

**ALDINE IMPROVEMENT DISTRICT
WATER & WASTEWATER PLANNING STUDY**



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SECTION 1. GENERAL

1.1 Location

The Aldine Improvement District (Aldine ID), located in unincorporated Harris County, Texas, encompasses an area of 14.79 square miles north of downtown Houston and is generally bound by Little York Road, Hardy Toll Road, Aldine Bender Road (FM 525), Homestead Road and Hirsch Road (3/4 miles east and parallel to US Highway 59). Aldine ID is surrounded on the north, east and south sides by the City of Houston's boundary and by a 7 square mile unincorporated area to the west, hereinafter referred to as Aldine West. The combined 21.8 square mile area which includes Aldine ID and Aldine West is known as the Aldine area of Harris County. Exhibit 1 shows the location of the study areas which is surrounded on three sides by the City of Houston.

1.2 History

The Aldine community dates back to the 1800s when railroad companies established engine switching stations there for northbound routes. The stations served as convenient delivery points for dairy, cattle, and poultry producers. Area industry and infrastructure were built to support an agricultural economy.

Subsequent development near Aldine, however, has been less beneficial. Bush Intercontinental Airport, one of the largest airports in the U.S., was completed in 1968, and Greenspoint Mall and Beltway 8 both opened in the 1980s.

While all three contributed somewhat to growth in Aldine, their greater impact was to entice the City of Houston to annex large sectors of land north and west of Aldine. This action left a relatively rural community surrounded on three sides by the City and sandwiched between Houston's central business district and its major international airport.

Lacking essential city services - water, sewer, police, fire, or social - Aldine has since struggled to compete economically with its neighbors to the north, south, and west.

1.3 Characteristics of the Area

Much of the Aldine area is without community water and sewer facilities and rely on individual water wells and on-site sewage facilities (OSSF). Most of the OSSF's are of the conventional septic tank/absorption trench type and many are in a state of failure. As a result, health hazards and environmental degradation problems in Aldine are common.

1.4 Demographics

As of 1997, 60 percent of the population in Aldine earned an average annual income below \$30,000. In 2002, unemployment was 6.3 percent, 0.5 percent higher than the state average.

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Aldine ID has estimated the 2000 population within the district to be 50,195, while the population in the Aldine West area has been estimated at 24,720 in that same year.

Aldine experienced a major shift in ethnicity during the 1980s, with whites representing 60 percent of the population in 1980 and Hispanics representing 47 percent by 1990.

The district is home to the 10th largest school district in Texas. Although persons over the age of 25, without a high school diploma, remain high (37 percent), those acquiring a college degree rose from 6 to 14 percent between 1990 and 2000.

Sixty-five percent of all homes in Aldine were built between 1960 and 1980. The rate of home ownership in Aldine is higher than in Harris County, however, home values are drastically lower than in other areas of the county.

The developed areas of Aldine that do have public water and sewer service include both utility districts and investor owned utilities (IOUs), most of which are 30 to 40 years old and are in poor physical condition.

Drainage for the Aldine study area is provided primarily through the Greens Bayou and Halls Bayou Watersheds. Much of the area adjacent to the bayous is subject to flooding.

1.5 Planning Grant

Aldine ID received a Texas Water Development Board Planning Grant to develop a regional plan for providing water supply and wastewater treatment facilities to serve the area within its boundaries (Service Area). State Representative Kevin Bailey has provided invaluable assistance by identifying critical areas where constituents are in need of public water and sewer services and by enlisting the support of Harris County and the City of Houston.

The Harris County Public Infrastructure Department, Engineering Division has supported this study by supplying base mapping data and by furnishing staff to evaluate existing OSSF's within Aldine ID. Bracewell & Patterson LLP has provided pro bono legal services to assist in developing the legal and financing concepts needed to implement the plan. Aldine ID has provided staff to coordinate committee meetings and public meetings during the course of the study, as well as having its attorney involved in the study. Engineering services for the study have been provided by WaterEngineers, Inc. under a contract with the Aldine ID.

Much prior effort has gone into planning for the water supply and wastewater treatment needs of the Houston area. Until the Aldine ID was created, no agency existed to provide community input to the city, county or regional planning efforts or to assist in the implementation of plans in the service area.

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1.6 Plan Objective

The plan presents a basis for quantifying water supply and wastewater collection and treatment needs for the Aldine study area, develops a plan for providing public water and sewer services in the Aldine ID service area, and sets forth the alternatives for funding the capital and operating costs for the facilities, as well as possible mechanisms for operating and managing the system.

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SECTION 2. EXECUTIVE SUMMARY

The combined Aldine ID and Aldine West area, with a population of almost 75,000, is a 21 square mile unincorporated area next to the City of Houston. This area was long ago passed over for annexation because it did not have property values sufficient to produce the necessary taxes to pay for city services. About half of the Aldine area is without public water and sewer service facilities and was developed relying on individual water wells and septic systems. Of the public systems that exist, many are over 30 years old and badly need repair or replacement.

There are several neighborhoods in the Aldine ID in immediate need of water and/or sewer service. Harris County estimates that the district includes 4,619 individual septic systems; 1,385 of the systems are failing and 2,401 of the systems are on lots that are too small or otherwise unsuitable for onsite septic systems. Most of the residences with unsuitable systems have shallow, improperly constructed water wells that are contaminated by the failed septic systems.

The projected year 2055 average daily water demand in Aldine ID is 8.85 MGD with a peak day requirement of 13.3 MGD. It is estimated that approximately 77% of the total demand must come from surface water. To meet that need, a looped water transmission line connected to the City is needed. The line sizes of this loop vary from 24 inches to 16 inches in order to carry the maximum day flow needed in the Aldine ID and Aldine West areas.

The capital cost of facilities needed to transport surface water into the district is over \$23 million, including the cost of sizing the line to meet the needs of the Aldine West area. In order to meet Harris-Galveston Coastal Subsidence District (HGCSA) requirements, the line must be functioning by the year 2020 and must be completed by 2030.

In addition, water storage and repumping facilities must be constructed to receive the surface water and send it on to customers. Water distribution lines must be constructed in areas that do not currently have public water service available. Constructing water lines in existing heavily congested road right of ways will be expensive. Water distribution line capital costs are estimated to be \$29 million.

The wastewater treatment capacity to serve the presently unserved areas of Aldine ID is estimated to be 7.5 MGD. Adding the unserved areas of Aldine West increases it to almost 13 MGD. This plan recommends constructing new interim wastewater treatment plants to service the near-term sewer needs of the district. For the long term a regional solution is believed to be necessary in which wastewater will be conveyed to City of Houston wastewater treatment plants through large diameter trunk sewers. Cooperation between the District and the City will be a must in order to achieve the ultimate regional wastewater treatment solution. Costs for wastewater treatment capacity are projected to be over \$55 million.

Wastewater collection lines (sewers) must be extended to unserved areas and are perhaps the most expensive piece of the system. The only location left in many road right of ways is under the existing pavement. Not only is sewer construction made more expensive by the significant congestion and

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traffic control necessary, but roadways must be rebuilt after the sewers are in place. Wastewater collection project costs are estimated to be \$83.8 million.

The recommended water & wastewater implementation plan includes phased improvements that will require estimated funding over the next 50 years as noted below:

Phase 1	2005-2015	\$ 79,152,554
Phase 2	2015-2035	\$ 69,337,285
Phase 3	2035-2055	\$ 53,734,468
<u>Total</u>	<u>2005-2055</u>	<u>\$202,224,307 (*)</u>

(*) - all cost estimates are in 2004 \$USD

The proposed Phase 1 projects are estimated to cost almost \$80 million and are scheduled to be implemented over the next 10 years. Since it is highly unlikely that funding for the projects will come entirely from grants, TWDB loan funding will be the best available option for some of the projects.

The plan recommends that Aldine ID create a local government corporation (LGC), either independently or together with Harris County, to coordinate the water and sewer utility development on behalf of the District. In fact as a result of this study, the Aldine Improvement District Board has created the recommended LGC, and it is called the Aldine Water & Sewer Authority. The District is working closely with Harris County on several water/sewer projects being funded under the community development block grant program and will be constructed in 2005-2006.

In essence this plan has already begun to be implemented. Harris County is using Community Block Grants to provide a sewerage system in the Tasfield community, as well as a water supply and sewerage system in the North Houston Heights subdivision. The Tasfield community already has public water supply from an investor owned utility (IOU). Engineering plans are complete for both projects and construction of one or both is expected to begin in 2005.

A condition of Harris County to fund these and future projects is that there be an agency in place prepared to operate and maintain the systems. The Aldine ID Board has responded by creating an LGC called the Aldine Water & Sewer Authority (AWSA). AWSA will be responsible for seeing that water and sewer facilities are operated and maintained and for billing and collection of user fees.

AWSA administrative funding will come from Aldine ID until such time that water and sewer income is sufficient to pay the operating overhead. Aldine ID will continue to control AWSA in that the directors of AWSA will be appointed by the Aldine ID. AWSA is expected to begin operation in January 2005.

An opportunity exists to enhance the value of the new Tasfield and North Houston Heights systems that are being constructed by purchasing two existing IOU's from willing sellers. Approximately \$300,000 will be needed to complete the purchase of the two systems. These funds cannot come from the grants and would have to be funded separately.

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SECTION 3. DATA ACQUISITION

3.1 City of Houston Planning Studies & Facilities

3.1.1 Houston Water Master Plan

It was anticipated that much of the effort in preparing the District's water supply plan would be to extract information from the City of Houston's most recent Water Master Plan (HWMP) and to determine priorities and funding requirements. The City has been preparing to serve as the regional water supplier since the 1950's. Part of the HWMP included constructing the Northeast Water Treatment Plant on Lake Houston. That facility is nearing completion and the transmission lines to transport the treated surface water to the vicinity of Aldine I. D. are complete.

The most recent HWMP does not include estimates of water demands in the Aldine area, nor does it address transmission lines, water storage and pumping facilities or distribution lines in Aldine.

3.1.2 Houston Wastewater Planning Studies

The 1979 "Master Plan For The Orderly Development Of Sewerage Facilities For The North Houston Area" was prepared for the City of Houston by Binkley & Holmes, Inc. The study called for transporting wastewater from the Aldine Bender Road area to a proposed regional treatment facility on Smith Road, which is the location of the existing City of Houston North Belt Regional WWTP.

The Plan also called for wastewater in the area south of Greens Bayou to be routed south and east to a proposed regional wastewater treatment facility to be located near the intersection of Hirsch Road and Little York Road. The City subsequently purchased a 20 acre tract at that location, but recently turned it over to the Houston Parks & Recreation Department. Indications are that the site is too small to meet current City criteria for a regional wastewater treatment facility. In meetings with the city, it was determined that the city has no intention of developing a wastewater treatment plant on that site.

Subsequently a 1988 study entitled "City of Houston Wastewater System Design and Operating Strategy - Facility Plan And Water Quality Management Strategy" was prepared by Pate Engineers, Inc./Espey, Huston & Associates, Inc., A Joint Venture. The consultants evaluated the needs for providing sewer service in the City's extraterritorial jurisdiction (ETJ) areas.

One premise of the plan is that it is more economical to operate wastewater treatment facilities that are at least 5 MGD capacity and that smaller facilities should be abandoned and the wastewater conveyed to a sub-regional treatment plant location. The plan anticipated that the city of Houston would require utility districts to construct the sub-regional treatment facilities as development occurred, in lieu of allowing the proliferation of smaller package plants. The city's ETJ power is mainly used when new development occurs in utility districts that propose to sell bonds to finance public improvements, which has not happened in the Aldine area.

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The 1988 Plan proposed two new treatment plant locations along Greens Bayou (Design capacities of 7.5 MGD and 10.0 MGD) and two along Halls Bayou (Design capacities of 5.0 MGD and 10.0 MGD). The total ultimate design capacity of 32.5 MGD would allow abandonment of all existing wastewater treatment plants in the Aldine ID service area. That capacity is based on ultra-high density development.

3.1.3 Existing Surface Water Treatment & Transmission Facilities

The city of Houston, under the auspices of a Local Government Corporation, is in the process of constructing the Northeast Water Treatment Plant (WTP). The plant will treat water from Lake Houston and its initial design capacity is 40 MGD. In addition the city is constructing an 84 inch water transmission line from the Northeast WTP to the vicinity of Hirsch Road and the North Sam Houston Tollway East (Beltway 8). The city has already constructed a 42 inch water transmission line along Hirsch Road from Beltway 8 to tie into their distribution system in the vicinity of Little York Road.

The city has installed outlet connections on the Hirsch Road transmission line in the following locations:

- Hirsch Road @ Aldine Bender Road – 42 inch tee facing west
- Hirsch Road @ Lauder Road – 30 inch tee facing west
- Hirsch Road @ Mount Houston – 24 inch tee facing east

3.2 Houston Galveston Area Council

3.2.1 Wastewater Planning Studies

In 2000, the Houston-Galveston Area Council (HGAC) published its “Domestic Wastewater Regionalization White Paper” in cooperation with the Texas Natural Resource Conservation Commission, now the Texas Commission on Environmental Quality (TCEQ) and the USEPA. In this treatise, HGAC recommends that a proactive wastewater treatment regionalization policy be set in place under a “Regional Authority,” modeled on the subsidence issue and the Harris Galveston Coastal Subsidence District.

Although the City of Houston is identified as a logical entity to implement a regional wastewater collection and treatment policy, it is recognized that City of Houston funds could not be spent in the ETJ and that neither the City nor Harris County is in a position to tackle regional issues.

3.2.2 Population Projections

Year 2000 population data were obtained and the calculations and estimates are presented in Table 1. Aldine ID had a population of 49,821 and Aldine West had a population of 23,966.

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3.3 Texas Commission on Environmental Quality

3.3.1 Existing Utility Districts

Although the TCEQ regulates the creation and operation of utility districts, their public access database does not include detailed boundary information. Existing utility districts were located using a City of Houston Planning Department map obtained from the City. The boundaries of the existing utility districts are shown on the public water system map in Exhibit 2 and the public sewer system map in Exhibit 3.

3.3.2 Existing Investor-Owned Utilities

The TCEQ regulates investor owned utilities (IOU) and issues each utility a Certificate of Convenience and Necessity (CCN), giving each IOU the exclusive right and obligation to provide water and/or sewer service to a specific service area. Separate CCN's are issued for water supply and sewer service areas. The locations of IOU CCN areas were obtained from maps obtained from the TCEQ Rate Analysis/Plan Review Section of the Water Permits & Resource Management Division. The CCN locations are shown on the public water system map in Exhibit 2 and the public sewer system map in Exhibit 3.

3.3.3 Existing Public Water Supply Utilities

Information on the facilities and customers of each public utility were obtained from the TCEQ online database, which may be found at <http://www3.tceq.state.tx.us/iwud/>. Table 2 presents a summary of the data obtained.

3.3.4 Existing TCEQ Permitted Wastewater Treatment Plants

Data on the locations and permitted capacities of existing wastewater treatment facilities located in the Aldine area were provided by the Houston Region 12 office of the TCEQ. The data on the actual flows discharged by each permitted facility were obtained from the TCEQ Customer Reports and Services Section, Information Resources Division, Office of Administrative Services.

Table 3 presents the permittee and flow data on existing permitted wastewater treatment plants in the Aldine ID service area. Table 3.1 lists the data for the Aldine West area and Table 3.2 presents the data for treatment plants located within the City of Houston. The locations of all of the treatment facilities are shown on Exhibit 3.

3.4 Existing Public Utility Infrastructure Plans

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Engineering plans for water and sewer lines are held by individual utility districts. No attempt was made to obtain copies of such plans as analysis of their adequacy was outside the scope of this study. In addition, those districts that were contacted offered the attitude that water and sewer facilities internal to utility districts is the responsibility of each district and not a matter that needed to be studied by an outside entity. From there it was decided that the study would only include quantification of water and sewer needs and the facilities needed to transport services to the boundary of the districts.

3.5 Harris Galveston Coastal Subsidence District

3.5.1 Regulations Affecting Groundwater Use

Current HGCSO regulations require major groundwater users (> 10 MG/year) in the Aldine area to reduce dependence on groundwater by 30 % in the year 2010, by 70 % in 2020 and by 80 % in 2030. In addition, each major user was required to have an approved groundwater reduction plan (GRP) by January 2003. In most cases reduction of groundwater use means replacing groundwater with treated surface water.

The City of Houston owns most of the water withdrawal rights for surface water in the Houston area, as well as most of the surface water treatment plant capacity. Ultimately the surface water needed to replace existing groundwater usage in Aldine will come from the City of Houston's surface water facilities.

HGCSO regulations allow groundwater users to trade surface water conversion credits so that some users may not have to switch to using surface water, but may contract with other users who do convert to surface water in excess of the required amount. The City of Houston is the party that most Aldine area utilities have contracted with to trade groundwater credits.

Virtually all large groundwater users in the Aldine area have joined the City of Houston GRP and have begun paying the City an amount equal to \$0.34 per 1,000 gallons of groundwater pumped, the equivalent cost of 30 % of the City's current wholesale water rate of \$1.13 / 1,000 gallons.

3.5.2 Aldine Area Permitted Water Well Pumpage

HGCSO requires that all commercial wells be permitted, as well as all water wells with a casing diameter greater than 5 inches. Data on the location and annual pumpage of permitted groundwater wells in the Aldine vicinity for the year 2001 were obtained from HGCSO and are tabulated in Table 4. The users were divided into two groups, one with an annual groundwater pumpage of less than 10 million gallons (MG) and the other with annual groundwater pumpage exceeding 10 MG. Total annual groundwater pumpage in the Aldine study area (Aldine ID + Aldine West) was 2,228 MG, an equivalent annual average daily flow of 6.1 million gallons per day (MGD). Of the groundwater pumped by permitted users, over 90 % of the total flow was from users in the greater than 10 MG/year category.

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In addition to the permitted wells, there are probably several thousand small casing diameter, shallow, residential wells in the Aldine area with undocumented usage. Unless HGCSD regulations change, residential wells will continue to provide groundwater to small users in the Aldine area. If there are 2,000 residential wells pumping an average of 400 gallons per day (gpd), the total withdrawal would be 292 MG/year (0.915 MG/day), which is about 13 % of the HGCSD permitted withdrawals.

3.6 Texas Water Development Board

3.6.1 Water Use Projections

The TWDB has sponsored regional water planning efforts over the state with the Houston area falling into Planning Region Area H. Water use predictions for the study were developed based on the type of user and were not geographically based. Therefore, no data from the Region H Group study was available.

3.6.2 Grant/Loan Program Eligibility

Low interest TWDB loans are available to upgrade and expand publically owned water and sewer facilities. IOU's are not currently eligible to participate in the loan programs. A complete discussion of the financing options may be found in Section 6.3.

3.7 San Jacinto River Authority

The San Jacinto River Authority was contacted regarding any planning studies that they may have conducted for the Aldine area. They indicated that they do not operate in that area.

3.8 Location of Floodway and Flood Plain Areas

Exhibit 4 shows the locations of the floodway and 100 year flood plain areas in Aldine ID and Aldine West. A significant portion of the land in the Aldine area adjoining Greens Bayou and Halls Bayou is within the 100 year flood plain and several areas are included in the Federal Emergency Management Agency (FEMA) sponsored buyout program.

FEMA is now revising the flood plain maps in Harris County and it is generally thought that additional areas will fall within the 100 year flood plain. At the same time, flood control projects are underway that are anticipated to remove some areas from the flood plain.

3.9 Description of the Unserved Areas in Aldine ID

Aldine ID has been divided into eleven service zones for convenience in preparing and presenting the service plan. Table 5 shows the computation of the acreage of areas with and without public water supply and sewer service in Aldine ID. Each area is unique in its character and needs. The service zone locations, characteristics and some information pertaining to existing service providers follows:

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3.9.1 Service Zone 1

Service Zone 1 (SZ-1) is generally bound by Aldine Bender Road, property lines half way between Chrisman Road and Reeveston Road, Harris County Flood Control Ditch (HCFCD) No. P138, and the Hardy Toll Road. SZ-1 is the northwestern most area of Aldine Improvement District and can be located on Exhibit 7.

SZ-1 has an area of approximately 493 acres and includes Morales Cemetery and subdivisions such as Excelsior Gardens and Aldine Townsites. Excelsior Gardens and Aldine Townsites are located in the northwest corner of SZ-1.

In general, tracts of land in SZ-1 are relatively large and land use is primarily commercial. The southeast corner of SZ-1 is currently shown to be within the 100-year flood plain. There is no significant development within the flood plain.

Exhibit 4 shows the location of the one area within SZ-1 that was evaluated in the OSSF inspection program. Table 6 indicates that the results of the OSSF evaluation in the Excelsior Gardens Subdivision had 5 out of 58 sewer systems that were unable to correctly handle the current sanitary needs.

Exhibits 2 and 3 show the existing public water and wastewater service providers in Aldine ID. There is not presently any public water or sewer service available in SZ-1. The only privately owned wastewater treatment plant in SZ-1 serves Boring Specialties, Inc.

3.9.2 Service Zone 2

SZ-2 is generally bound by Aldine Bender Road, property lines behind Maximilian Street, Greens Bayou, and property lines half way between Chrisman Road and Reeveston Road. SZ-2 is the northern part of the Aldine Improvement District located on the east side of SZ-1 as shown on Exhibit 7.

This Service Zone area is approximately 545 acres in size and includes the developed neighborhood of Aldine Place, which is located in the northeast corner of the SZ-2.

Lots in this area other than Aldine Place are relatively large and are primarily used for small businesses, churches and some single family residential dwellings. Approximately half of SZ-2, including Aldine Place, is presently shown to be located within the 100 year flood plain.

Although Aldine Place is developed into half acre lots, there are no public utilities available. Existing Aldine Place homes are served by onsite water wells and septic systems. The OSSF survey which is summarized in Table 6 shows that 35 of the existing 216 onsite sewer systems in Aldine Place have failed as shown on Exhibit 4.

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SZ-2 does not currently have public water or sewer service available. There are two privately owned wastewater treatment plants in SZ-2 serving KOA Houston North and United Structures of America.

3.9.3 Service Zone 3

Service Zone 3 is generally bound by HCFCD No. P138, Chrisman Road, property lines between Isom and Aldine Mail Road, Aldine Westfield Road, Halls Bayou and Hardy Toll Road. SZ-3 is located along the central western boundary of the Aldine ID and can be located on Exhibit 7.

The area of SZ-3 is approximately 704 acres, and it includes neighborhoods such as Aldine Gardens, Slater Parker, Bergville, Greenwood and Civic Place.

In general, developed tracts in this area are relatively large and are used for small businesses or residential housing. A large area on the south side of SZ-3 along Halls Bayou is located in the 100 year flood plain. A smaller area in the north along HCFCD P138 is also in the flood zone.

Exhibits 2 and 3 show the existing public water and wastewater service providers in Aldine ID. Existing public water utilities include Greenwood Place Civic Club, Inc. (CCN # 12544) and Champs Water Company, Inc. (CCN # 10972). The only existing public sewer service is provided by Champs Water Company (CCN # 20385). Other than the small areas served by the two CCN's, this section is not served with public water or sewer.

Harris County surveyed the existing on-site sewage facilities in Aldine ID and found 23 out of 239 septic systems failed in the north part of the area (Exhibit 4 and Table 6). Failed systems are typically found in the low lying flood zone areas.

The lone privately owned wastewater treatment plant in SZ-3 is an industrial wastewater treatment plant serving the Ashbrook Corporation.

3.9.4 Service Zone 4

Exhibit 7 shows the location of Service Zone 4, which is located in the west central part of Aldine ID adjacent to SZ-3. It is generally bound by HCFCD No. P138, HCFCD No. P138-02, property lines behind Rockshire, Charriton, Russ, Aldine Mail Road, Fall Meadow, Keith-Weiss Park, property lines between Isom and Aldine Mail Road, and Chrisman Road.

The area of SZ-4 is approximately 1,047 acres in size. The two developed residential neighborhoods include Castlewood and Magnolia Gardens. Other than these two developed neighborhoods, SZ-4 generally consists of relatively large acreage tracts that are vacant or are used for small commercial or large lot residential housing. The northern portion of SZ-4 along HCFCD No. P138, including about half of Castlewood Subdivision is located within the 100 year flood plain.

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Exhibits 2 and 3 show the existing public water and wastewater service providers in Aldine ID. Castlewood receives public water service from Suburban Utility Company (CCN # 10835) and Magnolia Gardens is served both public water and sewer service by Champs Water Company, Inc. (CCN # 10972/ # 20385).

Other than the Magnolia Gardens area, SZ-4 has no public sewer service. Harris County surveyed the existing on-site sewage facilities and found 44 out of 312 onsite sewer systems failed in the Castlewood area and 14 failed systems out of 246 surveyed in other areas (Exhibit 4 and Table 6).

Non-public service wastewater treatment plants in SZ-4 include Bayou Forest Village Mobile Home Park WWTP, Ana Johnson Mobile Home Park WWTP and the Aldine ISD Chrisman WWTP.

3.9.5 Service Zone 5

Service Zone 5 is generally bound by Halls Bayou on the north and east, Little York Road, Trenton, and the Hardy Toll Road. SZ-5 is the southwest area of Aldine ID and can be located on Exhibit 7.

The area is approximately 1,041 acres and it includes the neighborhoods of Virginia Acres, International Westfield Manor, Lindale Farms, Oakwilde, Castledale, Greenwood Village, Westfield Estates, Woodsdale, Walden Place, Hardy Heights, Stettner, Allen & Fondren, Hy Point and Hahl Sites.

Much of the area in SZ-5 has been developed into small residential lots. While most of these have public water service, only a small area has public sewer service. Significant portions of SZ-5 (north and east) along Halls Bayou are in the 100 year flood plain.

Exhibits 2 and 3 show the locations of existing public water and sewer service providers in the Aldine ID. Public utility providers include Southwest Utilities Inc. (Water CCN # 11740), Hartwick Green Wastewater Company (Sewer CCN # 20851), and Sunbelt FWSD (Water CCN # 10833/ # 20347). Although Sunbelt includes a very large part of SZ-5 in its CCN, it does not actually provide sewer service there.

Exhibit 4 and Table 6 show that the OSSF survey found 500 out of 1,535 onsite sewer systems to be in a state of failure in SZ-5. Failed systems are spread throughout the area and are especially common in subdivisions with small lots in the flood zone.

Privately owned wastewater treatment plants in SZ-5 serve the Sundown Mobile Home Park and the Hooks Mobile Home Park.

3.9.6 Service Zone 6

Service Zone 6 lies is the north central part of Aldine ID and is generally bound by Aldine Bender Road, John F. Kennedy Blvd. (following City of Houston boundary lines) and Greens Bayou on both

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the south and west. The area as shown in Exhibit 7 is isolated from the rest of Aldine ID by Greens Bayou and the City of Houston boundary.

The area of SZ-6 is approximately 360 acres and it includes the Interbelt North Business Center, which is totally within Harris County MUD 182 (CCN # P0981). HCMUD 182 has its own groundwater supply plant and wastewater treatment plant, but is negotiating with the City of Houston to replace their well with a water line connection to the City and their WWTP with a force main to the City sewer system.

Exhibits 2 and 3 show the locations of existing public water and sewer service providers in the Aldine ID.

In addition to HCMUD 182, SZ-6 includes a commercial subdivision called Aldine City which is not fully developed. The lots are relatively large and are predominately planned for use for commercial enterprises.

The Harris County survey of onsite sewer facilities, which may be found in Exhibit 4 and Table 6, found four of seven existing onsite sewer systems to be failed.

3.9.7 Service Zone 7

Service Zone 7 is generally bound by Aldine Bender Road, Lee Road, U.S. Hwy 59, Greens Bayou and Sequoia Bend Boulevard. The area is located in the northeast part of Aldine ID and can be located on Exhibit 7.

The area of this section is approximately 311 acres and it includes Sequoia Estates (totally contained within Sequoia ID, CCN # P0445) and the adjacent neighborhood of Parkwood Estates. The southern part of the SZ-7 adjacent to Greens Bayou is within the 100 year flood plain.

Exhibits 2 and 3 show the locations of existing public water and sewer service providers in the Aldine ID. Sequoia ID provides water supply and sewer service to the area within its boundary. The Parkwood Estates lots are residential and relatively small, relying on individual wells and OSSF systems.

