	mg/L	5/25/93	365.4
Conductivity,Specific	455	umhos/cm	5/25/93	120.1
Total Dissolved Solids	280	mg/L	5/25/93	160.1
Iron	<0.01	mg/L	5/25/93	200.7/6010
Calcium	62	mg/L	5/31/93	200.7/6010
Magnesium	18	mg/L	5/31/93	200.7/6010
Hardness as CaCO3	228	mg/L	5/31/93	330.2
Sodium	8	mg/L	5/31/93	200.7
Manganese	<0.01	mg/L	5/25/93	200.7/6010
Alkalinity, Total	186	mg/L	5/31/93	310.1
Alkalinity, Bicarbonate	227	mg/L	5/31/93	2320 B
Sulfate	37	mg/L	5/25/93	4500-SO4 E
Chloride	13	mg/L	5/25/93	4500-Cl B
Fluoride	0.51	mg/L	5/26/93	340.1
Nitrate-N	0.14	mg/L	5/31/93	352.1
Coliform, Fecal	380	col/100 mL	5/25/93	9222 D

Approved by:
Chuck Wallgren

Chuck Wallgren
Owner

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 28721

Enter cation results in mg/l

mg/l Iron:	0.01	me/l Iron:	0.0004
mg/l Ca :	62.00	me/l Ca :	3.0938
mg/l Mg :	18.00	me/l Mg :	1.4796
mg/l Na :	8.00	me/l Na :	0.3480
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.01	me/l Mn :	0.0004
		Sum Cations(me/l):	4.9222

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	227.00	me/l HCO3:	3.7228
mg/l SO4 :	37.00	me/l SO4 :	0.7696
mg/l Cl- :	13.00	me/l Cl- :	0.3666
mg/l Fl- :	0.51	me/l Fl- :	0.0268
mg/l NO3 :	0.14	me/l NO3N:	0.0023
		Sum Anions (me/l):	4.8881

%ERROR = : 0.3476

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (210) 340-0343

REPORT OF SAMPLE ANALYSIS

To: David Givler
Gaddis Simpson Engineers
7073 San Pedro
San Antonio, TX 78216

CLIENT INFORMATION	*LABORATORY INFORMATION*
Project Name:	**PCS Sample #:** 28720
Sample ID: BALCONES CREEK	**Date Rec'd:** 5/25/93
Date Taken: 5/24/93	**Time Rec'd:** 0800
Time Taken: 1800	**Report Date:** 6/1/93

TEST DESCRIPTION	SAMPLE RESULT	UNITS	DATE ANALYZED	METHOD USED
pH	8.3	S.U.	5/25/93	4500-H+ B
BOD5	<1	mg/L	5/25/93	5210 B
TSS	2	mg/L	5/25/93	2540 D
Ammonia-N	<0.1	mg/L	5/25/93	4500-NH3 B/E
Phosphate, Ortho	0.031	mg/L	5/25/93	365.4
Conductivity,Specific	480	umhos/cm	5/25/93	120.1
Total Dissolved Solids	276	mg/L	5/25/93	160.1
Iron	<0.01	mg/L	5/25/93	200.7/6010
Calcium	72	mg/L	5/31/93	200.7/6010
Magnesium	12	mg/L	5/31/93	200.7/6010
Hardness as CaCO3	228	mg/L	5/31/93	330.2
Sodium	5	mg/L	5/31/93	200.7
Manganese	<0.01	mg/L	5/25/93	200.7/6010
Alkalinity, Total	228	mg/L	5/31/93	310.1
Alkalinity, Bicarbonate	278	mg/L	5/31/93	2320 B
Sulfate	21	mg/L	5/25/93	4500-SO4 E
Chloride	10	mg/L	5/25/93	4500-Cl B
Fluoride	0.43	mg/L	5/26/93	340.1
Nitrate-N	<0.1	mg/L	5/31/93	352.1
Coliform, Fecal	130	col/100 mL	5/25/93	9222 D

Approved by:

Chuck Wallgren

Chuck Wallgren
Owner

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 28720

Enter cation results in mg/l

mg/l Iron:	0.01	me/l Iron:	0.0004
mg/l Ca :	72.00	me/l Ca :	3.5928
mg/l Mg :	12.00	me/l Mg :	0.9864
mg/l Na :	5.00	me/l Na :	0.2175
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.01	me/l Mn :	0.0004
		Sum Cations(me/l):	4.7975

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	278.00	me/l HCO3:	4.5592
mg/l SO4 :	21.00	me/l SO4 :	0.4368
mg/l Cl- :	10.00	me/l Cl- :	0.2820
mg/l Fl- :	0.43	me/l Fl- :	0.0226
mg/l NO3 :	0.09	me/l NO3N:	0.0014
		Sum Anions (me/l):	5.3020

%ERROR = : -4.9953

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (210) 340-0343

REPORT OF SAMPLE ANALYSIS

To: David Givler
Gaddis Simpson Engineers
7073 San Pedro
San Antonio, TX 78216

CLIENT INFORMATION	*LABORATORY INFORMATION*
Project Name:	**PCS Sample #:** 28709
Sample ID: SALADO CREEK RUNOFF	**Date Rec'd:** 5/24/93
Date Taken: 5/24/93	**Time Rec'd:** 1545
Time Taken:	**Report Date:** 6/1/93

Sample had heavy suspended and collodial solids present.

TEST DESCRIPTION	SAMPLE RESULT	UNITS	DATE ANALYZED	METHOD USED
pH	7.9	S.U.	5/24/93	4500-H+ B
BOD5	2	mg/L	5/24/93	5210 B
TSS	22	mg/L	5/25/93	2540 D
Ammonia-N	0.67	mg/L	5/25/93	4500-NH3 B/E
Phosphate, Ortho	0.680	mg/L	5/25/93	365.4
Conductivity,Specific	230	umhos/cm	5/25/93	120.1
Total Dissolved Solids	248	mg/L	5/25/93	160.1
Iron	6.73	mg/L	5/25/93	200.7/6010
Calcium	40	mg/L	5/31/93	200.7/6010
Magnesium	1	mg/L	5/31/93	200.7/6010
Hardness as CaCO3	106	mg/L	5/31/93	330.2
Sodium	<1	mg/L	5/31/93	200.7
Manganese	0.07	mg/L	5/25/93	200.7/6010
Alkalinity, Total	114	mg/L	5/31/93	310.1
Alkalinity, Bicarbonate	139	mg/L	5/31/93	2320 B
Sulfate	34	mg/L	5/25/93	4500-SO4 E
Chloride	1	mg/L	5/25/93	4500-Cl B
Fluoride	0.24	mg/L	5/26/93	340.1
Nitrate-N	0.48	mg/L	5/31/93	352.1
Coliform, Fecal	420	col/100 mL	5/24/93	9222 D
Iron, Diss (1.2 Micron Filter)	5.82	mg/L	6/2/93	200.7/6010
Iron, Diss (0.45 Micron Filter)	1.08	mg/L	6/2/93	200.7/6010

Approved by:

Chuck Wallgren

Chuck Wallgren
Owner

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 28709

Enter cation results in mg/l

mg/l Iron:	6.73	me/l Iron:	0.2409
mg/l Ca :	40.00	me/l Ca :	1.9960
mg/l Mg :	1.00	me/l Mg :	0.0822
mg/l Na :	0.99	me/l Na :	0.0431
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.07	me/l Mn :	0.0025
		Sum Cations(me/l):	2.3647

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	139.00	me/l HCO3:	2.2796
mg/l SO4 :	34.00	me/l SO4 :	0.7072
mg/l Cl- :	1.00	me/l Cl- :	0.0282
mg/l Fl- :	0.24	me/l Fl- :	0.0126
mg/l NO3 :	0.48	me/l NO3N:	0.0077
		Sum Anions (me/l):	3.0353