The Harris County OSSF survey included in Exhibit 4 found 111 of 235 existing onsite sewer systems to be failed (Exhibit 4 and Table 6).

3.9.8 Service Zone 8

Service Zone 8 is generally bound by Greens Bayou, U.S. Highway 59, Little York Road, Bentley Street, Kowis Street, Halls Bayou, Keith-Weiss Park, Fall Meadow Drive, Aldine Mail Road, Russ Drive, Charriton Drive and HCFCD # P138-01. SZ-8 is the largest of the Service Zone areas, fronts the west side of US Hwy 59 and is delineated on Exhibit 7.

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The area of SZ-8 is approximately 2,803 acres and it includes Brookside Memorial Park Cemetery, Schloboum Cemetery, Crowley Park and James Driver Park.

Significant areas within SZ-8 that adjoin Greens Bayou on the north and Halls Bayou on the south are shown to be within the 100 year flood plain.

Exhibits 2 and 3 show the locations of existing public water and sewer service providers in the Aldine ID. Approximately 74 % of the area within SZ-8 has public water service from utility districts which include Sunbelt FWSD (CCN # 10833/ # 20347) and Harris County WCID 74 (CCN # P0294) or by IOU's including Southwest Utilities, Inc., (CCN # 11740/ # 20581), Mount Houston Utilities (CCN # 12870/ # 20844), and Orange Grove Water Supply (CCN # 10895). Public sewer service is provided in approximately 63 % of SZ-8

It should be noted that about half of the CCN area held by Southwest Utilities, Inc. is not provided with sewer service. The area without service generally includes the eastern half of the CCN bordering US Highway 59.

The unserved areas within SZ-8 include the neighborhoods of Orange Grove Britton, North Houston Heights, Lanewood Place, Heartly Acres, Lonoke Place and Tasfield. Within these areas, the Harris County OSSF survey found 136 of 410 systems to be in violation (Exhibit 4 and Table 6).

The only non-public service wastewater treatment plant in this area is the Aldine ISD WWTP serving the Orange Grove Elementary School.

3.9.9 Service Zone 9

Service Zone 9 is located along the upper eastern boundary of Aldine ID and is generally bound by Greens Bayou, Homestead Road, Hirsch Road, East Hampton Drive, Aldine Mail Road and U.S. Hwy 59. Exhibit 7 shows the location of the area.

The area of SZ-9 is approximately 478 acres and it includes the neighborhoods such as Carol Place, Homestead Woods, Hillside Gardens and Kenwood Place that are without public water and sewer service. The northern part of this section is in the 100-year flood plain.

Exhibits 2 and 3 show the locations of existing public water and sewer service providers in the Aldine ID. Included in this area is Pine Village North Subdivision, which is included within the boundaries of Pine Village PUD (CCN # P0419). Pine Village PUD provides both public water and sewer service to tracts within its boundaries as well as to some outside tracts. Pine Village PUD has negotiated a contract to purchase surface water from the City of Houston from the City's new 42 inch surface water main along Hirsch Road.

In Exhibit 4 and Table 6, the Harris County OSSF survey found 60 of 228 existing onsite sewer systems in SZ-9 to have failed.

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3.9.10 Service Zone 10

Service Zone 10 is located on the eastern edge of Aldine ID and has US Hwy 59 as its western boundary. This area is generally bound by Aldine Mail Road, East Hampton Drive, Hirsch Road, Sam Houston Street, and U.S. Hwy 59. Exhibit 7 shows the location of SZ-10.

The area of SZ-10 is approximately 386 acres and it includes neighborhoods such as Northington and Lyncrest.

Development in the northern part of the area consists mostly of large commercial tracts. A few of these tracts have utility service from Pine Village PUD, although they are not within the district's boundaries. The area to the south includes a large lot residential subdivision along with an elementary school, a large rental mobile home park and large commercial tracts. The elementary school receives water and sewer services from the City of Houston via a water main extension and sewage lift station and force main.

There are no existing public water and sewer systems located in SZ-10, as depicted in Exhibits 2 and 3, respectively. The only wastewater treatment plant located in SZ-10 is privately owned and serves the Acorn Mobile Home Park.

Exhibit 4 and Table 6 show the results of the Harris County evaluation of onsite sewer facilities in Aldine ID which found 57 of 221 existing onsite sewer systems in SZ-10 to be in violation of County standards.

3.9.11 Service Zone 11

Service Zone 11 is generally bound by Sam Houston Street, Hirsch Road, Langley Road, and U.S. Hwy 59. The area lies in the southeast corner of Aldine ID and has U S Hwy 59 as its western border as shown on Exhibit 7.

This section contains approximately 679 acres. It includes neighborhoods such as Wright Loan & Security, Gish Subdivision, Inwood, Darden, Melwood Place, Benton Place, Emerson Place and Sherwood. There are no public water or sewer systems in SZ-11 as shown in Exhibits 2 and 3, respectively.

Land use in the area includes mostly small to medium lot residential use along with some commercial use along U S Hwy 59. Approximately half of the land in SZ-11 is shown to be in the 100 year flood plain.

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The Harris County OSSF evaluation data included in Exhibit 4 and Table 6 found 379 of 808 existing onsite sewer systems in SZ-11 to be in violation of County standards.

The only wastewater treatment plant located in SZ-11 serves a McDonalds Restaurant at the intersection of US Hwy 59 and Little York.

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SECTION 4. WATER & WASTEWATER USE ANALYSIS & NEEDS PROJECTIONS

4.1 Status of Existing On-Site Sewage Facilities

The initial scope of work included using volunteer members of the Texas On-Site Wastewater Association (TOWA) to evaluate existing OSSF systems. Harris County elected to use their own trained Permit Department personnel to do the inspections to avoid issues of whether volunteers would have the legal right to enter onto private property.

Table 6 presents the summary of the OSSF inspections performed by Harris County personnel. Over 4,500 systems in Aldine ID were evaluated. Most of the existing OSSF's are older than 10 years old and are conventional septic tank and field absorption line type systems.

County inspectors found 1,381 OSSF systems that were failing and 2,393 of the 4,565 were noted as being unsuitable due to failure, poor soil conditions, proximity to wells, or lack of sufficient treatment or disposal area. Table 6 groups the evaluations by subdivision and is sorted with the subdivisions with the highest numbers of failing systems being first in the table. The data also includes a calculation of the percentage of systems evaluated that are failing to enable the reader to compare the severity of the problems in each area.

Based on the data, there is a significant increase in the number of failed systems in small lot subdivisions located within the 100 year flood plain.

4.2 Status of Existing Individual Water Wells

Although the initial scope of the study included a proposal to sample individual residential water wells for bacteria during the course of the OSSF inspections, this was not done due to limited time availability of Harris County employees. Experience has shown that shallow individual wells constructed without full cementing of the casings and that are within 50 feet of a conventional septic system OSSF absorption field will almost always test positive for the presence of fecal coliform bacteria.

Testing for the presence of nitrate in the well water would be a better indication of septic system contamination. However, funds for testing for nitrate were not budgeted in the scope of the study. It is believed the vast majority of residential wells are subject to surface contamination due to the fact that most of the well casings were not pressure cemented during construction.

4.3 Availability of Population Data & Projections

As previously presented, the year 2000 population in the Aldine ID was estimated to be 49,821 and the year 2000 population in Aldine West was estimated to be 23,966. In lieu of using population projections for the future, a different approach was taken. Actually water use in areas that have been completely developed were analyzed. Then the ultimate demands of the study area were computed based on complete development of Aldine ID and Aldine West.

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4.4 Water Use Projections

Existing annual water demands for public utilities in the Aldine area are tabulated in Tables 7 and 7.1. The source of the water use data was HGCSO well permit reports and the source of the acreage used for calculations was measuring overall areas from the utility system map in Exhibit 2. The calculations indicate that the average annual water pumpage for public utilities was about 1,300 gpd/acre, with significant variations ranging from 360 gpd/acre to 2,628 gpd/acre.

The reasons for the disparities are probably related to inaccurate accounting for water use locations (utilities that have multiple service areas with multiple wells), partial development of service areas, and utilities serving significant numbers of customers outside their boundaries.

If water use were to be based upon potentially developing land into residential lots at four lots per acre using the TCEQ standard design of 400 gpd/connection, the predicted design water use would be 1,200 gpd/acre. If allowance is made for some higher density development, an average annual water use of 1,300 gpd/acre is considered reasonable.

Since HGCSO regulations will allow 20 percent of water use in the year 2030 to be from groundwater and there will be small commercial and residential wells that are not required to convert to surface water, the projected water use for the purposes of this study is 1,000 gpd/acre from surface water use (77 %) and 300 gpd/acre from groundwater use (23 %).

For the purposes of sizing surface water transmission lines, a maximum day value of 150 % of average annual usage or 1,500 gpd/acre was used. This rate assumes that surface water will ultimately be delivered to ground storage and re-pumping facilities designed to meet local diurnal flow requirements. The 1,500 gpd/acre maximum day value was used for existing public utilities, as well as for new services to presently unserved areas.

Using that analysis, the projected surface water requirement in the Aldine ID service area when completely developed is 8.85 MGD (13.27 MGD Peak Day). The projected surface water requirement of the entire Aldine study area when completely developed is 13.20 MGD (19.79 MGD Peak Day). The average annual projected water use in each service zone, including existing utility district and IOU demands, is shown in Table 8.

4.5 Status of Existing Water/Wastewater Infrastructure

Much of the infrastructure of existing Aldine area public utilities is considered to be in poor condition. Many of the systems were constructed in the 1960's and 1970's making them 30 to 40 years old. Many of the water and sewer piping materials used then have proven to be faulty; therefore many utilities have high maintenance budgets. Most water wells drilled in the 1960's and 1970's are nearing their useful lives and are in need of major repairs or replacement.

There are no existing wastewater treatment plants in Aldine adequately sited to make them capable of being expanded to a 4 MGD to 6 MGD sub-regional facility.

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4.6 Existing Wastewater Treatment Plant Compliance

The TCEQ has a new compliance history classification system that is supposed to provide an indication of overall system performance. The classification system includes all TCEQ permits including drinking water, wastewater treatment, hazardous wastes, landfills, injection wells, underground fuel storage and air quality. Most permitted Aldine utilities have only water and wastewater permits. Each wastewater treatment plant discharge permittee's rating is included in Table 3. (See <http://www.tnrcc.state.tx.us/enforcement/enforce/history/about.html>.)

TCEQ personnel indicate that compliance ratings between 0.1 and 40 are considered acceptable. Since all of the utilities in Aldine fall well within that range, the TCEQ compliance rating system does little to aid in determining the condition of the existing wastewater treatment facilities .

4.7 City of Houston Service Availability

4.7.1 Retail Services

The City of Houston provides retail water and sewer services to customers within the city boundaries and occasionally to customers outside the City. The procedure to obtain services requires submitting a request for services along with application fees based on site acreage. If approved for services, the City requires both water and sewer impact fees to be paid as a condition of service.

Typically retail services to outside city customers are on an individual basis, as the City does not want to provide retail services to large numbers of customers outside the city. The monthly service fees are 10 % higher than the City charges its customers inside the city. At one time the City had one of the highest water and sewer rates of any municipality in the state. However, the rate structure is set so that charges to customers using less than 3,000 gallons per month are very low. A proposed 9 % increase in city water and sewer rates is currently under consideration by the Houston City Council.

4.7.2 Wholesale Services

The City of Houston often provides wholesale water and/ or sewer services to utility districts and private utilities on a contract basis when it has capacity available. Customers have to install connecting lines for line extensions needed to obtain service.

In the past, the City has been more willing to provide water service than sewer service to outside users, but recently the City is responding with a willingness to accept wastewater for treatment at its plants that have excess capacity. For example, new utility districts on the west side of the City are responding to TCEQ required requests for service positively, indicating that the City is willing to provide wastewater treatment capacity for outside areas.

The current impact fees (capacity charges) the City charges for inside city water and sewer capacity are \$270 and \$945 per equivalent residential connection (315 gpd), respectively. This equates to

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\$0.857 per gpd of water supply capacity and \$3.00 per gpd of wastewater collection and treatment capacity based on the 315 gpd per connection allowance.

Currently the City charges \$1.13 per 1,000 gallons for wholesale surface water. This figure includes amortization for treatment plant and transmission charges. This value is expected to rise as the City's costs increase.

The City's monthly operating charges for sewer service are \$1.08 per 1,000 gallons if the wastewater is transported all the way to the treatment plant. The charge for discharging domestic wastewater into the City's sewer system is \$2.71 per 1,000 gallons, including the amortization allowance for the impact fee (capacity charge).

4.7.3 Water Supply Service to the Aldine Area

The City of Houston is in the process of constructing a new 40 MGD surface water treatment plant near Lake Houston, as well as an 84 inch transmission line to the vicinity of US Highway 59 and North Sam Houston Parkway East (BW 8). The City has already constructed a 42 inch transmission line along Hirsch Road that connects the 84 inch line to its distribution system near Hirsch Road and Little York Road. The City has indicated a willingness to allow withdrawal of surface water from the Hirsch Road line to serve the Aldine area.

Early in this study, the City was in the process of evaluating alternative routes for a new transmission line to move surface water from the Hirsch Road 42 inch line to the Greenspoint area, located north of North Sam Houston Parkway West and east of the North Freeway (IH 45), as well as the George Bush Intercontinental Airport area. This would have provided an opportunity to share in the cost of the line to size it to include the surface water that will be needed within the Aldine ID and Aldine West areas.

The City has since decided to serve the area with a transmission line owned jointly by the North Harris County Regional Water Authority. Now it will be necessary for the surface water transmission line requirements for Aldine to be in a separate line.

4.7.4 Wastewater Treatment

The City of Houston's 5.0 MGD rated North Belt Wastewater Treatment Plant, located on Smith Road near the northeastern corner of the Aldine ID service area, is operating at 30 % of its design flow capacity. The plant design anticipates expansion to approximately 50 MGD in the future. Presently flow to the plant is through a 72 inch trunk sewer which gravity flows from the intersection of Lee Road and Aldine Bender Road to the plant site.

All of the Aldine ID service area north of Greens Bayou can easily be served at the existing North Belt WWTP (See Exhibit 6). The City is currently negotiating with Harris County MUD 182 to provide wastewater treatment for that district, allowing the existing HCMUD 182 WWTP to be abandoned. If the force main from HCMUD 182 to the City's sewer is designed to allow additional

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users along Aldine Bender from HCMUD 182 to JFK Boulevard to be served, it will be easier to add other Aldine ID users in the future.

The City of Houston anticipates installing another deep trunk sewer in the future that would transport wastewater from the area east of Aldine to the plant. The line would be located south along Smith Road and Suburban Road to a point as far south as Little York Road. At this time the project is not in the City's capital improvement program and it may be a long time before the trunk sewer is constructed.

Due to the significant costs of constructing regional wastewater collection systems, the Aldine ID wastewater plan includes construction of several interim wastewater treatment facilities. However, the collection system plan anticipates the ultimate abandonment of the interim facilities with the flows going to the North Belt Regional WWTP.

4.8 Utility District Service Availability

Existing public utilities that provide sewer service in the Aldine area are not required to expand their service areas to customers outside their boundaries. Many of these systems experience severe infiltration/inflow problems that result in flow violations during wet weather periods. These problems, coupled with older structures designed under prior TCEQ design criteria, lead to the conclusion that in the long term, existing utility district wastewater treatment facilities cannot be part of the regional solution.

4.9 Service Structure Options

4.9.1 Local Government Authority

The Aldine ID has the explicit authority to create a nonprofit corporation to act on behalf of the District in implementing a project or providing a service. The statute provides that such a nonprofit created by the District would act as a Local Government Corporation (LGC), with the powers granted through Chapter 431, Subchapter D of the Transportation Code.

The Aldine LGC would have the authority to contract with other political subdivisions including the other utility districts within Aldine ID and the City of Houston. This allows the LGC to coordinate future utility expansions or upgrades with the other service providers in the District. For example, certain groundwater providers are required to submit a groundwater reduction plan (GRP) detailing how the provider plans to convert to surface water by 2010 in compliance with the HGCSO regulations. Water providers subject to the GRP requirement will either submit an independent GRP or join the City of Houston's regional GRP. The GRP requirement could serve as a catalyst for water suppliers in the District to coordinate with the LGC for water service due to obvious economies of scale, alternatively, the City of Houston could require utility districts and IOU's in Aldine ID to coordinate with the LGC as a part of the City of Houston's GRP.

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An LGC created solely by the District could not perform functions specifically prohibited by the District's authorizing statute. Since the District is prohibited from exercising eminent domain, Harris County should be asked to join in the LGC creation, adding its eminent domain powers to the powers of the LGC.

Finally, as a non-profit entity the LGC could receive grants and tax-exempt gifts from donated funds or equipment. Any income from the provision of water and sewer service may be retained by the LGC, however, the earnings may not benefit a private interest.

In agreement with the previously discussed HGAC regionalization recommendation, TCEQ could identify the Aldine ID as a Regional Wastewater Authority and prohibit the expansion of other wastewater treatment plants without the District's approval.

4.9.2 MUD Legal Authority

The District's authorizing statute grants Aldine ID the authority of a Municipal Management District ("MMD") under Chapter 375 of the TEXAS LOCAL GOVERNMENT CODE. Relevant to the purposes of this planning process, Chapter 375 of the LOCAL GOVERNMENT CODE also grants the District the power and authority of a Municipal Utility District, as authorized by Chapter 54 of the Texas Water Code.

MUDs provide the district with the broad authority to provide water and sewer services. MUDs also have the authority to acquire and construct facilities necessary to achieve its purpose inside or outside of the Districts boundaries. Additionally, MUDs may accept grants, gifts and loans.

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SECTION 5. SERVICE PLAN

5.1 General

A proposed service plan has been developed to demonstrate the facilities that would be needed to provide public water and sewer service to all unserved areas of Aldine ID. The District has been divided into eleven service zones for convenience in preparing and presenting the service plan. The service zones are shown in Exhibit 5-Proposed Water Distribution and Transmission Plan and Exhibit 6-Proposed Wastewater Collection and Treatment Plan.

5.2 Water Transmission Plan

The proposed water service plan consists of a transmission plan to convey the required amount of surface water projected for the Aldine ID and Aldine West areas to existing utilities and to new community distribution systems.

The transmission plan was developed with the aid of a hydraulic distribution model using the EPANET 2.0 Water System Modeling program. The model was calibrated using 150 % of the average annual flows. The average annual surface water flow projected for new systems was based on 1,000 gpd/acre, while HGCSO data on actual annual groundwater use was used for existing utilities.

The modeled condition is intended to provide service for the future maximum day condition. There will be adequate line pressure to serve customers without repumping for an interim period. Ultimately it is anticipated that each point of delivery user will be required to have their own ground storage and booster pumping facilities so that they can meet the peak hour demands on their system without drawing down pressure on the transmission system below a desirable level.

Based on the model and flow calculations, a proposed 24 inch line would connect to the Hirsch Road transmission line at Lauder Road. The proposed 24 inch would follow Lauder Road west to approximately Reeveston Road and would carry a peak daily flow of approximately 8 MGD. The line would reduce to 16 inch and run south to Aldine Mail Route, where it will eventually be connected to another line from the south.

The cost estimates for the water transmission lines are based upon City of Houston experience in constructing large diameter water lines. A methodology for allocating capital costs based upon the line segment cost per unit capacity was developed to project each participant's capital costs.

The construction costs of the Lauder Road segment of the transmission line were calculated on a line segment basis and are included in Table 9. A total capital cost of \$10.4 million dollars is estimated from the Hirsch Road connection to the intermediate point near Reeveston and Aldine Mail Road. Table 10 includes the calculation of shared costs for the lines in which Aldine ID participants would be served.

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A 24 inch surface water transmission line is also proposed to take approximately 12 MGD of surface water from the 42 inch Hirsch Road transmission line at Mount Houston Road west into Aldine ID, and north connecting the Lauder Road line to the Mount Houston Road line, forming a loop. The looped line will provide a high degree of reliability and allow taking segments of the loop out of service for scheduled maintenance of the line.

Table 11 shows the estimated construction costs of the transmission line, calculated on a line segment basis. The total cost of the Mount Houston Road segment transmission line is estimated to be over \$13.7 million, with \$3.0 million allocated to serve Aldine ID participants and \$10.7 million allocated to serve the Aldine West area. The transmission Plan is included in Exhibit 5. Table 12 shows the calculations for allocating capital cost among the participants.

The total estimated cost of constructing the water transmission loop line is \$24,007,517. The costs of the extension west beyond Aldine ID to serve Aldine West is not included in that estimate.

5.3 Water Distribution Plan

Exhibit 5 shows the proposed new water distribution systems that will be needed to provide public water service to the unserved areas within Aldine ID. Each service zone will either have one or more wells for water supply or will receive surface water from the proposed surface water transmission line into ground storage and booster pumping facilities. A network of distribution lines will be laid to provide water service, as well as fire protection. Cost estimate calculations for each service zone are included in Tables 13.1 – 13.11.

This plan proposes serving priority neighborhoods using interim groundwater wells if the surface water transmission line is not yet constructed when the community distribution systems are installed. Interim groundwater wells, with a 300 gpm capacity, can be built for approximately \$100,000 each. When surface water becomes available, the interim wells will serve as a backup and can be used to supplement flows during times of peak usage.

The District would construct groundwater supply plants with ground storage and booster pumping facilities capable of conversion to receive surface water. Construction of a water plant, including the 300 gpm well capable of serving 500 customers, would cost approximately \$400,000 or \$800 per customer.

This plan identifies twelve priority neighborhoods with 1,232 existing customers that would benefit from near-term water services. The neighborhoods that need water service generally include 5,000 to 10,000 square foot lots currently served from an individual shallow water well that may be contaminated from surface runoff from an on-site septic system on that lot. Neighborhoods that should receive immediate water service include Aldine Place, Allen & Fondren, Benton & Emerson Place, Inwood, Darden & Melwood Place, Lyncrest, North Houston Heights, Parkwood Estates, Sherwood & Benton Place, Stettner, Wright Loan & Security & Gish Subdivision.

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Connecting each resident would cost approximately \$1,000 - \$2,000 to replace home plumbing for increased pressure from piped water and for abandonment and cementing of existing wells.

5.4 Sanitary Sewage Collection Plan

5.4.1 General

The proposed Aldine Wastewater (Sewer) Service Plan is based upon providing public wastewater collection and treatment service to all unserved areas of the Aldine ID. Extensive sanitary sewer design calculations to serve the eleven service zones are included as Table 14. Table 15 summarizes the wastewater treatment capacity requirements for each of the service zones.

It is anticipated that some IOU and utility district facilities are in need of upgrading or replacement. The sanitary sewers are capable of handling all the wastewater from the unserved areas and from existing utility wastewater treatment facilities that may be abandoned in the future.

No wastewater treatment plant capacity is included to serve existing Aldine ID public utilities in the near-term plan. While it is ultimately desirable to convey all the wastewater in the Study Area to regional wastewater treatment plants, the costs for constructing the regional conveyance system far outweigh the cost of constructing smaller interim wastewater treatment plants.

To the degree possible, the Wastewater Service Plan anticipates that interim wastewater treatment systems may need to be expanded to include capacity to serve existing public utilities. Primarily this will require that adequate land is purchased to expand wastewater treatment plants in the future.

In general the Wastewater Service Plan anticipates that a regional collection system may be feasible in the distant future. To make it easier to collect the wastewater at that time, the near-term plan conveys wastewater to interim plants located along a line through the middle of the Aldine ID. While this is not always feasible, the concept was followed whenever possible.

Exhibit 6 shows the Aldine ID wastewater collection plan and the locations of proposed interim wastewater treatment plants. Other data on the map include the boundaries of existing public sewer service utilities, the locations of all existing wastewater treatment plants in the Aldine ID, as well as flood plain locations.

5.4.2 Critical Neighborhoods

There are several neighborhoods in the Aldine ID in immediate need of utility services, particularly sewer service. Harris County estimates that the district includes 4,619 individual septic systems; 1,385 of the systems are failing and 2,401 of the systems are on lots that are too small or otherwise unsuitable for onsite septic systems. This Plan recommends constructing new interim wastewater treatment plants to service the near-term sewer needs of the District.

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Through the planning process, neighborhoods in need of septic system replacement were identified. For example, one area is the North Houston Heights, located in unincorporated Harris County just east of Highway 59, south of Mount Houston Road, North of Mesquite Road and West of Washington Road. The area consists of 350 total lots and 127 existing structures. North Houston Heights has documented wastewater problems; however the area is not in a MUD, the lots are too small for replacement on-site sewage systems, and financial resources are limited at best. Because many of the lots are unsuitable for on-site septic systems, the only viable option for these neighborhoods is to connect to a wastewater plant.

5.5 Wastewater Trunk Line and Treatment Plants

5.5.1 Wastewater Plan For Service Zones 1 and 2

Service Zones 1 and 2 are shown to have sanitary sewers flowing to a single wastewater treatment plant referred to as the Reeveston WWTP. The estimated wastewater treatment capacity needed to serve SZ-1 and SZ-2 is 1.30 MGD. Cost estimates for the wastewater collection and treatment systems are included in Tables 13.1 and 13.2.

The Reeveston WWTP is anticipated to be abandoned at some point in the future with the wastewater being pumped to the SZ-3 collection system.

5.5.2 Wastewater Plan For Service Zones 3, 4 and 5

Service Zones 3, 4 and 5 are shown to have wastewater collection systems flowing to a proposed plant near Aldine Westfield and Halls Bayou, referred to hereafter as the Halls Bayou WWTP. The estimated wastewater treatment capacity to serve SZ-3, SZ-4 and SZ-5 is 2.89 MGD. Cost estimates for the collections systems are included in Tables 13.3, 13.4 and 13.5.

If the flow from SZ-1 and SZ-2 is added to SZ-3, SZ-4 and SZ-5, the capacity of the Halls Bayou WWTP increases to 4.19 MGD.

The collection systems through SZ-3 and SZ-4 have been oversized to provide capacity for the Aldine West area that is not within the Aldine ID boundary. The estimated flow from that area is 5.44 MGD, increasing overall capacity requirements of the plant to 9.63 MGD. Although no allowance for capital costs has been made to serve the area outside the Aldine ID, sufficient plant site area to increase the plant treatment capacity to the needed 9.63 MGD is recommended.

If the existing wastewater flows from all existing utilities within SZ-1, SZ-2, SZ-3, SZ-4 and SZ-5 are added, the maximum capacity needed at the Halls Bayou WWTP will be approximately 10 MGD.

5.5.3 Wastewater Plan For Service Zone 6

Service Zone 6 is isolated from the main body of Aldine ID; however, it is adjacent to the City of Houston. The plan shows a sewage lift station that will pump wastewater to the City of Houston,

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eventually winding up in the City's North Belt Regional WWTP. The estimated capacity to serve the unserved area of SZ-6 is 0.32 MGD. Table 13.6 shows the estimated capital costs.

5.5.4 Wastewater Plan For Service Zone 7

Service Zone 7 is also isolated from the rest of Aldine ID, and it is also near the City's 72 inch trunk sewer that flows to the North Belt Regional WWTP. Therefore the plan anticipates pumping the wastewater from SZ-7 to the 72 inch trunk sewer. The estimated capacity to serve the unserved area of SZ-7 is 0.24 MGD. Table 13.7 shows the estimated capital costs.

5.5.5 Wastewater Plan For Service Zone 8

The plan for serving unserved areas in Service Zone 8 includes conveying wastewater to a proposed new treatment facility near Vickery and Mount Houston Road called the Vickery Road WWTP. The calculated capacity requirement for the facility is 0.85 MGD. Table 13.8 shows the estimated capital costs for serving SZ-8.

The combined capacity of all existing wastewater treatment plants in SZ-8 is 3.05 MGD. The Vickery Road WWTP is anticipated to be abandoned with the wastewater being pumped to the SZ-10 collection system at some point in the future. Ultimately the combined 3.63 MGD flow for existing and unserved areas of SZ-8 should flow to the North Belt Regional WWTP.

5.5.6 Wastewater Plan For Service Zone 9

Service Zone 9 is located on the north side of Pine Village PUD, which pumps its wastewater to the City of Houston WCID 76 WWTP in which that district is a participant. According to the City, the WCID 76 WWTP will be taken out of service at some point in the future with the wastewater from that facility being conveyed to the North Belt Regional WWTP.

The estimated wastewater capacity needed to serve the unserved area of SZ-9 is 0.28 MGD. The plan calls for installing a lift station to pump the SZ-9 wastewater to the WCID 76 WWTP. Table 13.9 shows the estimated capital costs for serving SZ-9.

5.5.7 Wastewater Plan For Service Zone 10

Service Zone 10 is located on the east central side of the Aldine ID between US Highway 59 and the City of Houston. The estimated wastewater treatment capacity required in SZ-10 is 0.50 MGD. The plan includes constructing the Aldine East WWTP. Table 13.10 shows the capital cost for serving SZ-10.

Ultimately the wastewater from both SZ-8 and SZ-10 could be piped to the future trunk sewer that the City of Houston would construct to transfer wastewater northward to their North Belt Regional WWTP. If the City's trunk sewer is constructed prior to constructing the collection system

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improvements in SZ-10, the proposed Aldine East WWTP will not be constructed, but instead the wastewater will be conveyed to and treated at the North Belt Regional WWTP.

5.5.8 Wastewater Plan For Service Zone 11

Service Zone 11 is located in the far southeast corner of the Aldine ID. The estimated wastewater treatment capacity required is 0.83 MGD. One plan to treat wastewater in this area would be to pump the wastewater from SZ-11 south to the City's wastewater collection system. However, according to the City, sewers in that area are operating at over-capacity due to large amounts of infiltration/inflow. In addition, the wastewater treatment plant serving that area is at capacity and cannot easily be expanded due to lack of space at the site.

Alternately, if the Aldine East WWTP is constructed before the SZ-11 system, the wastewater could be pumped in a force main north to that plant. That would ultimately deliver the wastewater to the North Belt Regional WWTP when the Aldine East WWTP is abandoned.

At the time that the SZ-11 collection system is constructed, the most feasible option for treating the SZ-11 wastewater will be determined. For the purposes of assigning a cost to the plan, an interim wastewater treatment plant at the south end of SZ-11 is included. The estimated costs for the SZ-11 collection system and WWTP are shown in Table 13.11.

5.6 Phasing of Plans

This plan recommends implementing the water and sewer services in stages. The vast number of improvements with their associated high costs will take 30 to 50 years to fund. The first phase of the plan identifies priority neighborhoods which do not currently have water or sewer service available and which are likely to have on-site wells contaminated by their own malfunctioning septic systems.

5.7 Comments From Public Meetings

At three different times during the course of the study, notices were sent to each of the existing public utilities in the Aldine ID area and published in the local newspaper asking for comments and participation in the planning process. Representatives from Pine Village PUD and Sunbelt FWSD participated and provided helpful comments. Sunbelt FWSD reported that they were in the process of negotiating with the City to get surface water from the 42 inch Hirsch Road line. Their plan was to extend a 12 inch line from the 42 inch to their system. This plan was revised to locate the proposed surface water transmission line along Lauder Road convenient for Sunbelt FWSD.

This plan proposes a 24 inch line along Lauder that will be shared by HCWCID 74, Sunbelt FWSD, Suburban Utility, and Aldine ID. Each participant will benefit from the plan by getting the project completed sooner with lower participant costs. In addition, the City will have a market for the water that will be produced from their new Northeast WTP.

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No requests to obtain sewer service or statements of interest in cooperating on joint use wastewater treatment facilities were received. This does not mean that cooperation with existing public utilities will not occur in the future. As wastewater treatment systems deteriorate, effluent quality requirements become more stringent and environmental compliance actions become more costly, there will be a new interest in joining with responsible service providers to achieve economies of scale as well as achieve higher levels of treatment reliability.

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SECTION 6 CAPITAL COST ESTIMATES, FINANCING, RATE DETERMINATION

6.1 Aldine ID Water & Wastewater Facility Capital Costs

Estimated capital costs for the water supply and wastewater collection and treatment facilities to provide service to all areas of Aldine ID that are currently unserved are included in Tables 13.1 - 13.11. A summary of the capital costs is presented in Table 16. The total estimated capital cost to implement the plan is \$123,458,056 (2004 cost basis).

6.2 Overview of Aldine ID's Funding Availability

This section provides an overview of the financing tools available to the District as well as other sources that may provide funding as grants or low interest loans.

6.2.1 Funding From Taxes, Assessments and Fees

The District has the ability to utilize the following financial tools for water and sewer services:

Sales Tax. As allowed by statute, voters in the District approved a one-cent sales tax.

Property Tax. An ad valorem tax may also be imposed if approved by a majority vote.

Bonds. The District may issue bonds upon approval by the City of Houston.

Special Assessments. Projects, such as water and sewer development, may be financed through special assessments imposed by MMD's upon the property in the area that benefits from the project. Such assessments may only be imposed after a petition is submitted to the MMD board and then it is subject to notice and hearing requirements.

Impact Fees. MMD's may also impose impact fees through the procedures provided in Chapter 395 of the LOCAL GOVERNMENT CODE. Additionally, general obligation and revenue bonds may be issued for improvement projects and services.

Fees. Through its MUD powers, the District may collect all necessary charges and fees for the services provided.

6.2.2 Funding From Grants and Loans

Potential sources for grant funds or other low-interest loans:

SEP funds. The District can apply for Supplement Environmental Project ("SEP") grants to assist in the implementation of an interim wastewater treatment plant. The TEXAS WATER CODE allows an entity that is regulated by the TCEQ to contribute funds to qualifying SEPs to offset penalties or to otherwise allow the entity to enter into a negotiated agreement about

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a project impacting the environment. The District should apply to both the TCEQ and Harris County programs to place an interim wastewater treatment plant on the qualified list of SEP projects.

Community Development Block Grant Funds. The United States Department of Housing and Urban Affairs ("HUD") makes Community Development Block Grant ("CDBG") funds available to cities and counties for various projects, including improving water and wastewater services. Harris County is an entitlement County and receives [\$] dollars from HUD annually. The District anticipates applying for CDBG funds to assist low-income families connect to the water supply line and upgrade existing groundwater-compatible plumbing to function with the surface water which is pumped in at a higher pressure.

Co-Bank. Co-Bank is a government-sponsored enterprise that provides financing for water and waste disposal systems serving predominately unincorporated areas or communities with populations of 20,000 or less. It is a cash-flow lender. Loan amounts typically begin at one million dollars with a 20-year term. It also offers a Small Loan Program that provides loans between \$50,000 and \$500,000 to cover construction-related costs. It can provide competitive interest rates because it is a cooperative. However, candidates are evaluated strictly on the basis of credit worthiness. Additional information:

Links: www.cobank.com; www.epa.gov/npdes/ss0/finance/loans.htm.

Other Info.: TCEQ Regulatory Guidance; Water Supply Division; RG-220 (Revised); February 2003 "Funding Sources for Utilities"

Rural Utility Service; USDA program. The definition of rural may be flexible allowing Aldine ID to qualify.

Revolving Loans. The TWDB serves as Texas' financing authority for the Clean Water State Revolving Fund (CWSRF) and the Drinking Water State Revolving Fund (DWSRF). These revolving loans provide long-term low interest or negative interest payments. Applications are scored annually and granted subject to federal guidelines. Some states establish "set-aside" loans for low-income areas.

Rural Community Assistance Program ("R-Cap"). This program services low-income and rural areas.

6.2.3 Technical Assistance

The following sources are available for technical assistance in obtaining grants:

Texas Leadership Institute.
The Rensselaerville Institute.
Community Resources Group.

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Environmental Finance Centers. EPA sponsors a center in each EPA region. This center may be a resource for assistance in grant and loan applications.

6.2.4 Potential Future Sources of Funding

Nonborder Colonia Program. In 2001 the Legislature passed SB 322 which defines “nonborder colonia” as an unincorporated residential community located over 150 miles from the Texas international border where the average household income is less than the county in which the community is located. Texas Water Code 15.001(12). The legislation further allowed that grants or loans may be provided to nonborder colonia as provided by legislative appropriations. Texas Water Code 15.102(b). Although the legislation passed, the program, unfortunately, was not funded.

The Economically Distressed Areas Program (“EDAP”). EDAP provides grants and loans to fund the construction, acquisition, and improvement of water and wastewater systems to meet the minimal needs of residents. EDAP has granted over \$537 million to communities for water and waste water construction projects. The grant amounts range from \$305,739 to over \$55 million. Unfortunately, EDAP is limited to communities that are located in an “affected county,” which does not include Harris County. An affected county is a county located adjacent to the Texas-Mexico border, or a county that has a per capita income averaging 25 percent below the state average and an unemployment rate averaging 25 percent above the state average for the most recent three consecutive years for which statistics are available. Legislative action is required to expand the application of EDAP.

Cost Sharing with the City of Houston. The City of Houston provides sharing agreements between the City and developers for the cost of certain in-city utility development and extensions. Subject to funds allocated by City Council, the Houston ordinance provides that a developer may be reimbursed for 30 percent, 50 percent or 70 percent of the construction costs dependant upon the development. City of Houston Ordinance 47-164. Seventy percent reimbursement is allowed for single-family homes within the city limits. Low or moderate single-family homes receive additional assistance such as a \$3,000 dollar per lot reimbursement of the storm sewer drainage cost. The City’s reimbursement program is limited to developments within the city limits, and therefore not directly applicable to areas in the unincorporated areas of Harris County. This program should be considered, however, as a precedent for redeveloping older areas outside of the city limits that may be annexed in the future.

6.3 Rate Structure Determination

With the high capital cost of retrofitting water supply and wastewater treatment to existing communities, coupled with the fact that most developed, unserved areas in Aldine ID are low income, the rate structure for water and sewer service must be kept low. Otherwise residents will not connect to the systems or they will not be able to afford to pay the charges.

Experience shows that with prudent conservation, domestic (in home) water use is 50 to 60 gallons per day per person. Flows over that amount can normally be attributed to landscape watering, car

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washing or wastage. A four person household is predicted to use 6,000 to 7,200 gallons per month. A two person (retired couple) household may only use 3,000 to 3,600 gallons per month.

The Aldine ID rate structure should be patterned after the City of Houston’s with those whose monthly water use of 3,000 gallons paying approximately \$40.00 per month. A base rate (with no gallonage included) of \$15.00 for water and \$15.00 for sewer is recommended. Up to 3,000 gallons, a rate of \$1.00 for water and \$2.00 for sewer is proposed. From 3,000 gallons to 10,000 gallons, a rate of 2.00 for water and \$3.00 for sewer is the next increment. Sewer gallonage charges would be limited to the first 10,000 gallons each month. Between 10,000 and 20,000 gallons per month, a rate of \$4.00 for water would be imposed. Incremental monthly water use over 20,000 gallons would be billed at \$5.00 per 1,000 gallons.

The following table shows the combined water/sewer monthly bills using the proposed rate structure for flows up to 20,000 gallons:

Monthly Water Use, Gallons	Monthly Water & Sewer Bill	Monthly Water Use, Gallons	Monthly Water & Sewer Bill
1,000	\$33.00	11,000	\$78.00
2,000	\$36.00	12,000	\$82.00
3,000	\$39.00	13,000	\$86.00
4,000	\$44.00	14,000	\$90.00
5,000	\$49.00	15,000	\$94.00
6,000	\$54.00	16,000	\$98.00
7,000	\$59.00	17,000	\$102.00
8,000	\$64.00	18,000	\$106.00
9,000	\$69.00	19,000	\$110.00
10,000	\$74.00	20,000	\$114.00

6.4 Impact of Rate Structure on Service Area Users

The proposed rate structure is designed to provide economical service to customers that conserve water and to provide a higher service structure to customers who use large quantities of water. In essence, high quantity water users subsidize low water users. The proposed rate structure can be categorized as a conservation rate in that there is a significant financial incentive to minimize water use. Those who use only small amounts of water for household uses will benefit financially. Those who want to maintain large quantities of landscaping will pay dearly for the privilege. Philosophically

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speaking, new sources of water supply will be expensive to develop and users must begin to conserve the water that is available.

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SECTION 7. NEIGHBORHOOD PLANS

Three neighborhoods were chosen in Aldine ID that are typical of low income areas likely to experience health risks and pollution problems due to the insufficiency of existing facilities to perform an in-depth study for requirements to provide a safe and effective water and sewer system plan. The intent of the detailed neighborhood planning was to identify low income area projects that would qualify for CDBG funding.

Neighborhoods were selected for study prior to the completion of the OSSF evaluation survey. Table 6 shows all of the subdivisions that were evaluated, many of which have more severe OSSF problems than the ones selected for the neighborhood plans.

7.1 North Houston Heights Plan

North Houston Heights is located in SZ-8, east of Highway 59, south of Mount Houston Road, North of Mesquite Road and West of Washington Road. The area consists of 350 total lots and 127 existing structures. Each occupied lot has its own well and septic system. The area is not in a MUD, the lots are too small for replacement on-site sewage systems, and financial resources are limited at best. The Harris County OSSF evaluation noted that 37 % of the OSSF's are failing and 64 % of the lots are unsuitable for installation of an OSSF. The only viable option is to construct a wastewater collection and treatment system to serve the area.

A water and wastewater service plan was prepared for North Houston Heights and it is presented on Exhibit 8. The plan includes a new groundwater supply plant and a new interim wastewater treatment plant

At this time the Harris County Engineering Department has solicited engineering proposals for design of the water distribution and wastewater collection systems to serve North Houston Heights using Community Development Block Grant funds. It is anticipated that as more CDBG funds become available next year, the project will be constructed.

7.2 Parkwood Estates Plan

Parkwood Estates is located in SZ-7 south of Aldine Bender Road, east of Lee Road and US Highway 59, north of Greens Bayou. Parkwood Estates borders Sequoia Bend Subdivision on the west. The southmost part of the subdivision is subject to flooding and many of the properties have been purchased by Harris County under the FEMA buyout program.

A water and wastewater service plan was prepared for Parkwood Estates and it is presented on Exhibit 9. The plan includes constructing a water storage and booster pumping facility and connecting to City of Houston for the water supply. A lift station would convey wastewater via a force main to the City's 72 inch trunk sewer located at Aldine Bender Road and Lee Road.

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7.3 Tasfield Plan

Tasfield Subdivision is located in SZ-8 west of US Highway 59, north of West Little York. The subdivision currently has public water service via an investor owned utility. The Harris County OSSF survey found that 75 % of the existing OSSF system are failing and that no lots in the subdivision are suitable for installation of an OSSF system.

A wastewater service plan was prepared for Tasfield and it is presented on Exhibit 10. The plan includes constructing a wastewater collection system and lift station to convey wastewater via a force main to the City's 15 inch trunk sewer located on West Little York Road.

At this time the Harris County Engineering Department has solicited engineering proposals for design of the wastewater collection, pumping and conveyance system to serve Tasfield using Community Development Block Grant funds. It is anticipated that as more CDBG funds become available next year, the project will be constructed.

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SECTION 8. RECOMMENDED IMPLEMENTATION PLAN

8.1 General

An attempt has been made to prioritize the water and wastewater needs in Aldine ID and to provide public services to those in the greatest need first. It is anticipated that critical needs will develop and that priorities will be revised. The following is the initial recommended implementation plan.

8.2 Capital Cost Schedule for 10 Year Plan

The proposed projects to be implemented by 2015 are included in Table 17.1. The estimated cost of the proposed water and wastewater improvements is \$79.15 million. The projects proposed for completion during the first 10 year time increment are as follows:

- 24-inch water transmission line from Hirsch Road to Reeveston along Lauder Road
- 24-inch water transmission line from Mount Houston Road at Hirsch Road to the corner of Keith-Weiss Park and Aldine Westfield
- 12-inch water transmission line from the Mount Houston Road 24-inch transmission line to the corner of Aldine Westfield and Breacrest (SZ-5 WP)
- Water distribution lines in Aldine Place, Allen & Fondren, Benton & Emerson Place, Inwood, Darden & Melwood Place, Lyncrest, North Houston Heights, Parkwood Estates, Kenwood Place (SZ-9), Sherwood & Benton Place, Stettner, Wright Loan & Security, and Gish Subdivision
- Surface water storage and distribution facilities to serve Service Zones (SZ) 2, 5, 7, 8, 9, 10 and 11
- Vickery WWTP (0.1 MGD)
- Wastewater collection systems serving Tasfield, North Houston Heights and Parkwood Estates

8.3 Capital Cost Schedule for 30 Year Plan

The proposed projects to be implemented between 2015 and 2035 are included in Table 17.2. The estimated cost of the proposed water and wastewater improvements is \$69.34 million. The proposed projects to be completed by the year 2035 include:

- 24-inch water transmission line from the southern boundary of Keith-Weiss Park and Aldine Westfield north to Isom and west to Chrisman
- 12-inch water transmission line from the Lauder Road 42-inch transmission line to the surface water storage facility in Aldine Place
- Water distribution lines for SZ-2, 3, 5, 6, and 8
- Surface water storage and distribution facilities to serve SZ-3 and SZ-6
- Halls Bayou WWTP (2.5 MGD)
- Aldine East WWTP (1.3 MGD)
- Wastewater collection systems serving SZ-3, 5, 6, 8, 9, 10 and 11

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- Expansion of the Vickery WWTP from 0.1 MGD to 1.0 MGD.

8.4 Capital Cost Schedule for 50 Year Plan

The proposed projects to be implemented between 2035 and 2055 are included in Table 17.3. The estimated cost of the proposed water and wastewater improvements is \$53.73 million. The system improvements to be completed by the year 2055 include:

- 24-inch water transmission line from Isom to Lauder Road
- Surface water storage and distribution facility serving SZ-3
- Water distribution lines for SZ-1, 3 and 4
- Expansion of the Halls Bayou WWTP from 2.5 MGD to 5.0 MGD
- Wastewater collection systems serving SZ-1, 2, and 4
- 42-inch micro tunneled sewer line from the Vickery WWTP to the City of Houston's proposed sewer trunk line on Suburban Road.

After construction of the City of Houston Smith Road trunk sewer, the Vickery and Aldine East Interim Wastewater Treatment Plants will be abandoned and the Aldine ID service area regional water and wastewater plan will have been completed.

8.4 Cooperation With The City of Houston and Harris County

The City of Houston has provided leadership in the area of Regional Water Supply and Regional Wastewater Treatment in the form of studies and investments in improvements. Most recently the City has joined in a Local Government Corporation (LGC) with Harris County and the North Harris County Regional Water Authority to construct the Northeast Surface Water Treatment Plant and the water transmission line to convey the treated surface water to users.

A proposed Aldine LGC to provide regional water supply and wastewater treatment solutions should be created by Aldine ID. Cooperation and participation by the City of Houston and Harris County will ensure that the future of the Aldine area is to become an asset to the community, providing a quality place to live and work. Although the City cannot spend its funds to unreasonably enhance areas outside its boundary, its cooperation and participation in joint use projects will ensure that value and quality are attained.

8.5 Recommended Legislative Action

Legislative action to direct the TWDB to use more of the federal funds it receives in grants and matching grants, rather than straight loans is needed to fund projects in economically depressed areas such as Aldine ID. Adding the Aldine ID area to the present state non-border colonia program, similar to the Rio Grande Valley colonia funding program will greatly assist in providing the funds needed to implement the Aldine Water and Wastewater Plan.

**TABLE 1
SUMMARY OF POPULATION DATA IN THE YEAR 2000**

CENSUS TRACT	YEAR 2000 POPULATION	% OF TRACT IN SERVICE AREA	POP. IN SERVICE AREA
14000US48201221600	7911	80%	6,329
14000US48201221700	7160	45%	3,222
14000US48201222400	8685	95%	8,251
14000US48201222500	15411	40%	6,164
SUBTOTAL ALDINE WEST			23,966
14000US48201221800	4132	99%	4,091
14000US48201221900	4361	100%	4,361
14000US48201222100	5388	100%	5,388
14000US48201222200	3936	100%	3,936
14000US48201222300	4107	100%	4,107
14000US48201222800	3167	100%	3,167
14000US48201222900	7313	100%	7,313
14000US48201223000	8289	100%	8,289
14000US48201223100	2055	98%	2,014
14000US48201231700	3888	90%	3,499
14000US48201232100	3585	90%	3,227
14000US48201232200	4297	10%	430
SUBTOTAL ALDINE I.D.			49,821
TOTAL POPULATION IN THE ALDINE STUDY AREA			73,787

**TABLE 2
SUMMARY OF EXISTING PUBLIC WATER SYSTEM DATA IN ALDINE ID SERVICE AREA**

Utility District / CCN Name	District No.	Service Area (acres)	Water PWSID	Water CCN	Pop. Count	# Conn	Total Stor. (MG)	Elev. Stor. (MG)	Total Prod (MGD)	Service Pump Cap. (MGD)	Avg Daily Use (MGD)	Pres Tank Cap (MG)
Harris County WCID 74	4115000	356	1010480	P0294	5592	1864	1.051	0.25	3.168	3.6	0.678	0.005
AquaSource Utility, Inc. (Tasfield)	1011865			11157	189	63	0	0	0	0	0	
Southwest Utilities, Inc. (Aldine Meadows)	1010092			11740	219	73	0.063	0	0.072	0.244	0.021	
Mount Houston Utilities (Mt Houston Sq)	1011957			12870	325	10	0.07	0	0.288	0.504	0	0.0012
Sunbelt FWSD	7632500	2418	1010292	10833	8352	2784	0.462	0	2.232	3.744	0.74	0.025
Galco Utilities				10736			Activity Unknown					
Nitsch & Son Utility Co., Inc			1010145	11124	1977	659	0.135	0	0.576	1.44	0.296	
North Freeway Center		Inactive	1011595	11582	100	7	0	0	0.036	0	0	
Westfield MHP, Inc			1011947	11782	768	256	0.063	0	0.36	1.008	0.093	0.008
Country Living Apartments			1011501	12590	141	47	0	0	0.098	0	6	0.5525
Pine Village PUD	7107000	323	1010901	P0419	1476	492	0.5	0	1.512	2.16	0.137	0.02
Sequoia ID	7555500	181	1010205	P0445	1146	382	0.12	0	0.662	1.46	0.128	0.01
Harris County MUD 182	3737432	91	1012725	P0981	250	29	0	0	0.23	0	0.034	0.01
West Road WSC		Inactive					Inactive					
C & P Utilities Inc. (Aldine Village Sub.)	1010931			12085	765	255	0.063	0	0.432	0.958	0.148	0.01
C & P Utilities Inc. (Azalea Estates MHP)	1011253			12085	44	15	0	0	0.115	0	0.002	0.001
Champs Water Co., Inc. (Aldine Forest Sub.)	1010410			10972	108	36	0.01	0	0.063	0.345	0.02	0.001
Hartwick Green WW Co.							Activity Unknown					

**TABLE 3
TCEQ PERMITTED DISCHARGE PERMITS
IN THE ALDINE ID SERVICE AREA**

Map Ref. Number	TCEQ Permit Number	Permittee	TCEQ Compliance History Rating	Permitted Flow mgd	Average Flow-2001 mgd
2	12765-001	United Structures of America	0.47	0.0080	0.0038
3	12484-001	Boring Specialties	0.39	0.0050	0.0017
4	11739-001	Champs Water Co. - Aldine Forest	0.16	0.0250	0.0092
5	12617-001	Sandra Goodwin - KOA Park	0.07	0.0350	0.0020
6	12259-001	Bayou Forest Village MHP	0.63	0.0300	0.0070
7	12399-001	Karbalai - Sundown MHP	0.60	0.0250	0.0174
9	12083-001	Hooks MHP	0.51	0.0600	0.0240
10	13084-001	Xiu Hiu Li - McCulloch-Hartwick		0.0250	0.0118
11	11821-001	Ana Johnson	n/a	0.0500	no flow
12	10436-001	Champs Water Co., Inc. -	0.16	0.1500	0.0896
13	12070-002	Aldine ISD - Chrisman Road	2.84	0.0600	0.0362
14	01536-000	Ashbrook Corporation	1.58	0.0040	0.0029
15	11673-001	Woodloch MHP	0.07	0.0300	0.0121
16	10812-001	Sunbelt - High Meadows	4.90	0.9900	0.6643
18	12273-001	Harris County MUD 182	0.30	0.1000	0.0173
34	11791-001	Sunbelt - Fairgreen	4.90	0.5000	0.1264
35	12070-004	Aldine ISD - Orange Grove	2.84	0.0150	0.0080
36	10679-001	Harris County WCID 74	1.50	0.8400	0.7271
37	14144-001	Center America		0.0990	0.0127
38	10236-001	Sunbelt - Oakwilde	4.90	0.4500	0.3447
39	12772-001	5510 Acorn LLC - Acorn MHP	2.50	0.0300	0.0080
40	11255-001	Southwest Utilities - Greenwood Village	1.48	0.1580	0.1935
41	14001-001	Hartman, James - McDonald's	1.02	0.0040	0.0018
42	10495-150	City of Houston - WCID 76	3.01	0.7000	0.4690
Total				4.3930	2.7905

TABLE 3.1

TCEQ PERMITTED DISCHARGE PERMITS
IN THE ALDINE WEST SERVICE AREA

Map Ref. Number	TCEQ Permit Number	Permittee	TCEQ Compliance History Rating	Permitted Flow mgd	Average Flow-2001 mgd
8	12555-001	Westfield MHP	0.24	0.1000	0.0680
21	10518-001	Sunbelt-Northline	4.90	0.3000	0.2447
22	10694-001	Southwest Utilities - Colonial Hills	1.48	0.1000	0.0768
23	12450-001	Darlene Ann Young		0.0200	
24	13882-001	C & P Utilities - Aldine Village		0.1500	0.1117
25	10825-001	Harvest Communities	0.00	0.0230	0.0160
26	13749-001	E & M Balaban	0.23	0.0250	0.0084
28	12261-002	Solhjou, Houshang - Pin Oak	0.00	0.0300	
29	13767-001	Fatima Family Village	0.14	0.0120	0.0097
30	12282-001	Solhjou, Bahran - Rosewood MHP	1.62	0.0300	0.0131
31	10419-001	Nitsch & Son	1.67	0.2500	0.1318
32	14217-001	Karbalai, Laura - Carby St. MHP	0.60	0.0200	0.0078
33	12261-001	Solhjou, Houshang - Melrose MHP	3.95	0.0400	0.0111
Total				1.1000	0.1735

TABLE 3.2

TCEQ PERMITTED DISCHARGE PERMITS
OUTSIDE & ADJACENT TO THE ALDINE STUDY AREA

Map Ref. Number	TCEQ Permit Number	Permittee	TCEQ Compliance History Rating	Permitted Flow mgd	Average Flow-2001 mgd
1	12070-001	Aldine ISD - Aldine Jr. High	2.84	0.0630	0.0290
17	10495-101	City of Houston - Imperial Valley		4.0000	1.5066
19	10495-122	City of Houston - Northbelt	3.01	5.0000	1.3055
20	14156-001	E.H. Lowenstein		0.0025	0.0013
27	14066-001	Felcor Airport Utility-Holiday Inn		0.1000	0.0640
Total				9.1655	2.9064