%ERROR = : -12.4185

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (210) 340-0343

REPORT OF SAMPLE ANALYSIS

To: David Givler
Gaddis Simpson Engineers
7073 San Pedro
San Antonio, TX 78216

CLIENT INFORMATION	*LABORATORY INFORMATION*
Project Name:	**PCS Sample #:** 28722
Sample ID: LEWIS CREEK	**Date Rec'd:** 5/25/93
Date Taken: 5/25/93	**Time Rec'd:** 0945
Time Taken: 0845	**Report Date:** 6/1/93

TEST DESCRIPTION	SAMPLE RESULT	UNITS	DATE ANALYZED	METHOD USED
pH	8.0	S.U.	5/25/93	4500-H+ B
BOD5	<1	mg/L	5/25/93	5210 B
TSS	12	mg/L	5/25/93	2540 D
Ammonia-N	<0.1	mg/L	5/25/93	4500-NH3 B/E
Phosphate, Ortho	0.070	mg/L	5/25/93	365.4
Conductivity,Specific	560	umhos/cm	5/25/93	120.1
Total Dissolved Solids	320	mg/L	5/25/93	160.1
Iron	0.27	mg/L	5/25/93	200.7/6010
Calcium	95	mg/L	5/31/93	200.7/6010
Magnesium	9	mg/L	5/31/93	200.7/6010
Hardness as CaCO3	272	mg/L	5/31/93	330.2
Sodium	7	mg/L	5/31/93	200.7
Manganese	<0.01	mg/L	5/25/93	200.7/6010
Alkalinity, Total	288	mg/L	5/31/93	310.1
Alkalinity, Bicarbonate	351	mg/L	5/31/93	2320 B
Sulfate	13	mg/L	6/1/93	4500-SO4 E
Chloride	11	mg/L	5/25/93	4500-Cl B
Fluoride	0.32	mg/L	5/26/93	340.1
Nitrate-N	0.08	mg/L	5/31/93	352.1
Coliform, Fecal	200	col/100 mL	5/25/93	9222 D

RECEIVED
SIMPSON GROUP
SAN ANTONIO

JUN [illegible]

Approved by:

Chuck Wallgren

Chuck Wallgren
Owner

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 28722

Enter cation results in mg/l

mg/l Iron:	0.27	me/l Iron:	0.0097
mg/l Ca :	95.00	me/l Ca :	4.7405
mg/l Mg :	9.00	me/l Mg :	0.7398
mg/l Na :	7.00	me/l Na :	0.3045
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.01	me/l Mn :	0.0004
		Sum Cations(me/l):	5.7949

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	351.00	me/l HCO3:	5.7564
mg/l SO4 :	13.00	me/l SO4 :	0.2704
mg/l Cl- :	11.00	me/l Cl- :	0.3102
mg/l Fl- :	0.32	me/l Fl- :	0.0168
mg/l NO3 :	0.08	me/l NO3N:	0.0013
		Sum Anions (me/l):	6.3551

%ERROR = : -4.6107

POLLUTION CONTROL SERVICES

435 Isom Road, Suite 228 San Antonio, TX 78216 (210) 340-0343

REPORT OF SAMPLE ANALYSIS

To: David Givler
Gaddis Simpson Engineers
7073 San Pedro
San Antonio, TX 78216

CLIENT INFORMATION	*LABORATORY INFORMATION*
Project Name:	**PCS Sample #:** 28708
Sample ID: PLEASANT VALLEY RUNOFF	**Date Rec'd:** 5/24/93
Date Taken: 5/24/93	**Time Rec'd:** 1545
Time Taken:	**Report Date:** 6/1/93