**TABLE 4
HGCS D PERMITTED WELLS IN THE VICINITY
OF THE ALDINE STUDY AREA**

Well Number	Public Well Owner	Composite Gallons Pumped < 10,000,000	Composite Gallons Pumped >10,000,000
1524	Southern Water Corporation		80,462,000
1667	Pine Village P.U.D.		73,294,000
1861	Holiday Inn Houston Int. Airport		32,928,000
1872	Sunbelt F.W.S.D.		55,139,500
1918	Center America	4,192,000	
2001	Suburban Utility Company		30,066,000
2040	Nitsch & Son Utility Co., Inc.		34,513,500
2041	Nitsch & Son Utility Co., Inc.		34,513,500
2137	Harris County WCID No. 74		129,470,150
2173	Hydril Company L.P.	9,451,363	
2178	Ashbrook Corporation	1,392,530	
2179	Ashbrook Corporation	20,000	
2191	Sequoia I.D.		47,753,000
2194	Johnny B. & Melinda McGee	1,033,700	
2195	Johnny B. & Melinda McGee	1,033,700	
2208	Sunbelt F.W.S.D.		105,748,500
2209	Sunbelt F.W.S.D.		105,748,500
2210	Sunbelt F.W.S.D.		105,748,500
2211	Sunbelt F.W.S.D.		95,007,000
2212	Sunbelt F.W.S.D.		95,007,000
2213	Sunbelt F.W.S.D.		95,007,000
2238	Sunbelt F.W.S.D.		15,484,000
2360	Southwest Utilities, Inc.		44,198,000
2372	Southwest Utilities, Inc.		18,762,000
2373	Southwest Utilities, Inc.		29,088,500
2374	Southwest Utilities, Inc.		3,471,000
2428	Champ's Water Company		12,140,000
2429	Champ's Water Company		12,140,000
2430	Champ's Water Company		12,140,000
2512	C & P Utilities		28,783,000
2513	C & P Utilities		28,783,000
2702	Westfield Mobile Home Park, Inc.		16,694,500
2744	Douglas Utility Company		31,321,000
2745	Douglas Utility Company		31,321,000
2945	Kataoka, Reo-Huntsville Gardens	520,000	
2946	Huntsville Gardens, Inc.	1,794,960	
2971	Harris County WCID No. 74		129,470,150
3023	Russell L. McClellan	782,850	

**TABLE 4
HGCS D PERMITTED WELLS IN THE VICINITY
OF THE ALDINE STUDY AREA**

Well Number	Public Well Owner	Composite Gallons Pumped < 10,000,000	Composite Gallons Pumped >10,000,000
3038	Champ's Water Company		7,932,000
3039	Champ's Water Company		7,932,000
3129	William E. Hartzog	2,138,400	
3145	J. Karbalai, Trustee	1,473,000	
3146	J. Karbalai, Trustee	1,473,000	
3305	Brian A. Handal	1,125	
3306	Brian A. Handal	1,125	
3353	Sunbelt F.W.S.D.		105,748,500
3438	Champ's Water Company		12,140,000
3459	Aldine I.S.D.		18,343,900
3483	Hooks Mobile Home Park, Ltd.		8,722,650
3484	Hooks Mobile Home Park, Ltd.		8,722,650
3525	Sunbelt F.W.S.D.		55,139,500
3606	Woodloch MHP, LLC	3,456,319	
3765	Westfield Mobile Home Park, Inc.		16,694,500
3903	Southwest Utilities, Inc.		44,198,000
3905	Sequoia ID	0	
3907	Aldine I.S.D.		7,396,488
3929	Harris County MUD No.182		13,229,000
3948	Southwest Utilities, Inc.		58,155,667
3963	Reliant Energy, Inc.	42,000	
4145	Aldine ISD		2,886,300
4189	Southwest Utilities, Inc.		18,762,000
4190	Southwest Utilities, Inc.		29,088,500
4208	Amilcar Amaya	1,128,000	
4212	Blue Bell Place Builders	1,402,000	
4217	Harris County Toll Road Authority	24,000	
4234	Southwest Utilities, Inc.		8,362,000
4252	Harris County Toll Road Authority	233,000	
4354	Aldine ISD		7,396,488
4355	Royal Coach Trails MHP	2,850,000	
4356	Royal Coach Trails MHP	2,850,000	
4364	Greenwood Place Civic Club	248,540	
4365	Greenwood Place Civic Club	208,000	
4392	Sandra L. Goodwin	821,850	
4393	Sandra L. Goodwin	821,850	
4433	Vernon Miller		1,000,000
4434	Vernon Miller		5,500,000
4435	Vernon Miller		5,500,000

**TABLE 4
HGCS D PERMITTED WELLS IN THE VICINITY
OF THE ALDINE STUDY AREA**

Well Number	Public Well Owner	Composite Gallons Pumped < 10,000,000	Composite Gallons Pumped >10,000,000
4442	Houshang Solhjou	4,190,900	
4460	R.C. Bumbstead, Inc.	1,600,000	
4464	Russell L. McClellan	782,850	
4484	Houshang Solhjou	2,419,350	
4527	Linda Hartzog	2,500,000	
4582	Shawn Sharafi and Farzanh Mozafrian	2,643,400	
4583	Shawn Sharafi and Farzanh Mozafrian	2,643,400	
4598	Petroleum Wholesale, Inc.	32,990	
4603	Joe Boulais	876,000	
4604	Joe Boulais	162,250	
4606	Joe Boulais	365,000	
4615	Murray & Patricia Campbell	90,000	
4616	Murray & Patricia Campbell	180,000	
4619	Gospel Assembly Church	1,105,300	
4629	Cheng's Flea Market	70,300	
4631	Gospel Assembly Church	1,105,300	
4666	Balaban's Apartment	7,074,200	
4694	Chapman & Cole	50,000	
4726	Houston Well Screen	1,865,000	
4732	Bilrite Reel & Lumber Company	12,000	
4733	Mel Northey	100,000	
4740	Houston Pipe Benders	6,460,400	
4781	B.J. Coburn	2,750,000	
4785	Gulshan Enterprises, Inc.	900,000	
4808	Patricia Englishbee	1,000,000	
4828	Jet Machine Works Inc.	23,184	
4844	Nishi Enterprise	700,000	
4854	Norman C. Telge	800,000	
4857	Thomas Wertheim	700,000	
4866	Joe Bob Smith	120,000	
4867	Red Dot RV Park	1,241,800	
4892	Bolt Manufacturing Co., Inc.	355,577	
4893	Mary Ellen Burch		17,016,500
4903	Don Fitch	600,000	
4909	Great Time Skate, Inc.	58,371	
4914	Jim Kiger	144,000	
4938	Bayou Forest Village, Inc.	4,352,625	
4962	Betty Jo Norris	142,000	
4964	North Commerce Plaza	676,540	

**TABLE 4
HGCS D PERMITTED WELLS IN THE VICINITY
OF THE ALDINE STUDY AREA**

Well Number	Public Well Owner	Composite Gallons Pumped < 10,000,000	Composite Gallons Pumped >10,000,000
4968	Peachleaf Associates Venture #1	1,033,200	
4980	Thurman Black	111,600	
4981	Eastex Forest Products	4,400,000	
4985	Aldine Gardens Mobile Home Park 2	2,400,000	
4987	Boring Specialties, Inc.	540,660	
4988	Boring Specialties, Inc.	432,264	
4990	Cranford X-Ray Co.	100,000	
5000	Champagne Webber Inc., Texas	8,204,900	
5006	Accent Marble	246,000	
5009	Tsun Cow Sun Light Motel	14,300	
5026	SMS of Texas, Inc.	100,000	
5031	Smart Stop #2	20,000	
5038	Ivette Sardina	100,000	
5039	SWEA Gardens Estates Utility	4,016,000	
5052	Pfokawi Group	12,000	
5055	Donna R. Raymond	180,000	
5065	United Structures of America	2,088,428	
5066	United Structures of America	2,088,428	
5094	GSE Lining Technology, Inc.	687,850	
5104	Bethel Christian Academy	400,000	
5132	Southwest Utilities, Inc.		1,037,000
5145	Unity Baptist Church	29,000	
5146	Unity Baptist Church	21,300	
5152	Ana Johnson	79,200	
5155	Nick G. Kritikos	165,450	
5209	Balaban's Apartment	2,417,400	
5224	Evelyn G. Jordan	14,280	
5237	Sumatee Baldeo	1,000,000	
5241	Robert J. Marek	300,000	
5242	Robert J. Marek	600,000	
5255	Advent Presbyterian Church	345,000	
5270	Metal Building Components, Inc.	1,475,500	
5347	Airline Skate Center	4,850	
5363	Robert Cole, Inc.	1,259,000	
5368	Dadeks Machine Works, Inc.	25,175	
5370	Sunco Properties	738,000	
5380	Harris County E.S.D. No. 1	252,000	
5386	Jim Hall	48,000	
5426	Hao Than	467,480	

**TABLE 4
HGCS D PERMITTED WELLS IN THE VICINITY
OF THE ALDINE STUDY AREA**

Well Number	Public Well Owner	Composite Gallons Pumped < 10,000,000	Composite Gallons Pumped >10,000,000
5452	Harvest Communities of Airline	9,511,600	
5546	McDaniels Metals Inc.	37,670	
5552	Parkway Research Corp.	116,996	
5554	Joe Albert	19,663	
5563	John Guillory	63,729	
5580	Afzal Shekhani	60,000	
5617	Milestone Metals, Inc.	4,000,000	
5625	Flame Metallurgical	2,400	
5628	Herb Creek Enterprises, Inc.	48,000	
5647	Fernando Limas Jr.	12,000	
5692	RS Concrete LLC	4,944,400	
5695	Pokrova Ukranian Parish	174,000	
5753	Paradigm Bank	15,000	
5811	Houston Process Systems Inc.	20,800	
5812	Houston Process Systems Inc.	4,160	
5821	Bailiff Enterprises, Inc.	120,000	
5836	Mustang Canvas Co.	17,200	
5838	Kevin Davis	360,000	
5840	Bi-Ro Enterprises	6,000	
5859	Bolts & Nuts Plus	240,000	
5869	Sefton Steel Fabricators, Inc.	91,520	
5870	Sefton Steel Fabricators, Inc.	60,060	
5919	John Michael Corder	120,000	
5925	Mike Sharpton	105,600	
5938	Jose N. Segura	81,000	
5960	James Huff	4,320	
5971	Bob Dimmick	12,500	
5973	Shahid Ali	120,000	
5987	Jamie Garcia	475,300	
5999	Carter McAlexander	273,750	
6014	Roger Reyes	10,890	
6051	I.J. Danley	50,660	
6055	Bahram Sohljou	3,999,150	
6057	Auto Zone #1476	29,000	
6109	Raven Mechanical	47,250	
6112	All States Corporation Inc.	200,000	
6177	Thomas McBride	194,000	
6417	Gene R. Laningham	10,450	
6429	Robert Perez	36,500	

**TABLE 4
HGCS D PERMITTED WELLS IN THE VICINITY
OF THE ALDINE STUDY AREA**

Well Number	Public Well Owner	Composite Gallons Pumped < 10,000,000	Composite Gallons Pumped >10,000,000
6440	Royal Baths Manufacturing Co.	603,136	
6444	SW Century Communications, Inc.	190,000	
6447	Symons Corporation	81,000	
6449	United Rentals Heavy Machinery	1,000,000	
6454	Jerrel W. Parten	500,000	
6456	National Pneumatic Supply, Inc.	7,800	
6463	Mary E. Barrow	3,650	
6473	LST Equipment, Inc.	31,200	
6486	Jet Machine Works	600	
6487	Diamond Bar M Inc.	100,000	
6497	Gail G. Watkins	803,520	
6500	Tex-Star Services Inc.	3,600	
6502	M.S. Beck	72,000	
6520	Southwest Heat Treat	40,800	
6528	Iglesia Dedios Pentecostal	12,000	
6533	Doris A. McFadden	175,200	
6534	Jesus E. Navarro	675	
6536	W.D. Richmond	500,000	
6545	Worldwide Container Service	76,500	
6561	Boring Specialties, Inc.	160,024	
6564	Dr. Roger Mendoza Inc.	18,250	
6566	Deodath & Kaloutie Nandlal	218,000	
6569	I.M. Pena, Inc.	500,000	
6574	Ray Smith	100,103	
6578	Superior Wellhead, Inc.	156,000	
6581	Tejas Industrial Supply, Inc.	240,000	
6582	Timberland Ent., Inc.	4,800	
6584	Robert Velasquez	16,475	
6589	Hallmark Sales Corporation	84,000	
6598	Mansour Shojaie	18,000	
6599	Superior Shot Peening, Inc.	72,000	
6601	Peter Walsh	400,000	
6602	Paul York	175,000	
6608	Domatex, Inc.	12,000	
6620	Wayne Romoser	494,400	
6628	Gertrude J. Salek Trustee	96,000	
6629	Austin's Cabinets & Construction	25,550	
6630	Brookside Memorial Park	693,500	
6631	Brookside Memorial Park	693,500	

**TABLE 4
HGCS D PERMITTED WELLS IN THE VICINITY
OF THE ALDINE STUDY AREA**

Well Number	Public Well Owner	Composite Gallons Pumped < 10,000,000	Composite Gallons Pumped >10,000,000
6635	Lowrance Machine Shop, Inc.	78,000	
6639	Walter S. Mead	7,800	
6640	Mogas Industries, Inc.	1,000,000	
6649	Remet Industries	120,000	
6658	James Davis	72,000	
6665	Theresa V. Miaoulis	167,140	
6672	K & S Contracting, Inc.	3,600	
6674	King Fuels, Inc.	3,982	
6686	Action Fleet & Truck Equipment	36,000	
6687	Bahram Sohljou	3,999,150	
6695	Robert S. Herbert	62,500	
6708	Jacinto De Leon	1,500,000	
6720	Curlee Manufacturing Co.	601,200	
6724	Dorothy Gay Nell Hall	100,000	
6726	Herrera Tile Co., Inc.	182,500	
6731	Cecil Johnson	72,000	
6739	GT Industrial Properties, Inc.	144,000	
6742	Kinard Mechanical & Plumbing	1,000,000	
6743	Hutcherson Tile Co., Inc.	81,120	
6745	Quality II Insulators, Inc.	42,000	
6746	Refuge Temple	1,000,000	
6748	Spring Gardens Nursery	7,011,400	
6749	St. Leo Catholic Church	221,600	
6762	Karen Patterson	4,800	
6770	Donald L. McKoy	15,600	
6783	John Carlo, Inc.	18,250	
6785	Houston Drywall, Inc.	37,600	
6801	Maverick Interests, Ltd.	15,850	
6806	Walter Bradford	60,000	
6808	Champions Resources, Inc.	210,000	
6820	Joe Nowiczewski	600,000	
6826	Tricon Precast Ltd.	6,335,000	
6829	Accuweld	10,075	
6830	David R. Torok	29,500	
6831	Guadalupe Villareal	3,000	
6834	Houshang Sohljou	2,419,350	
6841	Church of Christ in Melrose Park	1,500	
6847	American Pioneer Investments, Inc.	19,000	
6857	Joseph & Alfred Biedrzycki	360,000	

**TABLE 4
HGCS D PERMITTED WELLS IN THE VICINITY
OF THE ALDINE STUDY AREA**

Well Number	Public Well Owner	Composite Gallons Pumped < 10,000,000	Composite Gallons Pumped >10,000,000
6866	Heritage Custom Furniture	15,000	
6874	A & J Custom Homes, Inc.	252,000	
6875	Airline Used Auto Parts	27,000	
6877	Bar-Yam Engineering Co.	90,500	
6886	General Plumbing Contractors, Inc.	48,000	
6894	Morales Cemetery	7,200	
6895	Morales Cemetery	7,200	
6918	Texas Ice Cream Corp.	12,000	
6925	Shirley Nevins	24,000	
6926	Michael R. Ward	7,440	
6930	Avi Ron	150,000	
6940	Karen Nelson	114,000	
6961	Northville Company	30,480	
6985	Gulf Western Ventures, Inc.	7,500	
7040	Hwan Kim	167,043	
7053	Acorn LLC		11,189,900
7060	Old Dominion Freight Line Inc.	183,600	
7103	Mann's Machine & Gear, Inc.	1,045	
7110	Richard Wyman	60,000	
7114	Thomas Eschner	216,000	
7122	Henry Street Investments	1,000,000	
7151	Templo Poder Y Gozo	2,520	
7167	Donnie Keen	105,000	
7170	Ameritek Construction Company	7,200	
7192	Arbor Care, Inc.	95,150	
7198	David J. Abghary	165,200	
7239	Houshang Solhjoui	4,190,900	
7240	WWCS Inc.	57,200	
7243	Jehovah's Aldine Congregation	14,400	
7289	Southwest Heat Treat	35,700	
7325	Juan Trevino	200,000	
7355	Woodcraft Studios	2,400	
7418	RJR Reality	500,000	
7469	C.J. Bruley	500,000	
7481	Formwork Services & Supply	79,670	
7514	John Patella	20,000	
7515	James J. Cole	13,600	
7525	Flame Metallurgical Inc.	18,252	
7536	Vinh V. Nguyen	998,260	

**TABLE 4
HGCS D PERMITTED WELLS IN THE VICINITY
OF THE ALDINE STUDY AREA**

Well Number	Public Well Owner	Composite Gallons Pumped < 10,000,000	Composite Gallons Pumped >10,000,000
7547	James M. & Selena M. Patterson	415,000	
7559	Jack Lee	2,001	
7566	Jim Burns	25,000	
7567	W.E. Cahill	50,000	
7581	Be Pham	1,080,000	
7594	James E. Bishop	50,000	
7599	Red Dot RV Park	635,650	
7603	Royal Bath Manufacturing Co.	381,649	
7616	F.E. Hoback	100,000	
7635	Murphy Shipping & Comm. Svcs.	82,391	
7637	Cactus King	61,730	
7684	Cecil Johnson	96,000	
7691	Henry Wong	18,000	
7694	Woodloch MHP, LLC	3,456,319	
7723	Carlos R. Duran	25,000	
7746	Humble Westfield Loop Road, Ltd.	300,000	
7758	Cecil Johnson	60,000	
7760	Back/Larose	600,000	
7769	B & F Manufacturing	19,300	
7771	Eddie Bancroft	39,000	
7786	Lenore Properties, Inc.	848,550	
7803	A.J. Weaver	246,108	
7852	OEM Components, Inc.	120,000	
7856	9504 Airline Drive Ltd.	1,000,000	
7866	Rayford Maddux	25,650	
7877	Deloris Moore	50,000	
7920	Udelson Realty Investors	1,000,000	
7941	First Cambodian Baptist - Aldine	15,600	
7945	H & B Land Development Inc.	86,400	
7965	Russell Manufacturing & Fabricating, Inc.	195,300	
8007	James Jayroe	3,520	
8017	Neon Electric Corporation	279,190	
8080	Federico Garcia	50,000	
8095	Charley Huynh	35,000	
8139	RS Concrete	4,944,400	
8173	Carlos A. Centes	2,400	
8182	Ozarka Spring Water	2,880	
8214	Cecil Johnson	600,000	
8225	De-Maxs, Inc.	14,600	

**TABLE 4
HGCS D PERMITTED WELLS IN THE VICINITY
OF THE ALDINE STUDY AREA**

Well Number	Public Well Owner	Composite Gallons Pumped < 10,000,000	Composite Gallons Pumped >10,000,000
8249	Pejman Milani	43,200	
8257	Maria Cervantes	220,000	
8295	Chol. S. Song	180,000	
8315	William Lazerko	120,000	
8380	C & B Utilities	6,000	
8403	International Pentecostal Church	100,000	
8438	Petroleum Wholesale Inc.	78,750	
8506	Northwood Baptist Church	12,000	
8538	Cameo Fabricating	36,000	
8543	Laura Karbalai	2,751,000	
8551	J. Karbalai Trustee	250,000	
8565	Cecil Johnson	360,000	
8571	Profirio H. Aguilar	72,128	
8586	Reslink, Inc.	6,200	
8636	Robert E. Buzbee	1,277	
8639	Cookies Bar & Grill	500,000	
8650	Kidd Pipeline & Specialties, Inc.	10,400	
8653	Chien Min Lee	441,000	
8658	Ivette M. Sardina	100,000	
8679	John B. Carey	19,500	
8702	Killingsworth Realty Co.	7,038	
8775	Rolos Carbureators	2,000	
8779	Suzette M. Stidom	150,000	
8794	Houston Pipe Benders	400	
8829	Airline United Methodist Church	40,400	
8856	Sunshine Partnership	5,775	
8881	Red Dot RV Park	635,650	
71xx	Bert. T. Edwards, Jr.	1,000,000	
	Total	222,014,498	2,006,295,843

**TABLE 5
COMPUTATION OF SERVICE ZONE LAND AREAS IN ALDINE ID**

Water

Service Zone	Total Area Including CCNs & Districts (Acres)	Area of CCNs/Districts (Acres)	Unserviced Area (Acres)	Percent Area Served (%)	Percent Area Unserved (%)
1	493	0	493	0	100
2	545	0	545	0	100
3	704	16	688	2	98
4	1,047	482	564	46	54
5	1,041	536	505	52	48
6	360	101	259	28	72
7	311	122	189	39	61
8	2,803	2,065	738	74	26
9	478	334	144	70	30
10	386	0	386	0	100
11	679	0	679	0	100
Total	8,847	3,656	5,191	41	59

Sewer

Service Zone	Total Area Including CCNs & Districts (Acres)	Area of CCNs/Districts (Acres)	Unserviced Area (Acres)	Percent Area Served (%)	Percent Area Unserved (%)
1	493	0	493	0	100
2	545	0	545	0	100
3	704	11	693	2	98
4	1,047	62	985	6	94
5	1,041	411	630	39	61
6	360	101	259	28	72
7	311	122	189	39	61
8	2,803	1,775	1,028	63	37
9	478	334	144	70	30
10	386	0	386	0	100
11	679	0	679	0	100
Total	8,847	2,816	6,031	32	68

Parks & Cemeteries

Name	Area (Acres)
Keith - Weiss Park	481
Melrose Park	104
James Driver Park	37
Crowley Park	39
Morales Cemetery	16
Brookside Cemetery	204
Total	881

EVALUATION OF EXISTING ON-SITE SEWAGE FACILITIES IN THE ALDINE ID

Subdivision Name	Service Zone	Key Map	Water Source	Type of Development	Number of Systems Evaluated	Number of Systems Failing	% Failing	Number Not Suitable For Onsite	In Floodplain	Drainage Type	Soil Type
Woodsdale, Westfield Estates, & Walden Place	SZ-5	413V / 414S	Public	Residential	534	219	41	425	123	Ditch	Class III
Sherwood & Benton Place	SZ-11	414T/U	Private Wells	Comm./Res.	407	209	51	288	407	Ditch	Class II & III
Inwood, Darden, & Melwood Place	SZ-11	414 Q/U	Private Wells	Residential	194	102	53	165	all	Ditch	Class III
Mary Francis & Mary Eleanor	SZ-5	413R/414Z	Public	Residential	266	83	31	205	0	Ditch	Class III
Sequoia Estates	SZ-7	374Z	Private Wells	Residential	130	75	58	79	0	Ditch	Class III
North Houston Heights & Lanewood Place	SZ-8	414 P/Q	Private Well	Residential	182	68	37	119	0	Ditch	Class II & III
Greenwood Village	SZ-5	414P	Public	Residential	100	48	48	91	34	Ditch	Class III
Castlewood	SZ-4	374W/414A/E	Public	Residential	312	44	14	37	0	Ditch	Class III & IV
Benton & Emerson Place	SZ-11	414V/S	Private Wells	Residential	126	43	34	97	126	Ditch	Class III
Stettner	SZ-5	413 R	Public	Residential	42	42	100	41	0	Ditch	Class III
Kenwood Place	SZ-9	414 D/E	Private Wells	Residential	183	42	23	60	112	Ditch	Class II
Tasfield/Laird	SZ-8	414T	Public	Residential	56	42	75	68	68	Ditch	Class II
Parkwood Estates	SZ-7	374Z	Private Wells	Comm./Res.	105	36	34	22	0	Ditch	Class III
Aldine Place	SZ-2	373Z	Private Wells	Residential	216	35	16	138	partial	Ditch	Class III
Lyncrest	SZ-10	414 L/Q	Private Well	Residential	70	31	44	43	0	Ditch	Class IV
Northington Estates	SZ-10	414M	Private Wells	Residential	151	26	17	35	0	Ditch	Class III
Wright Loan & Security & Gish Subdivision	SZ-11	414 Q/R	Public & Priv	Comm./Res.	81	25	31	14	0	Ditch	Class III
Aldine Gardens, Slater Parker, Bergville, Greenwood, Civic Place	SZ-3	413 C/G	Public & Priv	Comm./Res.	239	23	10	24	0	Ditch	Class III
Oakwilde & Castledale	SZ-5	414 N/P	Public	Residential	71	22	31	61	0	Ditch	Class III
Hy Point	SZ-5	413Q	Private Wells	Comm./Res.	73	21	29	43	0	Ditch	Class II
Woodsdale & Hardy Acres	SZ-5	414S	Public & Priv	Residential	152	18	12	37	0	Ditch	Class III
Carol Place, Homestead Woods, Hillside Gardens	SZ-9	414D	Private Wells	Residential	45	18	40	20	44	Ditch	Class II
Lindale Farms	SZ-5	413R/414N	Private Wells	Residential	43	18	42	22	43	Ditch	Class IV
Orange Grove Britton	SZ-8	414 K/L	Public	Residential	109	17	16	25	0	Ditch	Class III
Magnolia Gardens	SZ-4	373Z/413 D/H	Private Wells	Comm./Res.	246	14	6	115	61	Ditch	Class III
Hahl Sites	SZ-5	413 L/M/Q	Private Wells	Residential	125	11	9	8	125	Ditch	Class II
Virginia Acres	SZ-5	413Q	Private Wells	Comm./Res.	45	9	20	9	0	Ditch	Class II
Allen & Fondren	SZ-5	413R	Private Wells	Residential	25	9	36	10	0	Ditch	Class II
Lonoke Place	SZ-8	414N	Private Well	Comm./Res.	37	8	22	30	0	Curb & Gutter	
International, Westfield & Manor	SZ-5	413R	Public	Residential	29	7	24	15	0	Ditch	Class II
Excelsior Gardens & Aldine Townsites	SZ-1	373 T/U/X/Y	Private Wells	Comm./Res.	58	5	9	16	0	Ditch	Class III
Aldine City (not fully dev.)	SZ-6	374X	Private Wells	Residential	7	4	57	0	0	Ditch	Class III
T. S. Lubbock Survey		413M	Public & Priv	Comm./Res.	12	3	25	2	0	Ditch	Class II
Hardy Heights	SZ-5	413 Q/R	Private Wells		30	2	7	16	0	Curb/Gutter	Class III
Hartley Acres	SZ-8	414P	Public & Priv.	Comm./Res.	26	1	4	8	0	Ditch	Class II
Aldine Bender(2000-5718)		373Z-373Z	Private Wells	Commercial	33	1	3	5	0	Curb/Gutter	Class III
Britton/Whitney Survey		414L	Private Wells	Comm./Res.	5	0	0	0	0	Ditch	Class III
TOTAL					4565	1381		2393			

TABLE 7

ANALYSIS OF EXISTING PUBLIC WATER USE IN ALDINE ID

Public Utility	General Location	Subsection Acreage	HGCSD Well Nos.	Annual Usage, MG	Daily Usage, GPD	Annual Use GPD/Acre
Southwest Utilities	Lauder & Trailcrest	39.20	2372, 4189	37.60	103,013.70	2627.90
Suburban Utility Co.	Lauder & Trailcrest	126.09	2001	30.10	82,465.75	654.02
Greenwood Place		4.80		0.00	13.15	
Champ's Water Co.	NE corner of Lauder & Reeveston	10.89	2428	7.46	20,424.66	1875.54
Champ's Water Co.	NW corner of Aldine Westfield & Aldine Iv	61.70	2429, 2430, 3438	36.30	99,452.05	1611.86
Southwest Utilities	SE corner of Keith-Weiss Park	153.11	2373, 4190	58.00	158,904.11	1037.83
Sunbelt FWSD	Between Aldine Westfield and Halls Bayc	568.11	2211, 2212, 2213	285.00	780,821.92	1374.42
Southwest Utilities	Norlinda	6.60	2374	3.50	9,589.04	1452.89
HC/MUD 182	SE corner of Greens Bayou & Aldine Ber	100.55	3929	13.23	36,246.58	360.48
Sequoia I.D.	Sequoia Bend & Aldine Bender	122.30	2191	47.75	130,821.92	1069.68
Sunbelt FWSD	Lauder & JFK	841.70	2208, 2209, 2210, 3353	423.00	1,158,904.11	1376.86
HC/WCID 74	West of U.S 59 on Aldine Mail	370.10	2137, 2971	258.94	709,424.66	1916.85
Southwest Utilities	Bentley & Rosemary	337.02	2360, 3903	88.40	242,191.78	718.63
Southwest Utilities		266.50	3948	58.10	159,178.08	597.29
Pine Village PUD	East of U.S. 59 at Aldine Mail	133.54	1667	73.30	200,821.92	1503.79
TOTAL		3,142.22		1420.68	3,892,273.42	
AVERAGE					259,484.89	
MINIMUM					13.15	
MAXIMUM					1,158,904.11	

TABLE 7.1

ANALYSIS OF EXISTING PUBLIC WATER USE IN ALDINE WEST

Public Utility	General Location	Subsection Acreage	HGCSD Well Nos.	Annual Usage, MG	Daily Usage, GPD	Annual Use GPD/Acre
C & P Utilities	Sellers Road & Hollyvale	44.75	2512, 2513	57.60	157,808.22	3526.44
Sunbelt FWSD	S of Halls Bayou at Cheswick	260.34	1872, 3525	110.28	302,131.51	1160.54
Sunbelt FWSD	NE corner of Aldine Mail & Lijja	57.50	2238	15.48	42,410.96	737.58
Sharafi/Mozafrian	Yale & West Nellis	17.00	4582, 4583	5.29	14,482.19	851.89
Westfield MHP	Gulf Bank & Glennlast	84.45	2702, 3765	33.40	91,506.85	1083.56
Niftsch & Son	Karen & Breacrest	213.84	2040, 2041	71.03	194,591.78	909.99
Champ's Water Servi	Airline & Mading	23.70	3038, 3039	15.86	43,463.01	1833.88
TOTAL		701.58			846,394.52	
AVERAGE					120,913.50	
MINIMUM					14,482.19	
MAXIMUM					302,131.51	

**TABLE 8
SURFACE WATER TRANSMISSION FLOWS BY SERVICE ZONE IN ALDINE ID**

Projected Total Water Demand in Aldine ID (IOUs/Districts and unserved areas)

Service Zone	Area (acres)	Peak Day Flow			Design Average Daily Flow		
		(gpd/acre)	(mgd)	(gpm)	(gpd/acre)	(mgd)	(gpm)
1	493	1,500	0.74	514	1,000	0.49	343
2	545	1,500	0.82	568	1,000	0.55	379
3	704	1,500	1.06	733	1,000	0.70	489
4	1,047	1,500	1.57	1,090	1,000	1.05	727
5	1,041	1,500	1.56	1,084	1,000	1.04	723
6	360	1,500	0.54	375	1,000	0.36	250
7	311	1,500	0.47	324	1,000	0.31	216
8	2,803	1,500	4.20	2,920	1,000	2.80	1,947
9	478	1,500	0.72	498	1,000	0.48	332
10	386	1,500	0.58	402	1,000	0.39	268
11	679	1,500	1.02	708	1,000	0.68	472
Sub-total:	8,847		13.27	9,216		8.85	6,144

Projected Water Demand for the Aldine West Study Area

Sub-section	Area (acres)	Peak Day Flow			Design Average Daily Flow		
		(gpd/acre)	(mgd)	(gpm)	(gpd/acre)	(mgd)	(gpm)
Total area outside AID	4,348	1,500	6.52	4,529	1,000	4.35	3019

Total (including Aldine West) =	19.79	13.20
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**TABLE 9
ALLOCATION OF COSTS OF THE LAUDER ROAD
SURFACE WATER TRANSMISSION LINE IN ALDINE ID**

Line Segment 1			
From: Lauder @ Hirsch	Line Size =	24 Inches	
To: Lauder @ 200 ft West of Hirsch	Length (ft) =	200	
	Cost/foot = \$	275	
	Total cost = \$	55,000	
	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost
Unserved Areas in SZ- 3 & 4	2.33	35%	\$ 19,058
Unserved Areas in SZ- 1 & 2	1.55	23%	\$ 12,685
Champ's Water Company	0.1095	2%	\$ 896
Greenwood Place	0.0075	0%	\$ 61
Suburban Utility	0.19	3%	\$ 1,547
Sunbelt FWSD	1.26	19%	\$ 10,339
HC WCID 74	0.56	8%	\$ 4,543
Pine Village PUD	0.20	3%	\$ 1,645
Unserved Areas in SZ- 9	0.52	8%	\$ 4,224
Total	6.72	100%	\$ 55,000

Line Segment 2			
From: Lauder @ 200 ft West of Hirsch	Line Size =	24 Inches	
To: Lauder @ US 59	Length (ft) =	3,200	
	Cost/foot = \$	275	
	Total cost = \$	880,000	
	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost
Unserved Areas in SZ- 3 & 4	2.33	39%	\$ 341,355
Unserved Areas in SZ- 1 & 2	1.55	26%	\$ 227,203
Champ's Water Company	0.1095	2%	\$ 16,056
Greenwood Place	0.0075	0%	\$ 1,100
Suburban Utility	0.19	3%	\$ 27,713
Sunbelt FWSD	1.26	21%	\$ 185,194
HC WCID 74	0.56	9%	\$ 81,380
Total	6.00	100%	\$ 880,000

Line Segment 3 (US 59)			
From: Lauder @ US 59 (East Side)	Line Size =	24 Inches	
To: Lauder @ US 59 (West Side)	Length (ft) =	300	
	Cost/foot = \$	1,500	
	Total cost = \$	450,000	
	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost
Unserved Areas in SZ- 3 & 4	2.33	39%	\$ 174,556
Unserved Areas in SZ- 1 & 2	1.55	26%	\$ 116,183
Champ's Water Company	0.1095	2%	\$ 8,210
Greenwood Place	0.0075	0%	\$ 562
Suburban Utility	0.19	3%	\$ 14,171
Sunbelt FWSD	1.26	21%	\$ 94,701
HC WCID 74	0.56	9%	\$ 41,615
Total	6.00	100%	\$ 450,000

**TABLE 9
ALLOCATION OF COSTS OF THE LAUDER ROAD
SURFACE WATER TRANSMISSION LINE IN ALDINE ID**

Line Segment 4		Line Size =	24 Inches
From:Lauder @ US 59 (West Side)		Length (ft) =	2,800
To: Lauder @ Ciceter		Cost/foot = \$	275
		Total cost = \$	770,000
	Participant	Flow Needed (mgd)	% of Total Flow (%)
	Unserved Areas in SZ- 3 & 4	2.33	39%
	Unserved Areas in SZ- 1 & 2	1.55	26%
	Champ's Water Company	0.1095	2%
	Greenwood Place	0.0075	0%
	Suburban Utility	0.19	3%
	Sunbelt FWSD	1.26	21%
	HC WCID 74	0.56	9%
	Total	6.00	100%
			\$ 770,000

Line Segment 5		Line Size =	24 Inches
From:Lauder @ Ciceter		Length (ft) =	4,000
To: Lauder @ JFK		Cost/foot = \$	275
		Total cost = \$	1,100,000
	Participant	Flow Needed (mgd)	% of Total Flow (%)
	Unserved Areas in SZ- 3 & 4	2.33	43%
	Unserved Areas in SZ- 1 & 2	1.55	28%
	Champ's Water Company	0.1095	2%
	Greenwood Place	0.0075	0%
	Suburban Utility	0.19	3%
	Sunbelt FWSD	1.26	23%
	Total	5.45	100%
			\$ 1,100,000

Line Segment 6		Line Size =	24 Inches
From:Lauder @ JFK		Length (ft) =	6,400
To: Lauder @ 1600 ft East of Aldine Westfield		Cost/foot = \$	275
		Total cost = \$	1,760,000
	Participant	Flow Needed (mgd)	% of Total Flow (%)
	Unserved Areas in SZ- 3 & 4	2.33	56%
	Unserved Areas in SZ- 1 & 2	1.55	37%
	Champ's Water Company	0.1095	3%
	Greenwood Place	0.0075	0%
	Suburban Utility	0.19	5%
	Total	4.18	100%
			\$ 1,760,000

**TABLE 9
ALLOCATION OF COSTS OF THE LAUDER ROAD
SURFACE WATER TRANSMISSION LINE IN ALDINE ID**

<u>Line Segment 7</u>		Line Size =	24 Inches
From: Lauder @ 1600 ft East of Aldine Westfield		Length (ft) =	6,540
To: Lauder @ Easement		Cost/foot = \$	275
		Total cost = \$	1,798,500
	Participant	Flow Needed (mgd)	% of Total Flow (%) Participant Cost
	Unserved Areas in SZ- 3 & 4	2.33	58% \$ 1,048,168
	Unserved Areas in SZ- 1 & 2	1.55	39% \$ 697,653
	Champ's Water Company	0.1095	3% \$ 49,302
	Greenwood Place	0.0075	0% \$ 3,377
	Total	3.99	100% \$ 1,798,500

<u>Line Segment 8</u>		Line Size =	16 Inches
From: Lauder @ Easement		Length (ft) =	4,200
To: Easement @ Aldine Mail Route		Cost/foot = \$	250
		Total cost = \$	1,050,000
	Participant	Flow Needed (mgd)	% of Total Flow (%) Participant Cost
	Unserved Areas in SZ- 3 & 4	2.33	60% \$ 630,406
	Unserved Areas in SZ- 1 & 2	1.55	40% \$ 419,594
	Total	3.88	100% \$ 1,050,000

**TABLE 10
ALLOCATION OF ESTIMATED COSTS OF THE LAUDER ROAD
SURFACE WATER TRANSMISSION LINE
IN ALDINE ID**

Participant Line Segment	Unserviced Areas in SZ- 3 & 4	Unserviced Areas in SZ- 1 & 2	Champ's Water Company	Greenwood Place	Suburban Utility	Sunbelt FWSD	HC WCID 74	Pine Village PUD	Unserviced Areas in SZ- 9	Line Segment Total Cost
<i>Line Segments with Aldine ID participation</i>										
1	\$ 19,058	\$ 12,685	\$ 896	\$ 61	\$ 1,547	\$ 10,339	\$ 4,543	\$ 1,645	\$ 4,224	\$ 55,000
2	\$ 341,355	\$ 227,203	\$ 16,056	\$ 1,100	\$ 27,713	\$ 185,194	\$ 81,380			\$ 880,000
3	\$ 174,556	\$ 116,183	\$ 8,210	\$ 562	\$ 14,171	\$ 94,701	\$ 41,615			\$ 450,000
4	\$ 298,685	\$ 198,803	\$ 14,049	\$ 962	\$ 24,249	\$ 162,044	\$ 71,207			\$ 770,000
5	\$ 470,174	\$ 312,944	\$ 22,115	\$ 1,515	\$ 38,171	\$ 255,081				\$ 1,100,000
6	\$ 979,390	\$ 651,875	\$ 46,067	\$ 3,155	\$ 79,512					\$ 1,760,000
7	\$ 1,048,168	\$ 697,653	\$ 49,302	\$ 3,377						\$ 1,798,500
8	\$ 630,406	\$ 419,594								\$ 1,050,000
<i>Sub-Total:</i>	\$ 3,961,793	\$ 2,636,941	\$ 156,695	\$ 10,733	\$ 185,364	\$ 707,360	\$ 198,745	\$ 1,645	\$ 4,224	\$ 7,863,500
<i>15 % Contingency</i>	\$ 594,269	\$ 395,541	\$ 23,504	\$ 1,610	\$ 27,805	\$ 106,104	\$ 29,812	\$ 247	\$ 634	\$ 1,179,525
<i>Sub-Total:</i>	\$ 4,556,061	\$ 3,032,482	\$ 180,200	\$ 12,342	\$ 213,169	\$ 813,464	\$ 228,557	\$ 1,892	\$ 4,858	\$ 9,043,025
<i>5 % Engineering, Surveying & Testing</i>	\$ 683,409	\$ 454,872	\$ 27,030	\$ 1,851	\$ 31,975	\$ 122,020	\$ 34,283	\$ 284	\$ 729	\$ 1,356,454
Participant Total Cost	\$ 5,239,471	\$ 3,487,354	\$ 207,230	\$ 14,194	\$ 245,144	\$ 935,484	\$ 262,840	\$ 2,176	\$ 5,586	\$ 10,399,479

**TABLE 11
ALLOCATION OF COSTS OF THE MOUNT HOUSTON ROAD
SURFACE WATER TRANSMISSION LINE IN ALDINE ID**

Line Segment 1		Line Size =	20 Inches		
From: Mt. Houston Rd. @ Hirsch		Length (ft) =	200		
To: Mt. Houston Rd. @ 200 ft West of Hirsch		Cost/foot = \$	260		
		Total cost = \$	52,000		
Participant	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost		
Aldine West- 1	3.26	27%	\$ 14,050		
Aldine West- 2	3.26	27%	\$ 14,050		
Unserved Areas in SZ- 5	0.79	7%	\$ 3,388		
Sunbelt FWSD	0.85	7%	\$ 3,672		
Southwest Utilities	1.20	10%	\$ 5,185		
Unserved Areas in SZ- 8	1.11	9%	\$ 4,771		
Unserved Areas in SZ- 10	0.58	5%	\$ 2,495		
Unserved Areas in SZ- 11	1.02	8%	\$ 4,389		
Total	12.07	100%	\$ 52,000		

Line Segment 2		Line Size =	20 Inches		
From: Mt. Houston Rd. @ 200 ft West of Hirsch		Length (ft) =	3,300		
To: Mt. Houston Rd. @ US 59		Cost/foot = \$	260		
		Total cost = \$	858,000		
Participant	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost		
Aldine West- 1	3.26	31%	\$ 267,198		
Aldine West- 2	3.26	31%	\$ 267,198		
Unserved Areas in SZ- 5	0.79	8%	\$ 64,437		
Sunbelt FWSD	0.85	8%	\$ 69,832		
Southwest Utilities	1.20	11%	\$ 98,601		
Unserved Areas in SZ- 8	1.11	11%	\$ 90,733		
Total	10.47	100%	\$ 858,000		

**TABLE 11
ALLOCATION OF COSTS OF THE MOUNT HOUSTON ROAD
SURFACE WATER TRANSMISSION LINE IN ALDINE ID**

Line Segment 3 (US 59)		Line Size =	20 Inches		
From: Mt. Houston Rd. @ US 59 (East Side)		Length (ft) =	300		
To: Mt. Houston Rd. @ US 59 (West Side)		Cost/foot = \$	1,500		
		Total cost = \$	450,000		
Participant	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost		
Aldine West- 1	3.26	31%	\$ 140,139		
Aldine West- 2	3.26	31%	\$ 140,139		
Unservd Areas in SZ- 5	0.79	8%	\$ 33,796		
Sunbelt FWSD	0.85	8%	\$ 36,625		
Southwest Utilities	1.20	11%	\$ 51,714		
Unservd Areas in SZ- 8	1.11	11%	\$ 47,587		
Total	10.47	100%	\$ 450,000		

Line Segment 4		Line Size =	20 Inches		
From: Mt. Houston Rd. @ US 59 (West Side)		Length (ft) =	2,000		
To: Mt. Houston Rd @ btwn Vickery & Conner		Cost/foot = \$	260		
		Total cost = \$	520,000		
Participant	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost		
Aldine West- 1	3.26	31%	\$ 161,938		
Aldine West- 2	3.26	31%	\$ 161,938		
Unservd Areas in SZ- 5	0.79	8%	\$ 39,053		
Sunbelt FWSD	0.85	8%	\$ 42,323		
Southwest Utilities	1.20	11%	\$ 59,758		
Unservd Areas in SZ- 8	1.11	11%	\$ 54,990		
Total	10.47	100%	\$ 520,000		

**TABLE 11
ALLOCATION OF COSTS OF THE MOUNT HOUSTON ROAD
SURFACE WATER TRANSMISSION LINE IN ALDINE ID**

Line Segment 5		Line Size =	20 Inches	
From: Mt. Houston Rd @ btwn Vickery & Conner		Length (ft) =	1,900	
To: Mt. Houston Rd. @ Glogger		Cost/foot = \$	260	
		Total cost = \$	494,000	
Participant	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost	
Aldine West- 1	3.26	35%	\$ 172,034	
Aldine West- 2	3.26	35%	\$ 172,034	
Unserved Areas in SZ- 5	0.79	8%	\$ 41,488	
Sunbelt FWSD	0.85	9%	\$ 44,961	
Southwest Utilities	1.20	13%	\$ 63,484	
Total	9.36	100%	\$ 494,000	

Line Segment 6		Line Size =	20 Inches	
From: Mt. Houston Rd. @ Glogger		Length (ft) =	8,600	
To: Keith Weiss Park @ Aldine Westfield		Cost/foot = \$	260	
		Total cost = \$	2,236,000	
Participant	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost	
Aldine West- 1	3.26	35%	\$ 778,680	
Aldine West- 2	3.26	35%	\$ 778,680	
Unserved Areas in SZ- 5	0.79	8%	\$ 187,786	
Sunbelt FWSD	0.85	9%	\$ 203,508	
Southwest Utilities	1.20	13%	\$ 287,347	
Total	9.36	100%	\$ 2,236,000	

**TABLE 11
ALLOCATION OF COSTS OF THE MOUNT HOUSTON ROAD
SURFACE WATER TRANSMISSION LINE IN ALDINE ID**

Line Segment 7		Line Size =	12 Inches	
From: Keith Weiss Park @ Aldine Westfield		Length (ft) =	2,000	
To: Breacrest @ Aldine Westfield		Cost/foot = \$	225	
		Total cost = \$	450,000	
Participant	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost	
Aldine West- 1	3.26	40%	\$ 179,820	
Aldine West- 2	3.26	40%	\$ 179,820	
Unserved Areas in SZ- 5	0.79	10%	\$ 43,365	
Sunbelt FWSD	0.85	10%	\$ 46,996	
Total	8.16	100%	\$ 450,000	

Line Segment 8		Line Size =	16 Inches	
From: Keith Weiss Park @ Aldine Westfield		Length (ft) =	4,000	
To: Aldine Westfield @ Isom		Cost/foot = \$	250	
		Total cost = \$	1,000,000	
Participant	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost	
Aldine West- 1	3.26	45%	\$ 446,198	
Aldine West- 2	3.26	45%	\$ 446,198	
Unserved Areas in SZ- 5	0.79	11%	\$ 107,605	
Total	7.31	100%	\$ 1,000,000	

Line Segment 9		Line Size =	16 Inches	
From: Aldine Westfield @ Isom		Length (ft) =	4,900	
To: Isom @ Easement		Cost/foot = \$	250	
		Total cost = \$	1,225,000	
Participant	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost	
Aldine West- 1	3.26	45%	\$ 546,592	
Aldine West- 2	3.26	45%	\$ 546,592	
Unserved Areas in SZ- 5	0.79	11%	\$ 131,816	
Total	7.31	100%	\$ 1,225,000	

**TABLE 11
ALLOCATION OF COSTS OF THE MOUNT HOUSTON ROAD
SURFACE WATER TRANSMISSION LINE IN ALDINE ID**

Line Segment 10		Line Size =	16 Inches	
From: Isom @ Easement		Length (ft) =	1,000	
To: Easement @ Aldine Mail Rt.		Cost/foot = \$	250	
		Total cost = \$	250,000	
Participant	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost	
Aldine West- 1	3.26	50%	\$	125,000
Aldine West- 2	3.26	50%	\$	125,000
Total		6.52	100%	\$ 250,000

Line Segment 11		Line Size =	16 Inches	
From: Easement @ Aldine Mail Rt.		Length (ft) =	4,300	
To: Easement @ Lauder		Cost/foot = \$	250	
		Total cost = \$	1,075,000	
Participant	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost	
Aldine West- 1	3.26	50%	\$	537,500
Aldine West- 2	3.26	50%	\$	537,500
Total		6.52	100%	\$ 1,075,000

Line Segment 12		Line Size =	16 Inches	
From: Easement @ Aldine Mail Rt.		Length (ft) =	4,400	
To: Aldine Mail Rt. @ Henry		Cost/foot = \$	250	
		Total cost = \$	1,100,000	
Participant	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost	
Aldine West- 1	3.26	50%	\$	550,000
Aldine West- 2	3.26	50%	\$	550,000
Total		6.52	100%	\$ 1,100,000

**TABLE 11
ALLOCATION OF COSTS OF THE MOUNT HOUSTON ROAD
SURFACE WATER TRANSMISSION LINE IN ALDINE ID**

<u>Line Segment 13</u>		Line Size =	16 Inches
From: Aldine Mail Rt. @ Henry		Length (ft) =	1,200
To: Aldine Mail Rt. @ Lilja		Cost/foot = \$	250
		Total cost = \$	300,000
Participant	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost
Aldine West- 1	3.26	100%	\$ 300,000
Total	3.26	100%	\$ 300,000

<u>Line Segment 14</u>		Line Size =	16 Inches
From: Aldine Mail Rt. @ Lilja		Length (ft) =	1,300
To: Lilja @ Helms		Cost/foot = \$	250
		Total cost = \$	325,000
Participant	Flow Needed (mgd)	% of Total Flow (%)	Participant Cost
Aldine West- 1	3.26	100%	\$ 325,000
Total	3.26	100%	\$ 325,000

**TABLE 12
ALLOCATION OF ESTIMATED COSTS OF THE MOUNT HOUSTON ROAD
SURFACE WATER TRANSMISSION LINE IN ALDINE ID**

Participant Line Segment	Aldine West-1	Aldine West-2	Unserviced Areas in SZ-5	Sunbelt FWSD	Southwest Utilities	Unserviced Areas in SZ-8	Unserviced Areas in SZ-10	Unserviced Areas in SZ-11	Line Segment Total Cost
Line Segments with Aldine ID participation									
1	\$ 14,050	\$ 14,050	\$ 3,388	\$ 3,672	\$ 5,185	\$ 4,771	\$ 2,495	\$ 4,389	\$ 52,000
2	\$ 267,198	\$ 267,198	\$ 64,437	\$ 69,832	\$ 98,601	\$ 90,733			\$ 858,000
3	\$ 140,139	\$ 140,139	\$ 33,796	\$ 36,625	\$ 51,714	\$ 47,587			\$ 450,000
4	\$ 161,938	\$ 161,938	\$ 39,053	\$ 42,323	\$ 59,758	\$ 54,990			\$ 520,000
5	\$ 172,034	\$ 172,034	\$ 41,488	\$ 44,961	\$ 63,484				\$ 494,000
6	\$ 778,680	\$ 778,680	\$ 187,786	\$ 203,508	\$ 287,347				\$ 2,236,000
7	\$ 179,820	\$ 179,820	\$ 43,365	\$ 46,996					\$ 450,000
8	\$ 446,198	\$ 446,198	\$ 107,605						\$ 1,000,000
9	\$ 546,592	\$ 546,592	\$ 131,816						\$ 1,225,000
10	\$ 125,000	\$ 125,000							\$ 250,000
11	\$ 537,500	\$ 537,500							\$ 1,075,000
12	\$ 550,000	\$ 550,000							\$ 1,100,000
	\$ 3,919,148	\$ 3,919,148	\$ 652,734	\$ 447,916	\$ 566,089	\$ 198,080	\$ 2,495	\$ 4,389	\$ 9,710,000
<i>Sub-Total:</i>	\$ 587,872	\$ 587,872	\$ 97,910	\$ 67,187	\$ 84,913	\$ 29,712	\$ 374	\$ 658	\$ 1,456,500
<i>15 % Contingency:</i>	\$ 4,507,020	\$ 4,507,020	\$ 750,644	\$ 515,104	\$ 651,002	\$ 227,792	\$ 2,870	\$ 5,048	\$ 11,166,500
<i>Sub-Total:</i>	\$ 676,053	\$ 676,053	\$ 112,597	\$ 77,266	\$ 97,650	\$ 34,169	\$ 430	\$ 757	\$ 1,674,975
<i>15 % Engineering, Surveying & Testing:</i>	\$ 5,183,073	\$ 5,183,073	\$ 863,241	\$ 592,369	\$ 748,652	\$ 261,961	\$ 3,300	\$ 5,805	\$ 12,841,475
Total:									
Line Segments with Aldine West participation									
13	\$ 300,000								\$ 300,000
14	\$ 325,000								\$ 325,000
	\$ 625,000								
<i>Sub-Total:</i>	\$ 93,750								
<i>15 % Contingency:</i>	\$ 718,750								
<i>Sub-Total:</i>	\$ 107,813								
<i>15 % Engineering, Surveying & Testing:</i>	\$ 826,563								
Total:									
Participant Total Cost	\$ 6,009,636	\$ 5,183,073	\$ 863,241	\$ 592,369	\$ 748,652	\$ 261,961	\$ 3,300	\$ 5,805	\$ 13,668,038

TABLE 13.1
PRELIMINARY COST ESTIMATE FOR A
GRAVITY SEWER SYSTEM & WATER SYSTEM TO SERVE SERVICE ZONE 1, HARRIS COUNTY, TEXAS

Platted Tracts = 228 Existing Occupied Tracts = 136

ITEM DESCRIPTION				
SANITARY SEWER SYSTEM	Quantity	Unit	Unit Cost	Item Cost
8-inch SDR 26 PVC Gravity Sewer	800	LF	\$35	\$28,000
10-inch SDR 26 PVC Gravity Sewer	2,600	LF	\$40	\$104,000
12-inch SDR 26 PVC Gravity Sewer	9,300	LF	\$45	\$418,500
15-inch SDR 26 PVC Gravity Sewer	10,600	LF	\$50	\$530,000
18-inch SDR 26 PVC Gravity Sewer	4,000	LF	\$55	\$220,000
Bore & Jack 8-inch sewer	215	LF	\$100	\$21,500
Bore & Jack 12-inch sewer	800	LF	\$150	\$120,000
Manholes	62	EA	\$3,000	\$186,000
6-inch service lines (short side)	71	EA	\$600	\$42,600
6-inch service lines (long side)	71	EA	\$1,500	\$106,500
Driveway Repairs	136	EA	\$500	\$68,000
Connect service lines to customer lines	228	LF	\$500	\$114,000
Drain & Demolish Septic Tanks	136	LF	\$500	\$68,000
Subtotal				\$2,027,100
Lift Station & Force Main				
Force Main to Reeveston WWTP	4,000	LF	\$35	\$140,000
Concrete wet well, valve box, pumps, controls & accessories	1	LS	\$100,000	\$100,000
Subtotal				\$240,000
Wastewater Treatment Plant Capacity	616,250	GPD	\$5	\$3,081,250
Subtotal Sanitary Sewer System				\$5,348,350
WATER DISTRIBUTION SYSTEM				
8-inch waterline	10,800	LF	\$35	\$378,000
12-inch waterline	21,400	LF	\$45	\$963,000
Bore & Jack 8-inch water line	400	LF	\$100	\$40,000
Bore & Jack 12-inch water line	100	LF	\$150	\$15,000
6-inch isolation valves	0	EA	\$800	\$0
8-inch isolation valves	14	EA	\$800	\$11,200
12-inch isolation valves	9	EA	\$800	\$7,200
Fire Hydrants	37	EA	\$1,500	\$55,500
Short Side Service w/ Meters	70	EA	\$400	\$28,000
Long Side Service w/ Meters	64	EA	\$800	\$51,200
Driveway Repairs	136	EA	\$500	\$68,000
Decommissioning & Cementing Private Wells	136	EA	\$750	\$102,000
Subtotal Water Distribution System				\$1,719,100
24 Inch Water Transmission Line to City of Houston	1	LS	\$1,261,962	\$1,261,962
Groundwater Storage and Pumping Plant	1	LS	\$500,000	\$500,000
Subtotal Water System Construction Cost				\$3,481,062
SUBTOTAL TOTAL CONSTRUCTION COSTS				\$8,829,412
Contingency @ 15%				\$1,324,412
Subtotal				\$10,153,824
Engineering, Inspection & Testing @12%				\$1,218,459
Geotechnical	27,300	LF	\$1.33	\$36,400
Surveying	27,300	LF	\$4	\$109,200
Subtotal				\$1,364,059
SUBTOTAL TOTAL CAPITAL COSTS				\$11,517,883
Additional Costs				
Lift Station/WWTP Site Acquisition	200,000	SF	\$1	\$200,000
Water Storage & Booster Pumping Site Acquisition	25,000	SF	\$5	\$125,000
Subtotal				\$325,000
TOTAL ESTIMATED CONSTRUCTION COSTS				\$11,842,883

TABLE 13.2
PRELIMINARY COST ESTIMATE FOR A
GRAVITY SEWER SYSTEM & WATER SYSTEM TO SERVE SERVICE ZONE 2, HARRIS COUNTY, TEXAS
Platted Tracts = 389 Existing Occupied Tracts = 233