TEST DESCRIPTION	SAMPLE RESULT	UNITS	DATE ANALYZED	METHOD USED
pH	8.1	S.U.	5/24/93	4500-H+ B
BOD5	2	mg/L	5/24/93	5210 B
TSS	13	mg/L	5/25/93	2540 D
Ammonia-N	<0.1	mg/L	5/25/93	4500-NH3 B/E
Phosphate, Ortho	0.216	mg/L	5/25/93	365.4
Conductivity,Specific	128	umhos/cm	5/25/93	120.1
Total Dissolved Solids	92	mg/L	5/25/93	160.1
Iron	1.27	mg/L	5/25/93	200.7/6010
Calcium	24	mg/L	5/31/93	200.7/6010
Magnesium	0	mg/L	5/31/93	200.7/6010
Hardness as CaCO3	60	mg/L	5/31/93	330.2
Sodium	<1	mg/L	5/31/93	200.7
Manganese	0.01	mg/L	5/25/93	200.7/6010
Alkalinity, Total	60	mg/L	5/31/93	310.1
Alkalinity, Bicarbonate	73	mg/L	5/31/93	2320 B
Sulfate	9	mg/L	5/25/93	4500-SO4 E
Chloride	1	mg/L	5/25/93	4500-Cl B
Fluoride	0.36	mg/L	5/26/93	340.1
Nitrate-N	0.21	mg/L	5/31/93	352.1
Coliform, Fecal	4000	col/100 mL	5/24/93	9222 D
Iron, Diss(1.2 Micron Filter)	0.87	mg/L	6/2/93	200.7/6010

Approved by:

Chuck Wallgren

Chuck Wallgren
Owner

Pollution Control Services
Mineral Analysis QA Check - Stabler Formula

PCS Sample#: 28708

Enter cation results in mg/l

mg/l Iron:	1.27	me/l Iron:	0.0455
mg/l Ca :	24.00	me/l Ca :	1.1976
mg/l Mg :	0.00	me/l Mg :	0.0000
mg/l Na :	0.99	me/l Na :	0.0431
mg/l K :		me/l K :	0.0000
mg/l Mn :	0.01	me/l Mn :	0.0004
		Sum Cations(me/l):	1.2866

Enter anion results in mg/l

mg/l CO3 :		me/l CO3 :	0.0000
mg/l HCO3:	73.00	me/l HCO3:	1.1972
mg/l SO4 :	9.00	me/l SO4 :	0.1872
mg/l Cl- :	1.00	me/l Cl- :	0.0282
mg/l Fl- :	0.36	me/l Fl- :	0.0189
mg/l NO3 :	0.21	me/l NO3N:	0.0034
		Sum Anions (me/l):	1.4349

%ERROR = : -5.4492

EXISTING FLOOD CONTROL DAM SITES & WATERSHEDS

NO.	S.A.R.A. STRUCT. NO.	DRAINAGE AREA (ACRES)	APPROX. ANNUAL YIELD[1] (ACRE-FEET)
1.	1	7,535	377
2.	2	3,294	165
TOTALS		10,829	542

POTENTIAL DAM SITES & WATERSHEDS*

NO.	DRAINAGE AREA (ACRES)	APPROX. ANNUAL YIELD[1] (ACRE-FEET)
1.**	10,930	547
2.	11,388	569
3.**	5,968	298
4.**	3,082	154
5.**	3,287	164
6.	13,934	697
7.	3,496	175
TOTALS	52,085	2,604

1 POTENTIAL DAM SITE & WATERSHED

1 EXISTING DAM SITE & WATERSHED

EXISTING IMPOUNDMENT WITH SURFACE WATER RIGHT

WATER SAMPLE LOCATIONS

POTENTIAL REUSE SITE

EXISTING REUSE SITE

EDWARDS AQUIFER RECHARGE ZONE

STUDY AREA BOUNDARY

WATERSHED BOUNDARY

[1] SEE REPORT TEXT FOR AN EXPLANATION OF THE TERM "YIELD."

*DOES NOT INCLUDE SITE ON CIBOLO CREEK. SEE REPORT TEXT FOR MORE INFORMATION.
**LOCATED WITHIN THE APPLEWHITE RESERVOIR/LEON DIVERSION DAM WATERSHED.

Figure 10: Local Surface Water Resources For North Bexar County

Edwards Underground Water District
North Bexar County Water Resource Study
W.E. Simpson Company Inc.
Wm. F. Guyton Associates, Inc.