ITEM DESCRIPTION				
SANITARY SEWER SYSTEM	Quantity	Unit	Unit Cost	Item Cost
8-inch SDR 26 PVC Gravity Sewer	20,000	LF	\$35	\$700,000
10-inch SDR 26 PVC Gravity Sewer	3,000	LF	\$40	\$120,000
12-inch SDR 26 PVC Gravity Sewer	8,500	LF	\$45	\$382,500
15-inch SDR 26 PVC Gravity Sewer	8,800	LF	\$50	\$440,000
Bore & Jack 8-inch sewer	215	LF	\$100	\$21,500
Bore & Jack 12-inch sewer	800	LF	\$150	\$120,000
Manholes	78	EA	\$3,000	\$234,000
6-inch service lines (short side)	68	EA	\$600	\$40,800
6-inch service lines (long side)	68	EA	\$1,500	\$102,000
Driveway Repairs	233	EA	\$500	\$116,500
Connect service lines to customer lines	389	LF	\$500	\$194,500
Drain & Demolish Septic Tanks	233	LF	\$500	\$116,500
Subtotal				\$2,588,300
Lift Station & Force Main				
Force Main to Reeveston WWTP	0	LF	\$35	\$0
Concrete wet well, valve box, pumps, controls & accessories	1	LS	\$100,000	\$100,000
Subtotal				\$100,000
Wastewater Treatment Plant Capacity	681,250	GPD	\$5	\$3,406,250
Subtotal Sanitary Sewer System				\$6,094,550
WATER DISTRIBUTION SYSTEM				
6-inch waterline	8,200	LF	\$25	\$205,000
8-inch waterline	10,400	LF	\$35	\$364,000
12-inch waterline	14,100	LF	\$45	\$634,500
Bore & Jack 6-inch water line	300	LF	\$75	\$22,500
Bore & Jack 8-inch water line	400	LF	\$100	\$40,000
Bore & Jack 12-inch water line	100	LF	\$150	\$15,000
6-inch isolation valves	11	EA	\$800	\$8,800
8-inch isolation valves	8	EA	\$800	\$6,400
12-inch isolation valves	10	EA	\$800	\$8,000
Fire Hydrants	37	EA	\$1,500	\$55,500
Short Side Service w/ Meters	70	EA	\$400	\$28,000
Long Side Service w/ Meters	64	EA	\$800	\$51,200
Driveway Repairs	233	EA	\$500	\$116,500
Decommissioning & Cementing Private Wells	233	EA	\$750	\$174,750
Subtotal Water Distribution System				\$1,525,150
24 Inch Water Transmission Line to City of Houston	1	LS	\$1,141,775	\$1,141,775
Groundwater Storage and Pumping Plant	1	LS	\$500,000	\$500,000
Subtotal Water System Construction Cost				\$3,166,925
SUBTOTAL TOTAL CONSTRUCTION COSTS				\$9,261,475
Contingency @ 15%				\$1,389,221
Subtotal				\$10,650,696
Engineering, Inspection & Testing @12%				\$1,278,084
Geotechnical	40,300	LF	\$1.33	\$53,733
Surveying	40,300	LF	\$4	\$161,200
Subtotal				\$1,493,017
SUBTOTAL TOTAL CAPITAL COSTS				\$12,143,713
Additional Costs				
Lift Station Site Acquisition	10,000	SF	\$5	\$50,000
Water Storage & Booster Pumping Site Acquisition	25,000	SF	\$5	\$125,000
Subtotal				\$175,000
TOTAL ESTIMATED CONSTRUCTION COSTS				\$12,318,713

TABLE 13.3
PRELIMINARY COST ESTIMATE FOR A
GRAVITY SEWER SYSTEM & WATER SYSTEM TO SERVE SERVICE ZONE 3, HARRIS COUNTY, TEXAS

Platted Tracts = 380 Existing Occupied Tracts = 228

ITEM DESCRIPTION				
SANITARY SEWER SYSTEM	Quantity	Unit	Unit Cost	Item Cost
8-inch SDR 26 PVC Gravity Sewer	2,900	LF	\$35	\$101,500
12-inch SDR 26 PVC Gravity Sewer	11,000	LF	\$45	\$495,000
15-inch SDR 26 PVC Gravity Sewer	4,300	LF	\$50	\$215,000
18-inch SDR 26 PVC Gravity Sewer	2,600	LF	\$55	\$143,000
24-inch SDR 26 PVC Gravity Sewer	5,600	LF	\$60	\$336,000
Bore & Jack 8-inch sewer	215	LF	\$100	\$21,500
Bore & Jack 12-inch sewer	800	LF	\$150	\$120,000
Manholes	56	EA	\$3,000	\$168,000
6-inch service lines (short side)	46	EA	\$600	\$27,600
6-inch service lines (long side)	52	EA	\$1,500	\$78,000
Driveway Repairs	228	EA	\$500	\$114,000
Connect service lines to customer lines	380	LF	\$500	\$190,000
Drain & Demolish Septic Tanks	228	LF	\$500	\$114,000
Subtotal				\$2,123,600
Lift Station & Force Main				
Force Main to Halls Bayou WWTP	1,500	LF	\$35	\$52,500
Concrete wet well, valve box, pumps, controls & accessories	1	LS	\$100,000	\$100,000
Subtotal				\$152,500
Wastewater Treatment Plant Capacity	866,250	WWTP	\$5	\$4,331,250
Subtotal Sanitary Sewer System				\$6,607,350
WATER DISTRIBUTION SYSTEM				
6-inch waterline	1,500	LF	\$25	\$37,500
8-inch waterline	9,950	LF	\$35	\$348,250
12-inch waterline	29,200	LF	\$45	\$1,314,000
Bore & Jack 6-inch water line	300	LF	\$75	\$22,500
Bore & Jack 8-inch water line	400	LF	\$100	\$40,000
Bore & Jack 12-inch water line	100	LF	\$150	\$15,000
6-inch isolation valves	2	EA	\$800	\$1,600
8-inch isolation valves	10	EA	\$800	\$8,000
12-inch isolation valves	17	EA	\$800	\$13,600
Fire Hydrants	49	EA	\$1,500	\$73,500
Short Side Service w/ Meters	70	EA	\$400	\$28,000
Long Side Service w/ Meters	64	EA	\$800	\$51,200
Driveway Repairs	228	EA	\$500	\$114,000
Decommissioning & Cementing Private Wells	228	EA	\$750	\$171,000
Subtotal Water Distribution System				\$2,200,650
24 Inch Water Transmission Line to City of Houston	1	LS	\$2,125,300	\$2,125,300
Groundwater Storage and Pumping Plant	1	LS	\$500,000	\$500,000
Subtotal Water System Construction Cost				\$4,825,950
SUBTOTAL TOTAL CONSTRUCTION COSTS				\$11,433,300
Contingency @ 15%				\$1,714,995
Subtotal				\$13,148,295
Engineering, Inspection & Testing @12%				\$1,577,795
Geotechnical	26,400	LF	\$1.33	\$35,200
Surveying	26,400	LF	\$4	\$105,600
Subtotal				\$1,718,595
SUBTOTAL TOTAL CAPITAL COSTS				\$14,866,890
Additional Costs				
Lift Station Site Acquisition	10,000	SF	\$5	\$50,000
Water Storage & Booster Pumping Site Acquisition	25,000	SF	\$3	\$75,000
Subtotal				\$125,000
TOTAL ESTIMATED CONSTRUCTION COSTS				\$14,991,890

TABLE 13.4
PRELIMINARY COST ESTIMATE FOR A
GRAVITY SEWER SYSTEM & WATER SYSTEM TO SERVE SERVICE ZONE 4, HARRIS COUNTY, TEXAS
Platted Tracts = 270 Existing Occupied Tracts = 160

ITEM DESCRIPTION				
SANITARY SEWER SYSTEM				
	Quantity	Unit	Unit Cost	Item Cost
10-inch SDR 26 PVC Gravity Sewer	15,200	LF	\$40	\$608,000
Bore & Jack 10-inch sewer	215	LF	\$100	\$21,500
Manholes	34	EA	\$3,000	\$102,000
6-inch service lines (short side)	45	EA	\$600	\$27,000
6-inch service lines (long side)	36	EA	\$1,500	\$54,000
Driveway Repairs	160	EA	\$500	\$80,000
Connect service lines to customer lines	270	LF	\$500	\$135,000
Drain & Demolish Septic Tanks	160	LF	\$500	\$80,000
Subtotal				\$1,107,500
Lift Station & Force Main				
Force Main to Halls Bayou WWTP	1,000	LF	\$35	\$35,000
Concrete wet well, valve box, pumps, controls & accessories	1	LS	\$100,000	\$100,000
Subtotal				\$135,000
Wastewater Treatment Plant Capacity	1,231,250	GPD	\$5	\$6,156,250
Subtotal Sanitary Sewer System				\$7,398,750
WATER DISTRIBUTION SYSTEM				
8-inch waterline	30,500	LF	\$35	\$1,067,500
12-inch waterline	2,100	LF	\$45	\$94,500
Bore & Jack 8-inch water line	400	LF	\$100	\$40,000
Bore & Jack 12-inch water line	100	LF	\$150	\$15,000
8-inch isolation valves	24	EA	\$800	\$19,200
12-inch isolation valves	2	EA	\$800	\$1,600
Fire Hydrants	39	EA	\$1,500	\$58,500
Short Side Service w/ Meters	70	EA	\$400	\$28,000
Long Side Service w/ Meters	64	EA	\$800	\$51,200
Driveway Repairs	401	EA	\$500	\$200,500
Decommissioning & Cementing Private Wells	401	EA	\$750	\$300,750
Subtotal Water Distribution System				\$1,876,750
24 Inch Water Transmission Line to City of Houston	1	LS	\$1,742,251	\$1,742,251
Groundwater Storage and Pumping Plant	1	LS	\$500,000	\$500,000
Subtotal Water System Construction Cost				\$4,119,001
SUBTOTAL TOTAL CONSTRUCTION COSTS				\$11,517,751
Contingency @ 15%				\$1,727,663
Subtotal				\$13,245,414
Engineering, Inspection & Testing @12%				\$1,589,450
Geotechnical	32,600	LF	\$1.33	\$43,467
Surveying	32,600	LF	\$4	\$130,400
Subtotal				\$1,763,316
SUBTOTAL TOTAL CAPITAL COSTS				\$15,008,730
Additional Costs				
Lift Station Site Acquisition	10,000	SF	\$5	\$50,000
Water Storage & Booster Pumping Site Acquisition	25,000	SF	\$2	\$50,000
Subtotal				\$100,000
TOTAL ESTIMATED CONSTRUCTION COSTS				\$15,108,730

TABLE 13.5
PRELIMINARY COST ESTIMATE FOR A
GRAVITY SEWER SYSTEM & WATER SYSTEM TO SERVE SERVICE ZONE 5, HARRIS COUNTY, TEXAS
Platted Tracts = 1660 Existing Occupied Tracts = 996

ITEM DESCRIPTION				
SANITARY SEWER SYSTEM	Quantity	Unit	Unit Cost	Item Cost
8-inch SDR 26 PVC Gravity Sewer	8,500	LF	\$35	\$297,500
12-inch SDR 26 PVC Gravity Sewer	19,900	LF	\$45	\$895,500
15-inch SDR 26 PVC Gravity Sewer	9,800	LF	\$50	\$490,000
18-inch SDR 26 PVC Gravity Sewer	3,700	LF	\$55	\$203,500
Bore & Jack 8-inch sewer	215	LF	\$100	\$21,500
Bore & Jack 12-inch sewer	800	LF	\$150	\$120,000
Manholes	95	EA	\$3,000	\$285,000
6-inch service lines (short side)	54	EA	\$600	\$32,400
6-inch service lines (long side)	48	EA	\$1,500	\$72,000
Driveway Repairs	996	EA	\$500	\$498,000
Connect service lines to customer lines	1,660	LF	\$500	\$830,000
Drain & Demolish Septic Tanks	996	LF	\$500	\$498,000
Subtotal				\$4,243,400
Lift Station & Force Main				
Force Main to Halls Bayou WWTP	2,200	LF	\$35	\$77,000
Concrete wet well, valve box, pumps, controls & accessories	2	LS	\$100,000	\$200,000
Subtotal				\$277,000
Wastewater Treatment Plant Capacity	787,500	GPD	\$5	\$3,937,500
Subtotal Sanitary Sewer System				\$8,457,900
WATER DISTRIBUTION SYSTEM				
8-inch waterline	29,850	LF	\$35	\$1,044,750
12-inch waterline	9,000	LF	\$45	\$405,000
Bore & Jack 8-inch water line	400	LF	\$100	\$40,000
Bore & Jack 12-inch water line	100	LF	\$150	\$15,000
8-inch isolation valves	31	EA	\$800	\$24,800
12-inch isolation valves	8	EA	\$800	\$6,400
Fire Hydrants	49	EA	\$1,500	\$73,500
Short Side Service w/ Meters	70	EA	\$400	\$28,000
Long Side Service w/ Meters	64	EA	\$800	\$51,200
Driveway Repairs	996	EA	\$500	\$498,000
Decommissioning & Cementing Private Wells	996	EA	\$750	\$747,000
Subtotal Water Distribution System				\$2,933,650
24 Inch Water Transmission Line to City of Houston (Mt. Houston Rd.)	1	LS	\$1,017,393	\$1,017,393
Groundwater Storage and Pumping Plant	1	LS	\$500,000	\$500,000
Subtotal Water System Construction Cost				\$4,451,043
SUBTOTAL TOTAL CONSTRUCTION COSTS				\$12,908,943
Contingency @ 15%				\$1,936,341
Subtotal				\$14,845,284
Engineering, Inspection & Testing @12%				\$1,781,434
Geotechnical	41,900	LF	\$1.33	\$55,867
Surveying	41,900	LF	\$4	\$167,600
Subtotal				\$2,004,901
SUBTOTAL TOTAL CAPITAL COSTS				\$16,850,185
Additional Costs				
Regional Wastewater Treatment Plant Site Acquisition	900,000	SF	\$0.50	\$450,000
Water Storage & Booster Pumping Site Acquisition	25,000	SF	\$3	\$75,000
Subtotal				\$525,000
TOTAL ESTIMATED CONSTRUCTION COSTS				\$17,375,185

TABLE 13.6
PRELIMINARY COST ESTIMATE FOR A
GRAVITY SEWER SYSTEM & WATER SYSTEM TO SERVE SERVICE ZONE 6, HARRIS COUNTY, TEXAS
Platted Tracts = 160 Existing Occupied Tracts = 7

ITEM DESCRIPTION				
SANITARY SEWER SYSTEM	Quantity	Unit	Unit Cost	Item Cost
8-inch SDR 26 PVC Gravity Sewer	1,400	LF	\$35	\$49,000
18-inch SDR 26 PVC Gravity Sewer	3,800	LF	\$55	\$209,000
Bore & Jack 8-inch sewer	215	LF	\$100	\$21,500
Bore & Jack 12-inch sewer	800	LF	\$150	\$120,000
Manholes	9	EA	\$3,000	\$27,000
6-inch service lines (short side)	7	EA	\$600	\$4,200
6-inch service lines (long side)	5	EA	\$1,500	\$7,500
Driveway Repairs	7	EA	\$500	\$3,500
Connect service lines to customer lines	160	LF	\$500	\$80,000
Drain & Demolish Septic Tanks	7	LF	\$500	\$3,500
Subtotal				\$525,200
Lift Station & Force Main				
Force Main to City of Houston	2,000	LF	\$35	\$70,000
Concrete wet well, valve box, pumps, controls & accessories	1	LS	\$100,000	\$100,000
Subtotal				\$170,000
Wastewater Treatment Plant Capacity	323,750	GPD	\$5	\$1,618,750
Subtotal Sanitary Sewer System				\$695,200
WATER DISTRIBUTION SYSTEM				
8-inch waterline	7,000	LF	\$35	\$245,000
Bore & Jack 8-inch water line	400	LF	\$100	\$40,000
8-inch isolation valves	13	EA	\$800	\$10,400
Fire Hydrants	12	EA	\$1,500	\$18,000
Short Side Service w/ Meters	70	EA	\$400	\$28,000
Long Side Service w/ Meters	64	EA	\$800	\$51,200
Driveway Repairs	7	EA	\$500	\$3,500
Decommissioning & Cementing Private Wells	7	EA	\$750	\$5,250
Subtotal Water Distribution System				\$401,350
Water Transmission Line to City of Houston	1	LS	\$50,000	\$50,000
Groundwater Storage and Pumping Plant	1	LS	\$500,000	\$500,000
Subtotal Water System Construction Cost				\$951,350
SUBTOTAL TOTAL CONSTRUCTION COSTS				\$1,646,550
Contingency @ 15%				\$246,983
Subtotal				\$1,893,533
Engineering, Inspection & Testing @12%				\$227,224
Geotechnical	7,000	LF	\$1.33	\$9,333
Surveying	7,000	LF	\$4	\$28,000
Subtotal				\$264,557
SUBTOTAL TOTAL CAPITAL COSTS				\$2,158,090
Additional Costs				
Lift Station Site Acquisition	10,000	SF	\$5	\$50,000
Water Storage & Booster Pumping Site Acquisition	25,000	SF	\$5	\$125,000
Subtotal				\$175,000
TOTAL ESTIMATED CONSTRUCTION COSTS				\$2,333,090

TABLE 13.7
PRELIMINARY COST ESTIMATE FOR A
GRAVITY SEWER SYSTEM & WATER SYSTEM TO SERVE SERVICE ZONE 7, HARRIS COUNTY, TEXAS
Platted Tracts = 270 Existing Occupied Tracts = 160

ITEM DESCRIPTION				
SANITARY SEWER SYSTEM				
	Quantity	Unit	Unit Cost	Item Cost
10-inch SDR 26 PVC Gravity Sewer	15,200	LF	\$40	\$608,000
Bore & Jack 10-inch sewer	215	LF	\$100	\$21,500
Manholes	34	EA	\$3,000	\$102,000
6-inch service lines (short side)	45	EA	\$600	\$27,000
6-inch service lines (long side)	36	EA	\$1,500	\$54,000
Driveway Repairs	160	EA	\$500	\$80,000
Connect service lines to customer lines	270	LF	\$500	\$135,000
Drain & Demolish Septic Tanks	160	LF	\$500	\$80,000
Subtotal				\$1,107,500
Lift Station & Force Main				
Force Main to City of Houston	1,000	LF	\$35	\$35,000
Concrete wet well, valve box, pumps, controls & accessories	1	LS	\$100,000	\$100,000
Subtotal				\$135,000
Wastewater Treatment Plant Capacity	236,250	WWTP	\$5	\$1,181,250
Subtotal Sanitary Sewer System				\$1,242,500
WATER DISTRIBUTION SYSTEM				
6-inch waterline	6,300	LF	\$25	\$157,500
8-inch waterline	7,400	LF	\$35	\$259,000
12-inch waterline	1,800	LF	\$45	\$81,000
Bore & Jack 6-inch water line	300	LF	\$75	\$22,500
Bore & Jack 8-inch water line	400	LF	\$100	\$40,000
Bore & Jack 12-inch water line	100	LF	\$150	\$15,000
6-inch isolation valves	6	EA	\$800	\$4,800
8-inch isolation valves	10	EA	\$800	\$8,000
12-inch isolation valves	2	EA	\$800	\$1,600
Fire Hydrants	20	EA	\$1,500	\$30,000
Short Side Service w/ Meters	70	EA	\$400	\$28,000
Long Side Service w/ Meters	64	EA	\$800	\$51,200
Driveway Repairs	160	EA	\$500	\$80,000
Decommissioning & Cementing Private Wells	160	EA	\$750	\$120,000
Subtotal Water Distribution System				\$741,100
Water Transmission Line to City of Houston	0	LF	\$50,000	\$0
Groundwater Storage and Pumping Plant	1	LS	\$500,000	\$500,000
Subtotal Water System Construction Cost				\$1,241,100
SUBTOTAL TOTAL CONSTRUCTION COSTS				\$2,483,600
Contingency @ 15%				\$372,540
Subtotal				\$2,856,140
Engineering, Inspection & Testing @12%				\$342,737
Geotechnical	15,200	LF	\$1.33	\$20,267
Surveying	15,200	LF	\$4	\$60,800
Subtotal				\$423,803
SUBTOTAL TOTAL CAPITAL COSTS				\$3,279,943
Additional Costs				
Lift Station Site Acquisition	10,000	SF	\$5	\$50,000
Water Storage & Booster Pumping Site Acquisition	25,000	SF	\$3	\$75,000
Subtotal				\$125,000
TOTAL ESTIMATED CONSTRUCTION COSTS				\$3,404,943

TABLE 13.8
PRELIMINARY COST ESTIMATE FOR A
GRAVITY SEWER SYSTEM & WATER SYSTEM TO SERVE SERVICE ZONE 8, HARRIS COUNTY, TEXAS
Platted Tracts = 350 Existing Occupied Tracts = 127

ITEM DESCRIPTION				
SANITARY SEWER SYSTEM				
	Quantity	Unit	Unit Cost	Item Cost
8-inch SDR 26 PVC Gravity Sewer	36,465	LF	\$35	\$1,276,275
10-inch SDR 26 PVC Gravity Sewer	1,420	LF	\$40	\$56,800
18-inch SDR 26 PVC Gravity Sewer	9,900	LF	\$55	\$544,500
Bore & Jack 8-inch sewer	215	LF	\$100	\$21,500
Bore & Jack 10-inch sewer	800	LF	\$150	\$120,000
Manholes	110	EA	\$3,000	\$330,000
6-inch service lines (short side)	141	EA	\$600	\$84,600
6-inch service lines (long side)	128	EA	\$1,500	\$192,000
Driveway Repairs	127	EA	\$500	\$63,500
Connect service lines to customer lines	350	LF	\$500	\$175,000
Drain & Demolish Septic Tanks	127	LF	\$500	\$63,500
Subtotal				\$2,927,675
Lift Station & Force Main				
Force Main to City of Houston	0	LF	\$35	\$0
Concrete wet well, valve box, pumps, controls & accessories	2	LS	\$100,000	\$200,000
Subtotal				\$200,000
Wastewater Treatment Plant	1,285,000	GPD	\$5	\$6,425,000
Subtotal Sanitary Sewer System				\$9,552,675
WATER DISTRIBUTION SYSTEM				
6-inch waterline	8,900	LF	\$25	\$222,500
8-inch waterline	17,550	LF	\$35	\$614,250
12-inch waterline	1,420	LF	\$45	\$63,900
Bore & Jack 6-inch water line	200	LF	\$75	\$15,000
Bore & Jack 8-inch water line	400	LF	\$100	\$40,000
Bore & Jack 12-inch water line	100	LF	\$150	\$15,000
6-inch isolation valves	15	EA	\$800	\$12,000
8-inch isolation valves	25	EA	\$800	\$20,000
12-inch isolation valves	6	EA	\$800	\$4,800
Fire Hydrants	28	EA	\$1,500	\$42,000
Short Side Service w/ Meters	70	EA	\$400	\$28,000
Long Side Service w/ Meters	64	EA	\$800	\$51,200
Driveway Repairs	127	EA	\$500	\$63,500
Decommissioning & Cementing Private Wells	127	EA	\$750	\$95,250
Subtotal Water Distribution System				\$1,064,900
24 Inch Water Transmission Line to City of Houston	1	LS	\$38,486	\$38,486
Groundwater Storage and Pumping Plant	1	LS	\$500,000	\$500,000
Subtotal Water System Construction Cost				\$1,603,386
SUBTOTAL TOTAL CONSTRUCTION COSTS				\$11,156,061
Contingency @ 15%				\$1,673,409
Subtotal				\$12,829,470
Engineering, Inspection & Testing @12%				\$1,539,536
Geotechnical	47,785	LF	\$1.33	\$63,713
Surveying	47,785	LF	\$4	\$191,140
Subtotal				\$1,794,390
SUBTOTAL TOTAL CAPITAL COSTS				\$14,623,860
Additional Costs				
Wastewater Treatment Plant Site Acquisition	225,000	SF	\$2	\$450,000
Water Storage & Booster Pumping Site Acquisition	25,000	SF	\$3	\$75,000
Subtotal				\$525,000
TOTAL ESTIMATED CONSTRUCTION COSTS				\$15,148,860

TABLE 13.9
PRELIMINARY COST ESTIMATE FOR A
GRAVITY SEWER SYSTEM & WATER SYSTEM TO SERVE
KENWOOD PLACE SUBDIVISION IN SERVICE ZONE 9, HARRIS COUNTY, TEXAS
Platted Tracts = 300 Existing Occupied Tracts = 250

ITEM DESCRIPTION	Quantity	Unit	Unit Cost	Item Cost
SANITARY SEWER SYSTEM				
8-inch SDR 26 PVC Gravity Sewer	10,000	LF	\$35	\$350,000
12-inch SDR 26 PVC Gravity Sewer	6,400	LF	\$45	\$288,000
Bore & Jack 8-inch sewer	215	LF	\$100	\$21,500
Bore & Jack 12-inch sewer	800	LF	\$150	\$120,000
Manholes	44	EA	\$3,000	\$132,000
6-inch service lines (short side)	60	EA	\$600	\$36,000
6-inch service lines (long side)	60	EA	\$1,500	\$90,000
Driveway Repairs	125	EA	\$500	\$62,500
Connect service lines to customer lines	250	LF	\$500	\$125,000
Drain & Demolish Septic Tanks	250	LF	\$500	\$125,000
Subtotal				\$1,350,000
Lift Station & Force Main				
Force Main to City of Houston WCID 76 WWTP	1,000	LF	\$35	\$35,000
Concrete wet well, valve box, pumps, controls & accessories	1	LS	\$100,000	\$100,000
Subtotal				\$135,000
City of Houston Wastewater Treatment Plant Capacity	180,000	GPD	\$5	\$900,000
Subtotal Sanitary Sewer System				\$2,385,000
WATER DISTRIBUTION SYSTEM				
6-inch waterline	8,100	LF	\$25	\$202,500
8-inch waterline	10,000	LF	\$35	\$350,000
12-inch waterline	1,000	LF	\$45	\$45,000
Bore & Jack 6-inch water line	400	LF	\$75	\$30,000
Bore & Jack 8-inch water line	400	LF	\$100	\$40,000
Bore & Jack 12-inch water line	100	LF	\$150	\$15,000
6-inch isolation valves	2	EA	\$800	\$1,600
8-inch isolation valves	2	EA	\$800	\$1,600
12-inch isolation valves	2	EA	\$800	\$1,600
Fire Hydrants	24	EA	\$1,500	\$36,000
Short Side Service w/ Meters	70	EA	\$400	\$28,000
Long Side Service w/ Meters	64	EA	\$800	\$51,200
Driveway Repairs	130	EA	\$500	\$65,000
Decommissioning & Cementing Private Wells	180	EA	\$750	\$135,000
Subtotal Water Distribution System				\$800,000
24 Inch Water Transmission Line to City of Houston	1	LS	\$2,939	\$2,939
Groundwater Storage and Pumping Plant	1	LS	\$500,000	\$500,000
Subtotal Water System Construction Cost				\$1,302,939
SUBTOTAL TOTAL CONSTRUCTION COSTS				\$3,687,939
Contingency @ 15%				\$553,191
Subtotal				\$4,241,130
Engineering, Inspection & Testing @12%				\$508,936
Geotechnical	16,400	LF	\$1.33	\$21,867
Surveying	16,400	LF	\$4	\$65,600
Subtotal				\$596,402
SUBTOTAL TOTAL CAPITAL COSTS				\$4,837,532
Additional Costs				
Lift Station Site Acquisition	10,000	SF	\$5	\$50,000
Water Storage & Booster Pumping Site Acquisition	25,000	SF	\$3	\$75,000
Subtotal				\$125,000
TOTAL ESTIMATED CONSTRUCTION COSTS				\$4,962,532

TABLE 13.10
PRELIMINARY COST ESTIMATE FOR A
GRAVITY SEWER SYSTEM & WATER SYSTEM TO SERVE SERVICE ZONE 10, HARRIS COUNTY, TEXAS
Platted Tracts = 200 Existing Occupied Tracts = 150

ITEM DESCRIPTION				
SANITARY SEWER SYSTEM	Quantity	Unit	Unit Cost	Item Cost
8-inch SDR 26 PVC Gravity Sewer	2,200	LF	\$35	\$77,000
10-inch SDR 26 PVC Gravity Sewer	3,400	LF	\$40	\$136,000
12-inch SDR 26 PVC Gravity Sewer	20,000	LF	\$45	\$900,000
15-inch SDR 26 PVC Gravity Sewer	3,200	LF	\$50	\$160,000
Bore & Jack 8-inch sewer	215	LF	\$100	\$21,500
Bore & Jack 12-inch sewer	800	LF	\$150	\$120,000
Manholes	63	EA	\$3,000	\$189,000
6-inch service lines (short side)	27	EA	\$600	\$16,200
6-inch service lines (long side)	27	EA	\$1,500	\$40,500
Driveway Repairs	150	EA	\$500	\$75,000
Connect service lines to customer lines	200	LF	\$500	\$100,000
Drain & Demolish Septic Tanks	150	LF	\$500	\$75,000
Subtotal				\$1,910,200
Lift Station & Force Main				
Force Main to City of Houston	0	LF	\$35	\$0
Concrete wet well, valve box, pumps, controls & accessories	1	LS	\$100,000	\$100,000
Subtotal				\$100,000
Wastewater Treatment Plant Capacity	482,500	GPD	\$5	\$2,412,500
Subtotal Sanitary Sewer System				\$2,010,200
WATER DISTRIBUTION SYSTEM				
6-inch waterline	1,900	LF	\$25	\$47,500
8-inch waterline	11,600	LF	\$35	\$406,000
12-inch waterline	14,800	LF	\$45	\$666,000
Bore & Jack 6-inch water line	200	LF	\$75	\$15,000
Bore & Jack 8-inch water line	400	LF	\$100	\$40,000
Bore & Jack 12-inch water line	100	LF	\$150	\$15,000
6-inch isolation valves	3	EA	\$800	\$2,400
8-inch isolation valves	12	EA	\$800	\$9,600
12-inch isolation valves	11	EA	\$800	\$8,800
Fire Hydrants	58	EA	\$1,500	\$87,000
Short Side Service w/ Meters	70	EA	\$400	\$28,000
Long Side Service w/ Meters	64	EA	\$800	\$51,200
Driveway Repairs	150	EA	\$500	\$75,000
Decommissioning & Cementing Private Wells	150	EA	\$750	\$112,500
Subtotal Water Distribution System				\$1,516,500
24 Inch Water Transmission Line to City of Houston	1	LS	\$2,556	\$2,556
Groundwater Storage and Pumping Plant	1	LS	\$500,000	\$500,000
Subtotal Water System Construction Cost				\$2,019,056
SUBTOTAL TOTAL CONSTRUCTION COSTS				\$4,029,256
Contingency @ 15%				\$604,388
Subtotal				\$4,633,644
Engineering, Inspection & Testing @12%				\$556,037
Geotechnical	28,800	LF	\$1.33	\$38,400
Surveying	28,800	LF	\$4	\$115,200
Subtotal				\$709,637
SUBTOTAL TOTAL CAPITAL COSTS				\$5,343,282
Additional Costs				
Lift Station Site Acquisition	225,000	SF	\$2	\$450,000
Water Storage & Booster Pumping Site Acquisition	25,000	SF	\$3	\$75,000
Subtotal				\$525,000
TOTAL ESTIMATED CONSTRUCTION COSTS				\$5,868,282

TABLE 13.11
PRELIMINARY COST ESTIMATE FOR A
GRAVITY SEWER SYSTEM & WATER SYSTEM TO SERVE SERVICE ZONE 11, HARRIS COUNTY, TEXAS
Platted Tracts = 407 Existing Occupied Tracts = 244

ITEM DESCRIPTION				
SANITARY SEWER SYSTEM	Quantity	Unit	Unit Cost	Item Cost
8-inch SDR 26 PVC Gravity Sewer	10,000	LF	\$35	\$350,000
12-inch SDR 26 PVC Gravity Sewer	8,000	LF	\$45	\$360,000
15-inch SDR 26 PVC Gravity Sewer	1,600	LF	\$60	\$96,000
Bore & Jack 8-inch sewer	300	LF	\$100	\$30,000
Bore & Jack 12-inch sewer	250	LF	\$150	\$37,500
Bore & Jack 15-inch sewer	100	LF	\$250	\$25,000
Manholes	62	EA	\$3,000	\$186,000
6-inch service lines (short side)	70	EA	\$600	\$42,000
6-inch service lines (long side)	70	EA	\$1,500	\$105,000
Driveway Repairs	150	EA	\$500	\$75,000
Connect service lines to customer lines	280	LF	\$500	\$140,000
Drain & Demolish Septic Tanks	280	LF	\$500	\$140,000
Subtotal				\$1,586,500
Lift Station & Force Main				
Force Main to City of Houston Treatment Facility	5,000	LF	\$50	\$250,000
Concrete wet well, valve box, pumps, controls & accessories	1	LS	\$100,000	\$100,000
Subtotal				\$350,000
Wastewater Treatment Plant Capacity	848,750	GPD	\$5	\$4,243,750
Subtotal Sanitary Sewer System				\$6,180,250
WATER DISTRIBUTION SYSTEM				
6-inch waterline	7,700	LF	\$25	\$192,500
8-inch waterline	3,800	LF	\$35	\$133,000
12-inch waterline	9,350	LF	\$45	\$420,750
Bore & Jack 6-inch water line	600	LF	\$75	\$45,000
Bore & Jack 8-inch water line	400	LF	\$100	\$40,000
Bore & Jack 12-inch water line	800	LF	\$150	\$120,000
6-inch isolation valves	8	EA	\$800	\$6,400
8-inch isolation valves	4	EA	\$800	\$3,200
12-inch isolation valves	10	EA	\$800	\$8,000
Fire Hydrants	24	EA	\$1,500	\$36,000
Short Side Service w/ Meters	85	EA	\$400	\$34,000
Long Side Service w/ Meters	85	EA	\$800	\$68,000
Driveway Repairs	170	EA	\$500	\$85,000
Decommissioning & Cementing Private Wells	240	EA	\$750	\$180,000
Subtotal Water Distribution System				\$1,179,350
Water Transmission Line	1	LS	\$200,000	\$200,000
Groundwater Storage and Pumping Plant	1	LS	\$500,000	\$500,000
Subtotal Water System Construction Cost				\$1,879,350
SUBTOTAL TOTAL CONSTRUCTION COSTS				\$8,059,600
Contingency @ 15%				\$1,208,940
Subtotal				\$9,268,540
Engineering, Inspection & Testing @12%				\$1,112,225
Geotechnical	19,600	LF	\$1.33	\$26,133
Surveying	19,600	LF	\$4	\$78,400
Subtotal				\$1,216,758
SUBTOTAL TOTAL CAPITAL COSTS				\$10,485,298
Additional Costs				
Wastewater Treatment Plant Site Acquisition	225,000	SF	\$2	\$450,000
Water Storage & Booster Pumping Site Acquisition	25,000	SF	\$3	\$75,000
Subtotal				\$525,000
TOTAL ESTIMATED CONSTRUCTION COSTS				\$11,010,298

**TABLE 14
SANITARY SEWER SYSTEM DESIGN CALCULATIONS IN ALDINE ID**

Service Zones 1 & 2:

Start Node	End Node	Gr. El. Start	Inv. El. Start	Depth Start (ft)	Gr. El. End	Inv. El. End	Change Invert (ft)	Depth End (ft)	Avg. Depth (ft)	Pipe Size (in)	Pipe Slope (%)	Length (ft)	Area Served (AC)	Accum. Acres	Gal/ Acre/ Day	Accum. Gal/ Day	Pipe Vol./ft (gal./ft)	Pipe Vol. (gal.)
SZ-1																		
0101	0102	80.5	76.50	4.0	81	73.12	3.38	7.9	5.9	12	0.0026	1,300	5.96		29,800	5.87	7,637	
0102	0104	80.5	73.12	7.4	80	72.08	1.04	7.9	7.7	12	0.0026	400	4.59	10.6	52,750	5.87	2,350	
0103	0104	80	76.00	4.0	80	72.62	3.38	7.4	5.7	12	0.0026	1,300	33.46		167,300	5.87	7,637	
0104	0106	80	72.08	7.9	80	71.30	0.78	8.7	8.3	12	0.0026	300	4.13	48.1	240,700	5.87	1,762	
0105	0106	80	76.17	3.8	80	71.88	4.29	8.1	6.0	10	0.0033	1,300	5.97		29,850	4.08	5,304	
0106	0109	80	71.30	8.7	79	70.26	1.04	8.7	8.7	12	0.0026	400	5.51	59.6	298,100	5.87	2,350	
0107	0108	80	76.33	3.7	80	74.57	1.76	5.4	4.5	8	0.0044	400	1.84		9,200	2.61	1,044	
0108	0109	80	74.57	5.4	79	70.61	3.96	8.4	6.9	10	0.0033	1,200	8.26	69.7	348,600	4.08	4,896	
0109	0118	79	70.26	8.7	77	68.70	1.56	8.3	8.5	12	0.0026	600	0.00	69.7	348,600	5.87	3,525	
0110	0111	79	75.33	3.7	78	73.57	1.76	4.4	4.0	8	0.0044	400	1.84		9,200	2.61	1,044	
0111	0113	78	73.57	4.4	78	72.69	0.88	5.3	4.9	8	0.0044	200	0.46	72.0	360,100	2.61	522	
0112	0113	79	75.33	3.7	78	73.57	1.76	4.4	4.0	8	0.0044	400	4.59		22,950	2.61	1,044	
0113	0115	78	72.69	5.3	78	71.81	0.88	6.2	5.7	8	0.0044	200	21.52	98.1	107,600	2.61	522	
0114	0115	78	73.75	4.3	78	69.95	3.80	8.1	6.2	15	0.0019	2,000	44.48		222,400	9.18	18,359	
0115	0117	78	69.95	8.1	78	69.57	0.38	8.4	8.2	15	0.0019	200	0.92	143.5	4,600	9.18	1,836	
0116	0117	78	74.33	3.7	78	72.57	1.76	5.4	4.5	8	0.0044	400	1.84		9,200	2.61	1,044	
0117	0118	78	69.57	8.4	77	68.62	0.95	8.4	8.4	15	0.0019	500	6.89	152.3	34,450	9.18	4,590	
0118	0119	77	68.62	8.4	76	66.15	2.47	9.8	9.1	15	0.0019	1,300	49.07	201.3	245,350	9.18	11,933	
0120	0119	75	71.33	3.7	76	68.69	2.64	7.3	5.5	8	0.0044	600	8.26		41,300	2.61	1,567	
0119	0121	76	66.15	9.8	76	61.20	4.95	14.8	12.3	18	0.0015	3,300	98.48	308.1	492,400	13.22	43,620	
0124	0125	78	74.00	4.0	80	70.10	3.90	9.9	7.0	12	0.0026	1,500	28.93		144,650	5.87	8,812	
0125	0123	80	70.10	9.9	79	69.32	0.78	9.7	9.8	12	0.0026	300	0.00	337.0	0	1,685,000	5.87	1,762
0122	0123	79	75.00	4.0	79	69.80	5.20	9.2	6.6	12	0.0026	2,000	50.51		252,550	5.87	11,750	
0123	0127	79	69.32	9.7	78	65.94	3.38	12.1	10.9	12	0.0026	1,300	0.00	387.5	0	1,937,550	5.87	7,637
0126	0127	78	74.33	3.7	78	69.93	4.40	8.1	5.9	8	0.0044	1,000	40.17		200,850	2.61	2,611	
0127	0128	78	69.93	8.1	78	66.63	3.30	11.4	9.7	10	0.0033	1,000	38.02	465.7	190,100	4.08	4,080	
0129	0128	78	74.00	4.0	78	72.18	1.82	5.8	4.9	12	0.0026	700	17.91	483.6	89,550	5.87	4,112	
0128	0121	78	66.63	11.4	78	62.99	3.64	15.0	13.2	12	0.0026	1,400	9.64	493.3	48,200	5.87	8,225	
Total									25,900				493.25		2,466,250			

**TABLE 14
SANITARY SEWER SYSTEM DESIGN CALCULATIONS IN ALDINE ID**

Start Node	End Node	Gr. El. Start	Inv. El. Start	Depth Start (ft)	Gr. El. End	Inv. El. End	Change Invert (ft)	Depth End (ft)	Avg. Depth (ft)	Pipe Size (in)	Slope (%)	Length (ft)	Area Served (AC)	Accum. Acres	Gal/ Acre/ Day	Gal/ Day	Accum. Gal/ Day	Pipe Vol./ft (gal./ft)	Pipe Vol. (gal.)
SZ-2																			
0201	0202	77	73.33	3.7	77	69.81	3.52	7.2	5.4	8	0.0044	800	0.52		5,000	2,600		2.61	2,089
0203	0202	75	71.00	4.0	77	67.88	3.12	9.1	6.6	12	0.0026	1,200	5.10		5,000	25,500		5.87	7,050
0202	0204	77	67.88	9.1	76	67.36	0.52	8.6	8.9	12	0.0026	200	0.30	499.2	5,000	1,500	2,495,850	5.87	1,175
0205	0204	75	71.00	4.0	76	67.88	3.12	8.1	6.1	12	0.0026	1,200	5.74		5,000	28,700		5.87	7,050
0204	0206	76	67.36	8.6	76	66.84	0.52	9.2	8.9	12	0.0026	200	0.46	505.4	5,000	2,300	2,526,850	5.87	1,175
0208	0207	74	69.75	4.3	76	65.38	4.37	10.6	7.4	15	0.0019	2,300	12.20		5,000	61,000		9.18	21,112
0207	0206	76	65.38	10.6	75	61.20	4.18	13.8	12.2	15	0.0019	2,200	11.91	529.5	5,000	59,550	2,647,400	9.18	20,195
0206	0209	73	61.20	11.8	75	59.40	1.80	15.6	13.7	18	0.0015	1,200	10.23		5,000	51,150		13.22	15,862
0210	0209	75	71.33	3.7	75	68.69	2.64	6.3	5.0	8	0.0044	600	7.91	547.6	5,000	39,550	2,738,100	2.61	1,567
0220	0221	75	71.33	3.7	75	70.45	0.88	4.5	4.1	8	0.0044	200	0.46		5,000	2,300		2.61	522
0222	0221	75	71.33	3.7	75	67.37	3.96	7.6	5.6	8	0.0044	900	2.07	550.2	5,000	10,350	2,750,750	2.61	2,350
0221	0223	75	67.37	7.6	75	66.49	0.88	8.5	8.1	8	0.0044	200	0.46		5,000	2,300		2.61	522
0224	0223	75	71.33	3.7	75	67.37	3.96	7.6	5.6	8	0.0044	900	2.07	552.7	5,000	10,350	2,763,400	2.61	2,350
0223	0225	75	67.37	7.6	75	66.71	0.66	8.3	8.0	10	0.0033	200	0.46		5,000	2,300		4.08	816
0226	0225	75	71.33	3.7	75	66.93	4.40	8.1	5.9	8	0.0044	1,000	2.07	555.2	5,000	10,350	2,776,050	2.61	2,611
0225	0227	75	66.93	8.1	75	66.27	0.66	8.7	8.4	10	0.0033	200	0.46		5,000	2,300		4.08	816
0228	0227	75	71.33	3.7	75	66.93	4.40	8.1	5.9	8	0.0044	1,000	2.07	557.7	5,000	10,350	2,788,700	2.61	2,611
0227	0229	75	66.93	8.1	75	66.27	0.66	8.7	8.4	10	0.0033	200	0.46		5,000	2,300		4.08	816
0228	0229	75	71.33	3.7	75	66.93	4.40	8.1	5.9	8	0.0044	1,000	2.30	560.5	5,000	11,500	2,802,500	2.61	2,611
0229	0231	75	66.27	8.7	75	65.61	0.66	9.4	9.1	10	0.0033	200	0.46		5,000	2,300		4.08	816
0230	0231	75	71.33	3.7	75	66.93	4.40	8.1	5.9	8	0.0044	1,000	2.30	563.3	5,000	11,500	2,816,300	2.61	2,611
0231	0233	75	65.61	9.4	75	65.09	0.52	9.9	9.6	12	0.0026	200	0.46		5,000	2,300		5.87	1,175
0234	0233	75	71.33	3.7	75	66.93	4.40	8.1	5.9	8	0.0044	1,000	2.30	566.0	5,000	11,500	2,830,100	2.61	2,611
0233	0235	75	65.09	9.9	75	64.57	0.52	10.4	10.2	12	0.0026	200	0.46		5,000	2,300		5.87	1,175
0236	0235	75	71.33	3.7	75	66.93	4.40	8.1	5.9	8	0.0044	1,000	2.91	569.4	5,000	14,550	2,846,950	2.61	2,611
0235	0237	75	64.57	10.4	75	64.05	0.52	10.9	10.7	12	0.0026	200	0.46	569.9	5,000	2,300	2,849,250	5.87	1,175
0240	0239	75	71.00	4.0	75	65.28	5.72	9.7	6.9	12	0.0026	2,200	11.37	581.2	5,000	56,850	2,906,100	5.87	12,925
0239	0237	75	65.28	9.7	75	63.00	2.28	12.0	10.9	15	0.0019	1,200	13.78		5,000	68,900		9.18	11,015
0237	0238	75	63.00	12.0	75	61.86	1.14	13.1	12.6	15	0.0019	600	12.91	607.9	5,000	64,550	3,039,550	9.18	5,508
0241	0242	75	70.75	4.3	75	66.00	4.75	9.0	6.6	15	0.0019	2,500	17.22	627.9	5,000	86,100		9.18	22,948
0238	0242	75	61.86	13.1	75	60.72	1.14	14.3	13.7	15	0.0019	600	2.75		5,000	13,750	3,139,400	9.18	5,508
0242	0243	75	60.72	14.3	75	58.25	2.47	16.8	15.5	15	0.0019	1,300	11.94		5,000	59,700		9.18	11,933
0244	0243	75	71.33	3.7	75	62.53	8.80	12.5	8.1	8	0.0044	2,000	3.39	643.2	5,000	16,950	3,216,050	2.61	5,222
0243	0209	75	58.25	16.8	75	55.25	3.00	19.8	18.3	18	0.0015	2,000	7.59	650.8	5,000	37,950	3,254,000	13.22	26,436
0209	0121	75	55.25	19.8	72	53.15	2.10	18.9	19.3	18	0.0015	1,400	4.65	655.5	5,000	23,250	3,277,250	13.22	18,506
0121	WWTP1	76	53.15	22.9	76	51.80	1.35	24.2	23.5	18	0.0015	900	13.43	668.9	5,000	67,150	3,344,400	13.22	11,896
Total													86,000	1038.40	5,000	5,192,000	408,945		

**TABLE 14
SANITARY SEWER SYSTEM DESIGN CALCULATIONS IN ALDINE ID**

Service Zones 3 & 4:																				
Start Node	End Node	Gr. El. Start	Inv. El. Start	Depth Start (ft)	Gr. El. End	Inv. El. End	Change Invert (ft)	Depth End (ft)	Avg. Depth (ft)	Pipe Size (in)	Slope (%)	Length (ft)	Area Served (AC)	Accum. Acres	Gal/Day	Accum. Gal/Day	Pipe Vol./ft (gal./ft)	Pipe Vol. (gal.)		
SZ-3																				
0301	0302	78	74.00	4.0	76	62.30	11.70	13.7	8.9	12	0.0026	4,500	138.65		5,000	693,250	5.87	26,436		
0303	0304	78	74.33	3.7	78	71.69	2.64	6.3	5.0	8	0.0044	600	4.13		5,000	20,650	2.61	1,567		
0304	0305	78	71.69	6.3	76	60.51	11.18	15.5	10.9	12	0.0026	4,300	126.59	131	5,000	632,950	5.87	25,262		
0305	0302	76	60.51	15.5	76	59.73	0.78	16.3	15.9	12	0.0026	300	5.74	136	5,000	28,700	5.87	1,762		
0302	0306LS	76	59.73	16.3	76	59.08	0.65	16.9	16.6	21	0.0013	500	9.74	285	5,000	48,700	17.99	8,996		
0306LS	0307	76	71.25	4.8	75	69.30	1.95	5.7	5.2	21	0.0013	1,500	46.96	332	5,000	234,800	17.99	26,987		
0309	0307	77	72.50	4.5	75	66.05	6.45	9.0	6.7	18	0.0015	4,300	128.28		5,000	641,400	13.22	56,838		
0308	0307	73	69.00	4.0	75	65.75	3.25	9.3	6.6	12	0.0026	1,250	33.91	511	5,000	169,550	5.87	7,343		
0307	0310	75	69.30	5.7	74	68.26	1.04	5.7	5.7	21	0.0013	800	16.99		5,000	84,950	17.99	14,393		
0311	0310	74	70.33	3.7	74	67.69	2.64	6.3	5.0	8	0.0044	600	9.13		5,000	45,650	2.61	1,567		
0310	0312	74	68.26	5.7	74	67.74	0.52	6.3	6.0	21	0.0013	400	8.97	529	5,000	44,850	17.99	7,197		
0313	0314	77	73.33	3.7	76	71.13	2.20	4.9	4.3	8	0.0044	500	21.34		5,000	106,700	2.61	1,306		
0314	0317	76	71.13	4.9	75	65.54	5.59	9.5	7.2	12	0.0026	2,150	38.93	589	5,000	194,650	5.87	12,631		
0315	0316	75	71.33	3.7	75	69.13	2.20	5.9	4.8	8	0.0044	500	1.15		5,000	5,750	2.61	1,306		
0316	0317	75	69.13	5.9	75	68.47	0.66	6.5	6.2	8	0.0044	150	0.52	591	5,000	2,600	2.61	392		
0317	0312	75	65.54	9.5	74	61.64	3.90	12.4	10.9	18	0.0015	2,600	75.81	667	5,000	379,050	13.22	34,367		
0312	0318	74	61.64	12.4	72.5	60.20	1.44	12.3	12.3	24	0.0012	1,200	20.66	688	5,000	103,300	23.50	28,199		
0318	0319	75	60.20	14.8	75	59.72	0.48	15.3	15.0	24	0.0012	400	5.51		5,000	27,550	23.50	9,400		
Total												26,550	693.01		3,465,050					

**TABLE 14
SANITARY SEWER SYSTEM DESIGN CALCULATIONS IN ALDINE ID**

Start Node	End Node	Gr. El. Start	Inv. El. Start	Depth Start (ft)	Gr. El. End	Inv. El. End	Change Invert (ft)	Depth End (ft)	Avg. Depth (ft)	Pipe Size (in)	Slope (%)	Length (ft)	Area Served (AC)	Accum. Acres	Gal/Day	Accum. Gal/Day	Pipe Vol./ft (gal./ft)	Pipe Vol. (gal.)	
SZ-4																			
0401	0402	74	70.00	4.0	73	66.62	3.38	6.4	5.2	12	0.0026	1,300	33.52		167,600	5,000	167,600	5.87	7,637
0403	0402	71.5	67.50	4.0	73	64.90	2.60	8.1	6.1	12	0.0026	1,000	38.57		192,850	5,000	192,850	5.87	5,875
0402	0404	73	66.62	6.4	73	64.15	2.47	8.8	7.6	15	0.0019	1,300	15.84	781	3,904,700	5,000	3,904,700	9.18	11,933
0405	0406	75	71.00	4.0	73.5	67.10	3.90	6.4	5.2	12	0.0026	1,500	36.39		181,950	5,000	181,950	5.87	8,812
0407	0408	74	70.33	3.7	73.5	67.25	3.08	6.2	5.0	8	0.0044	700	6.43		32,150	5,000	32,150	2.61	1,828
0408	0406	73.5	67.25	6.2	73.5	65.49	1.76	8.0	7.1	8	0.0044	400	0.00	824	4,118,800	5,000	4,118,800	2.61	1,044
0406	0404	73.5	67.10	6.4	73	65.54	1.56	7.5	6.9	12	0.0026	600	4.13	864	4,321,400	5,000	4,321,400	5.87	3,525
0411	0410	73	69.00	4.0	73	64.71	4.29	8.3	6.1	12	0.0026	1,650	9.76		48,800	5,000	48,800	5.87	9,693
0409	0410	71.5	67.50	4.0	73	64.90	2.60	8.1	6.1	12	0.0026	1,000	24.91		124,550	5,000	124,550	5.87	5,875
0410	0412	73	64.71	8.3	73	63.93	0.78	9.1	8.7	12	0.0026	300	0.00	899	4,494,750	5,000	4,494,750	5.87	1,762
0413	0412	73	69.33	3.7	73	66.69	2.64	6.3	5.0	8	0.0044	600	4.82		24,100	5,000	24,100	2.61	1,567
0414	0412	73	69.00	4.0	73	64.84	4.16	8.2	6.1	12	0.0026	1,600	12.05		60,250	5,000	60,250	5.87	9,400
0412	0415	73	63.93	9.1	73	63.15	0.78	9.9	9.5	12	0.0026	300	0.00	916	4,579,100	5,000	4,579,100	5.87	1,762
0416	0415	73	69.00	4.0	73	64.84	4.16	8.2	6.1	12	0.0026	1,600	11.71		58,550	5,000	58,550	5.87	9,400
0415	0417	73	63.15	9.9	73	61.85	1.30	11.2	10.5	12	0.0026	500	5.28	933	26,400	5,000	26,400	5.87	2,937
0417	0418	73	61.85	11.2	73	61.33	0.52	11.7	11.4	12	0.0026	200	15.15		75,750	5,000	75,750	5.87	1,175
0419	0418	73	69.00	4.0	73	63.80	5.20	9.2	6.6	12	0.0026	2,000	0.46	948	4,742,100	5,000	4,742,100	5.87	11,750
0418	0420	73	61.33	11.7	73	60.81	0.52	12.2	11.9	12	0.0026	200	14.12		70,600	5,000	70,600	5.87	1,175
0421	0420	73	69.00	4.0	73	63.67	5.33	9.3	6.7	12	0.0026	2,050	17.45		87,250	5,000	87,250	5.87	12,043
0422	0423	73	69.00	4.0	73	63.67	5.33	9.3	6.7	12	0.0026	2,050	0.00	953	4,765,000	5,000	4,765,000	5.87	12,043
0423	0420LS	73	63.67	9.3	73	63.15	0.52	9.9	9.6	12	0.0026	200	53.03		265,150	5,000	265,150	5.87	1,175
0420LS	0404	73	69.00	4.0	72	63.80	5.20	8.2	6.1	12	0.0026	2,000	13.77		68,850	5,000	68,850	5.87	11,750
0404	0424	72	65.54	6.5	72	64.02	1.52	8.0	7.2	15	0.0019	800	101.93		509,650	5,000	509,650	9.18	7,343
0425	0424	72	67.75	4.3	72	59.20	8.55	12.8	8.5	15	0.0019	4,500	8.26	967	4,835,000	5,000	4,835,000	9.18	41,307
0424	0426	72	64.02	8.0	72	63.27	0.75	8.7	8.4	18	0.0015	500	59.34		296,700	5,000	296,700	13.22	6,609
0427	0426	72	67.50	4.5	71	60.75	6.75	10.3	7.4	18	0.0015	4,500	6.89		34,450	5,000	34,450	13.22	59,482
0426	0428	73	63.27	9.7	71	61.32	1.95	9.7	9.7	18	0.0015	1,300	48.50		242,500	5,000	242,500	13.22	17,184
0429	0428	71	67.17	3.8	71	59.91	7.26	11.1	7.5	10	0.0033	2,200	128.10		640,500	5,000	640,500	4.08	8,975
0430	0428	71	67.17	3.8	71	58.92	8.25	12.1	8.0	10	0.0033	2,500	128.10		640,500	5,000	640,500	4.08	10,199
0428	0319	71	61.32	9.7	71	59.37	1.95	11.6	10.7	18	0.0015	1,300	128.10		640,500	5,000	640,500	13.22	17,184
0319	WWTP2	72.5	59.37	13.1	71	58.65	0.72	12.4	12.7	24	0.0012	600	53.72	985	4,923,000	5,000	4,923,000	23.50	14,099
Total												94,350	1677.61		8,388,050		8,388,050		582,492

**TABLE 14
SANITARY SEWER SYSTEM DESIGN CALCULATIONS IN ALDINE ID**

Service Zone 5:

Start Node	End Node	Gr. El.		Depth Start (ft)	Gr. El. End	Inv. El. End	Change Invert (ft)	Depth End (ft)	Avg. Depth (ft)	Pipe Size (in)	Slope (%)	Length (ft)	Area Served (AC)	Accum. Acres	Gal/Day	Accum. Gal/Day	Pipe Vol./ft (gal./ft)	Pipe Vol. (gal.)
		Start	End															
0501	0502	74	70.00	4.0	72	67.40	2.60	4.6	4.3	12	0.0026	1,000	9.18		45,900	5,000	5.87	5,875
0503	0502	70	66.00	4.0	72	63.53	2.47	8.5	6.2	12	0.0026	950	3.44		17,200	5,000	5.87	5,581
0502	0504	72	63.53	8.5	72	60.93	2.60	11.1	9.8	12	0.0026	1,000	1.72		8,600	5,000	5.87	5,875
0505	0506	72	68.00	4.0	72	66.96	1.04	5.0	4.5	12	0.0026	400	0.00	14	0	71,700	5.87	2,350
0507	0506	72	68.00	4.0	72	66.96	1.04	5.0	4.5	12	0.0026	400	0.00	14	0	71,700	5.87	2,350
0506	0504	72	66.96	5.0	68	63.84	3.12	4.2	4.6	12	0.0026	1,200	0.00	14	0	71,700	5.87	7,050
0504	0516	68	60.93	7.1	70	58.33	2.60	11.7	9.4	12	0.0026	1,000	2.41	17	83,750	5,000	5.87	5,875
0523	0524	72.5	68.50	4.0	70	63.56	4.94	6.4	5.2	12	0.0026	1,900	17.45	53	87,250	5,000	5.87	11,162
0524	0526	70	63.56	6.4	71	62.04	1.52	9.0	7.7	15	0.0019	800	19.28		96,400	5,000	9.18	7,343
0525	0526	70	65.75	4.3	71	64.23	1.52	6.8	5.5	15	0.0019	800	19.28		96,400	5,000	9.18	7,343
0526	0528	74	62.04	12.0	74	60.74	1.30	13.3	12.6	12	0.0026	500	17.68		88,400	5,000	5.87	2,937
0527	0528	72.5	68.50	4.0	74	63.43	5.07	10.6	7.3	12	0.0026	1,950	18.37	109	91,850	5,000	5.87	11,456
0528	0530	74	60.74	13.3	74	60.22	0.52	13.8	13.5	12	0.0026	200	0.00		544,050	5,000	5.87	1,175
0529	0530	72.5	68.50	4.0	74	63.30	5.20	10.7	7.4	12	0.0026	2,000	11.48		57,400	5,000	5.87	11,750
0530	0532	74	60.22	13.8	74	59.70	0.52	14.3	14.0	12	0.0026	200	0.00	120	0	601,450	5.87	1,175
0531	0532	74	70.00	4.0	74	69.48	0.52	4.5	4.3	12	0.0026	200	0.00		0	5,000	5.87	1,175
0532	0534	72	59.70	12.3	73	56.84	2.86	16.2	14.2	12	0.0026	1,100	18.37		91,850	5,000	5.87	6,462
0533	0534	73	68.75	4.3	74	64.38	4.37	9.6	6.9	15	0.0019	2,300	60.61	199	303,050	5,000	9.18	21,112
0534	0535	74	56.84	17.2	74	55.52	1.32	18.5	17.8	8	0.0044	300	2.98		14,900	5,000	2.61	783
0536	0535	74	69.75	4.3	74	66.62	3.14	7.4	5.8	15	0.0019	1,650	2.98	205	14,900	5,000	9.18	15,146
0537	0535	74	69.75	4.3	74	66.62	3.14	7.4	5.8	15	0.0019	1,650	2.98	211	14,900	5,000	9.18	15,146
0535	0538	74	55.52	18.5	71	47.92	7.60	23.1	20.8	15	0.0019	4,000	27.55	239	137,750	5,000	9.18	36,717
0539	0538	74	69.75	4.3	71	62.15	7.60	8.9	6.6	15	0.0019	4,000	27.55	239	137,750	5,000	9.18	36,717
0538	0540LS	71	47.92	23.1	73	47.32	0.60	25.7	24.4	18	0.0015	400	3.21	242	16,050	5,000	13.22	5,287
0540LS	0515	67	62.75	4.3	73	56.29	6.46	16.7	10.5	15	0.0019	3,400	66.69		333,450	5,000	9.18	31,210
0511	0510	74	70.00	4.0	73	60.12	9.88	12.9	8.4	12	0.0026	3,800	43.93		219,650	5,000	5.87	22,324
0510	0512	73	60.12	12.9	72	59.22	0.90	12.8	12.8	18	0.0015	600	2.75	355	13,750	5,000	13.22	7,931
0512	0513	68	59.22	8.8	72	55.02	4.20	17.0	12.9	18	0.0015	2,800	19.28		96,400	5,000	13.22	37,011
0509	0513	68	63.50	4.5	72	59.30	4.20	12.7	8.6	18	0.0015	2,800	19.28		96,400	5,000	13.22	37,011
0513	0514	68	55.02	13.0	72	50.82	4.20	21.2	17.1	18	0.0015	2,800	19.28		96,400	5,000	13.22	37,011
0508	0514	68	63.50	4.5	72	59.30	4.20	12.7	8.6	18	0.0015	2,800	19.28		96,400	5,000	13.22	37,011
0514	0515	68	50.82	17.2	72	46.62	4.20	25.4	21.3	18	0.0015	2,800	19.28		96,400	5,000	13.22	37,011
0515	0516	68	46.62	21.4	72	42.42	4.20	29.6	25.5	18	0.0015	2,800	19.28		96,400	5,000	13.22	37,011
0517	0516	68	63.50	4.5	72	59.30	4.20	12.7	8.6	18	0.0015	2,800	19.28		96,400	5,000	13.22	37,011
0516	0518	68	58.33	9.7	72	54.13	4.20	17.9	13.8	18	0.0015	2,800	19.28		96,400	5,000	13.22	37,011
0519	0518	68	63.50	4.5	72	59.30	4.20	12.7	8.6	18	0.0015	2,800	19.28		96,400	5,000	13.22	37,011
0518	0520	72	54.13	17.9	72	50.88	3.25	21.1	19.5	12	0.0026	1,250	36.08		180,400	5,000	5.87	7,343
0521	0520	68	64.00	4.0	72	56.72	7.28	15.3	9.6	12	0.0026	2,800	22.50	630	112,500	5,000	5.87	16,449
0520	0522	72	50.88	21.1	72	50.31	0.57	21.7	21.4	15	0.0019	300	17.91		89,550	5,000	9.18	2,754
Total													67,250	629.90	630	3,149,500	3,149,500	648,954

**TABLE 14
SANITARY SEWER SYSTEM DESIGN CALCULATIONS IN ALDINE ID**

Service Zone 6:																			
Start Node	End Node	Gr. El. Start	Inv. El. Start	Depth Start (ft)	Gr. El. End	Inv. El. End	Change Invert (ft)	Depth End (ft)	Avg. Depth (ft)	Pipe Size (in)	Slope (%)	Length (ft)	Area Served (AC)	Accum. Acres	Gal/ Acre/ Day	Gal/ Day	Accum. Gal/ Day	Pipe Vol./ft (gal./ft)	Pipe Vol. (gal.)
0601	0602	77	73.00	4.0	78	69.23	3.77	8.8	6.4	12	0.0026	1,450	63.66		5,000	318,300		5.87	8,518
0611	0602	81	77.33	3.7	78	72.93	4.40	5.1	4.4	8	0.0044	1,000	74.14		5,000	370,700		2.61	2,611
0610	0609	70	66.17	3.8	70	64.52	1.65	5.5	4.7	10	0.0033	500	12.41		5,000	62,050		4.08	2,040
0608	0609	70	66.33	3.7	70	65.45	0.88	4.5	4.1	8	0.0044	200	4.03		5,000	20,150		2.61	522
0609	0607	70	64.52	5.5	73	62.62	1.90	10.4	7.9	15	0.0019	1,000	73.78	228	5,000	368,900	1,140,100	9.18	9,179
0607	0606	73	62.62	10.4	73	62.43	0.19	10.6	10.5	15	0.0019	100	2.53		5,000	12,650		9.18	918
0606	0603	73	62.43	10.6	75	61.68	0.75	13.3	11.9	18	0.0015	500	9.09		5,000	45,450		13.22	6,609
0604	0603	75	71.33	3.7	75	70.23	1.10	4.8	4.2	8	0.0044	250	1.72		5,000	8,600		2.61	653
0605	0603	75	71.33	3.7	75	70.23	1.10	4.8	4.2	8	0.0044	250	2.72		5,000	13,600		2.61	653
0603	0602	75	61.68	13.3	78	60.63	1.05	17.4	15.3	18	0.0015	700	15.25	259	5,000	76,250	1,296,650	13.22	9,253
Total									5.950			5,950	259.33		5,000	1,296,650			40,956

**TABLE 14
SANITARY SEWER SYSTEM DESIGN CALCULATIONS IN ALDINE ID**

Service Zone 7:																			
Start Node	End Node	Gr. El. Start	Inv. El. Start	Depth Start (ft)	Gr. El. End	Inv. El. End	Change Invert (ft)	Depth End (ft)	Avg. Depth (ft)	Pipe Size (in)	Slope (%)	Length (ft)	Area Served (AC)	Accum. Acres	Gal/ Acre/ Day	Gal/ Day	Accum. Gal/ Day	Pipe Vol./ft (gal./ft)	Pipe Vol. (gal.)
0701	0702	65	61.00	4.0	65	57.49	3.51	7.5	5.8	12	0.0026	1,350	11.94	14	5,000	59,700	70,050	5.87	7,931
0702	0716	65	57.49	7.5	68	56.45	1.04	11.6	9.5	12	0.0026	400	2.07	14	5,000	10,350	70,050	5.87	2,350
0718	0716	72.5	68.83	3.7	68	62.23	6.60	5.8	4.7	8	0.0044	1,500	23.47	39	5,000	117,350	196,000	2.61	3,917
0716	0722	68	56.45	11.6	69.5	55.54	0.91	14.0	12.8	12	0.0026	350	1.72	74	5,000	8,600	196,000	5.87	2,056
0723	0720	75	71.33	3.7	70	63.85	7.48	6.1	4.9	8	0.0044	1,700	28.24	70	5,000	141,200	745,300	2.61	4,439
0721	0720	72	67.83	4.2	70	67.17	0.66	2.8	3.5	8	0.0044	150	0.69	70	5,000	3,450	745,300	2.61	392
0720	0722	70	63.85	6.1	69.5	62.75	1.10	6.7	6.4	8	0.0044	250	1.72	74	5,000	8,600	745,300	2.61	653
0722	0703	69.5	55.54	14.0	70	53.59	1.95	16.4	15.2	12	0.0026	750	3.78	74	5,000	18,900	368,150	5.87	4,406
0725	0724	75	71.33	3.7	75	70.67	0.66	4.3	4.0	8	0.0044	150	2.07	74	5,000	10,350	368,150	2.61	392
0731	0724	76	72.33	3.7	75	68.37	3.96	6.6	5.1	8	0.0044	900	7.23	100	5,000	36,150	502,200	2.61	2,350
0724	0714	75	68.37	6.6	75	67.05	1.32	7.9	7.3	10	0.0033	400	1.38	84	5,000	6,900	421,550	4.08	1,632
0715	0714	78	74.33	3.7	75	70.37	3.96	4.6	4.1	8	0.0044	900	7.23	93	5,000	36,150	549,000	2.61	2,350
0714	0712	75	67.05	7.9	75	65.90	1.16	9.1	8.5	10	0.0033	350	1.21	93	5,000	6,050	463,750	4.08	1,428
0713	0712	78	74.33	3.7	75	70.59	3.74	4.4	4.0	8	0.0044	850	6.83	100	5,000	34,150	592,650	2.61	2,219
0712	0710	75	65.90	9.1	73	64.74	1.16	8.3	8.7	10	0.0033	350	0.86	100	5,000	4,300	502,200	4.08	1,428
0711	0710	75	71.33	3.7	73	67.81	3.52	5.2	4.4	8	0.0044	800	7.81	110	5,000	39,050	549,000	2.61	2,089
0710	0708	73	64.74	8.3	72	63.59	1.16	8.4	8.3	10	0.0033	350	1.55	110	5,000	7,750	549,000	4.08	1,428
0709	0708	74	70.33	3.7	72	66.81	3.52	5.2	4.4	8	0.0044	800	7.35	119	5,000	36,750	592,650	2.61	2,089
0708	0703	72	63.59	8.4	70	62.43	1.16	7.6	8.0	10	0.0033	350	1.38	119	5,000	6,900	592,650	4.08	1,428
0707	0703	72	68.33	3.7	70	65.25	3.08	4.7	4.2	8	0.0044	700	6.43	125	5,000	32,150	624,800	2.61	1,828
0703	0700	70	53.59	16.4	70	52.55	1.04	17.5	16.9	12	0.0026	400	0.00	125	5,000	0	624,800	5.87	2,350
0704	0700	65	61.00	4.0	70	57.62	3.38	12.4	8.2	12	0.0026	1,300	20.03	148	5,000	100,150	741,000	5.87	7,637
0700	0706	70	52.55	17.5	72	51.13	1.43	20.9	19.2	15	0.0019	750	3.21	148	5,000	16,050	741,000	9.18	6,884
0727	0726	80	76.33	3.7	80	75.89	0.44	4.1	3.9	8	0.0044	100	0.86	149	5,000	4,300	745,300	2.61	261
0726	0729	80	75.89	4.1	80	74.57	1.32	5.4	4.8	8	0.0044	300	0.00	149	5,000	0	745,300	2.61	783
0728	0729	78	74.33	3.7	80	73.23	1.10	6.8	5.2	8	0.0044	250	29.84	189	5,000	149,200	945,000	2.61	653
0729	0730	80	73.23	6.8	75	63.55	9.68	11.4	9.1	8	0.0044	2,200	10.10	189	5,000	50,500	945,000	2.61	5,744
Total												18,650	189.00	189	5,000	945,000	945,000	2.61	71,115

**TABLE 14
SANITARY SEWER SYSTEM DESIGN CALCULATIONS IN ALDINE ID**

Service Zone 8:																		
Start Node	End Node	Gr. El. Start	Inv. El. Start	Depth Start (ft)	Gr. El. End	Inv. El. End	Change Invert (ft)	Depth End (ft)	Avg. Depth (ft)	Pipe Size (in)	Slope (%)	Length (ft)	Area Served (AC)	Accum. Acres	Gal/Day	Accum. Gal/Day	Pipe Vol./ft (gal./ft)	Pipe Vol. (gal.)
0801	0802	65	61.00	4.0	64	55.06	5.94	8.9	6.5	12	0.0033	1,800	16.07	5,000	80,350	5,000	5.87	10,575
0803	0802	63	59.00	4.0	64	55.23	3.77	8.8	6.4	12	0.0026	1,450	16.99	5,000	84,950	5,000	5.87	8,518
0802	0805	64	55.06	8.9	64	54.49	0.57	9.5	9.2	12	0.0019	300	0.00	33	0	165,300	5.87	1,762
0804	0805	65	61.00	4.0	64	54.73	6.27	9.3	6.6	12	0.0033	1,900	16.53	5,000	82,650	5,000	5.87	11,162
0806	0805	64	60.00	4.0	64	55.71	4.29	8.3	6.1	12	0.0033	1,300	11.48	5,000	57,400	5,000	5.87	7,637
0805	0808	64	54.49	9.5	65	53.92	0.57	11.1	10.3	12	0.0019	300	0.00	61	0	305,350	5.87	1,762
0807	0808	66	62.00	4.0	65	55.40	6.60	9.6	6.8	12	0.0033	2,000	18.37	5,000	91,850	5,000	5.87	11,750
0809	0808	64.5	60.50	4.0	65	55.22	5.28	9.8	6.9	12	0.0044	1,200	11.02	5,000	55,100	5,000	5.87	7,050
0808	0811	65	53.92	11.1	66	53.35	0.57	12.7	11.9	12	0.0019	300	0.00	90	0	452,300	5.87	1,762
0810	0811	66	62.00	4.0	66	55.07	6.93	10.9	7.5	12	0.0033	2,100	19.28	5,000	96,400	5,000	5.87	12,337
0812	0811	65	61.00	4.0	66	56.82	4.18	9.2	6.6	12	0.0044	950	9.18	5,000	45,900	5,000	5.87	5,581
0811	0800	66	53.35	12.7	67	52.97	0.38	14.0	13.3	12	0.0019	200	0.00	119	0	594,600	5.87	1,175
1201	1202	60	56.33	3.7	60	48.19	8.14	11.8	7.7	8	0.0044	1,850	8.49	5,000	42,450	5,000	2.61	4,830
1202	1204	60	56.33	3.7	60	55.45	0.88	4.5	4.1	8	0.0044	200	0.46	128	2,300	639,350	2.61	522
1203	1204	60	56.33	3.7	60	48.41	7.92	11.6	7.6	8	0.0044	1,800	8.26	5,000	41,300	5,000	2.61	4,700
1204	1200	60	48.41	11.6	60	47.53	0.88	12.5	12.0	8	0.0044	200	0.46	137	2,300	682,950	2.61	522
1206	1200	60	56.33	3.7	60	55.01	1.32	5.0	4.3	8	0.0044	300	0.69	5,000	3,450	743,200	2.61	783
1200	1205	60	47.53	12.5	60	40.27	7.26	19.7	16.1	8	0.0044	1,650	11.36	149	56,800	743,200	2.61	4,308
1205	ewwtp	60	40.27	19.7	60	39.61	0.66	20.4	20.1	8	0.0044	150	0.00	149	0	743,200	2.61	392
Total												19,950	148.64		743,200	5,000		97,130

**TABLE 14
SANITARY SEWER SYSTEM DESIGN CALCULATIONS IN ALDINE ID**

Service Zone 9:																		
Start Node	End Node	Gr. El. Start	Inv. El. Start	Depth Start (ft)	Gr. El. End	Inv. El. End	Change Invert (ft)	Depth End (ft)	Avg. Depth (ft)	Pipe Size (in)	Slope (%)	Length (ft)	Area Served (AC)	Accum. Acres	Gal/Day	Accum. Gal/Day	Pipe Vol./ft (gal./ft)	Pipe Vol. (gal.)
0901	0905	65	61.00	4.0	68	52.68	8.32	15.3	9.7	12	0.0026	3,200	22.04	5,000	110,200	117,100	5.87	18,799
0905	0906	68	52.68	15.3	67.5	51.90	0.78	15.6	15.5	12	0.0026	300	1.38	5,000	6,900	117,100	5.87	1,762
0902	0906	65	61.00	4.0	67.5	53.46	7.54	14.0	9.0	12	0.0026	2,900	23.30	5,000	116,500	244,500	5.87	17,037
0906	0908	67.5	51.90	15.6	67.5	51.12	0.78	16.4	16.0	12	0.0026	300	2.18	5,000	10,900	244,500	5.87	1,762
0907	0908	68	64.00	4.0	67.5	62.57	1.43	4.9	4.5	12	0.0026	550	3.67	5,000	18,350	269,750	5.87	3,231
0908	0900	67.5	51.12	16.4	67.5	50.08	1.04	17.4	16.9	12	0.0026	400	1.38	5,000	6,900	269,750	5.87	2,350
0918	0917	64	59.75	4.3	64	58.42	1.33	5.6	4.9	15	0.0019	700	6.77	5,000	33,850	6,426	9.18	6,426
0912	0913	64	60.33	3.7	64	59.89	0.44	4.1	3.9	8	0.0044	100	0.23	5,000	1,150	261	2.61	261
0914	0913	64	59.89	4.1	64	59.23	0.66	4.8	4.4	10	0.0033	200	0.46	5,000	2,300	816	4.08	816
0913	0915	64	59.23	4.8	64	58.79	0.44	5.2	5.0	8	0.0044	100	0.23	5,000	1,150	261	2.61	261
0916	0915	64	58.79	5.2	64	57.97	0.83	6.0	5.6	10	0.0033	250	1.43	5,000	7,150	1,020	4.08	1,020
0915	0917	64	57.97	6.0	64	57.14	0.83	6.9	6.4	10	0.0033	250	0.34	5,000	1,700	13,450	4.08	1,020
0917	0911	64	58.42	5.6	64	56.14	2.28	7.9	6.7	15	0.0019	1,200	10.79	5,000	53,950	101,250	9.18	11,015
0910	0911	64	60.33	3.7	64	58.13	2.20	5.9	4.8	8	0.0044	500	7.58	5,000	37,900	1,306	2.61	1,306
0911	0965	64	56.14	7.9	66	53.10	3.04	12.9	10.4	15	0.0019	1,600	23.19	5,000	115,950	255,100	9.18	14,687
0964	0965	66	62.00	4.0	66	54.59	7.41	11.4	7.7	12	0.0026	2,850	6.54	5,000	32,700	255,100	5.87	16,743
0965	0900	66	53.10	12.9	67.5	52.53	0.57	15.0	13.9	15	0.0019	300	2.07	5,000	10,350	298,150	9.18	2,754
0900	0962	66	61.75	4.3	67	59.09	2.66	7.9	6.1	15	0.0019	1,400	22.04	5,000	110,200	678,100	9.18	12,851
0958	0960	69.5	65.50	4.0	68.5	61.34	4.16	7.2	5.6	12	0.0026	1,600	39.95	5,000	199,750	678,100	5.87	9,400
0959	0960	68.5	64.83	3.7	68.5	62.63	2.20	5.9	4.8	8	0.0044	500	4.02	5,000	20,100	9,400	2.61	1,306
0960	0961	68.5	61.34	7.2	67	59.16	2.19	7.8	7.5	15	0.0019	1,150	25.37	5,000	126,850	346,700	9.18	10,556
0961	0962	67	59.16	7.8	67	58.97	0.19	8.0	7.9	15	0.0019	100	0.00	5,000	0	346,700	9.18	918
0962	0963	67	58.97	8.0	67	57.07	1.90	9.9	9.0	15	0.0019	1,000	3.56	5,000	17,800	1,042,600	9.18	9,179
0954	0955	69.5	65.67	3.8	68	60.22	5.45	7.8	5.8	10	0.0033	1,650	39.02	5,000	195,100	1,042,600	4.08	6,732
0956	0955	68	64.33	3.7	68	60.37	3.96	7.6	5.6	8	0.0044	900	18.82	5,000	94,100	195,100	2.61	2,350
0957	0955	68.5	64.83	3.7	68	60.43	4.40	7.6	5.6	8	0.0044	1,000	12.86	5,000	64,300	94,100	2.61	2,611
0955	0963	68	60.37	7.6	67	56.41	3.96	10.6	9.1	10	0.0033	1,200	9.64	5,000	48,200	401,700	4.08	4,896
0963	0949	67	57.07	9.9	66.5	54.79	2.28	11.7	10.8	15	0.0019	1,200	13.77	5,000	68,850	470,550	9.18	11,015
0950	0951	68	64.00	4.0	67.5	62.83	1.17	4.7	4.3	12	0.0026	450	5.16	5,000	25,800	470,550	5.87	2,644
0951	0952	67.5	62.83	4.7	68	57.24	5.59	10.8	7.7	12	0.0026	2,150	31.68	5,000	158,400	184,200	5.87	12,631
0953	0952	69.5	65.67	3.8	68	60.39	5.28	7.6	5.7	10	0.0033	1,600	36.67	5,000	183,350	184,200	4.08	6,528
0952	0949	67	57.24	9.8	66.5	54.25	2.99	12.3	11.0	12	0.0026	1,150	10.56	5,000	52,800	420,350	5.87	6,756
0966	0919	64	60.33	3.7	64	58.57	1.76	5.4	4.5	8	0.0044	400	1.49	5,000	7,450	420,350	2.61	1,044
0919	0920	64	58.57	5.4	64	57.91	0.66	6.1	5.8	8	0.0044	150	1.03	5,000	5,150	12,600	2.61	392
0921	0920	64	60.33	3.7	64	57.25	3.08	6.7	5.2	8	0.0044	700	5.62	5,000	28,100	12,600	2.61	1,828
0920	0923	64	57.25	6.7	64	56.47	0.78	7.5	7.1	12	0.0026	300	0.54	5,000	2,700	43,400	5.87	1,762
0922	0923	64	60.33	3.7	64	59.23	1.10	4.8	4.2	8	0.0044	250	1.89	5,000	9,450	43,400	2.61	653
0924	0923	65	61.33	3.7	64	58.25	3.08	5.7	4.7	8	0.0044	700	6.43	5,000	32,150	85,000	2.61	1,828
0923	0926	64	56.47	7.5	65	55.56	0.91	9.4	8.5	12	0.0026	350	0.00	5,000	0	85,000	5.87	2,056

**TABLE 14
SANITARY SEWER SYSTEM DESIGN CALCULATIONS IN ALDINE ID**

0925	0926	65	61.33	3.7	65	59.35	1.98	5.6	4.7	8	0.0044	450	3.62	5,000	18,100	2.61	1,175
0927	0926	65	61.33	3.7	65	58.25	3.08	6.7	5.2	8	0.0044	700	5.62	5,000	28,100	2.61	1,828
0926	0929	65	55.56	9.4	65	54.78	0.78	10.2	9.8	12	0.0026	300	0.00	5,000	0	5.87	1,762
0928	0929	65	61.33	3.7	65	58.25	3.08	6.7	5.2	8	0.0044	700	4.82	5,000	24,100	2.61	1,828
0930	0929	65	61.33	3.7	65	58.91	2.42	6.1	4.9	8	0.0044	550	3.79	5,000	18,950	2.61	1,436
0929	0932	65	54.78	10.2	65.5	54.26	0.52	11.2	10.7	12	0.0026	200	0.00	5,000	0	5.87	1,175
0931	0932	65.5	61.83	3.7	65.5	58.31	3.52	7.2	5.4	8	0.0044	800	3.67	5,000	18,350	2.61	2,089
0933	0932	65.5	61.83	3.7	65.5	59.19	2.64	6.3	5.0	8	0.0044	600	2.75	5,000	13,750	2.61	1,567
0932	0935	65.5	54.26	11.2	65.5	53.98	0.29	11.5	11.4	15	0.0019	150	0.00	5,000	0	9.18	1,377
0934	0935	65.5	61.83	3.7	65.5	58.09	3.74	7.4	5.5	8	0.0044	850	3.90	5,000	19,500	2.61	2,219
0936	0935	65.5	61.83	3.7	65.5	59.19	2.64	6.3	5.0	8	0.0044	600	2.07	5,000	10,350	2.61	1,567
0935	0940	65.5	53.98	11.5	66	53.60	0.38	12.4	12.0	15	0.0019	200	0.00	5,000	0	9.18	1,836
0937	0940	66	62.33	3.7	66	57.71	4.62	8.3	6.0	8	0.0044	1,050	4.82	5,000	24,100	2.61	2,742
0941	0940	66	62.33	3.7	66	59.69	2.64	6.3	5.0	8	0.0044	600	3.44	5,000	17,200	2.61	1,567
0940	0943	66	53.60	12.4	66	53.22	0.38	12.8	12.6	15	0.0019	200	0.00	5,000	0	9.18	1,836
0942	0943	66	62.33	3.7	66	57.27	5.06	8.7	6.2	8	0.0044	1,150	5.28	5,000	26,400	2.61	3,003
0944	0943	66	62.33	3.7	66	59.69	2.64	6.3	5.0	8	0.0044	600	2.75	5,000	13,750	2.61	1,567
0943	0946	66	53.22	12.8	66	52.84	0.38	13.2	13.0	15	0.0019	200	0.00	5,000	0	9.18	1,836
0945	0946	66	62.33	3.7	66	56.83	5.50	9.2	6.4	8	0.0044	1,250	5.74	5,000	28,700	2.61	3,264
0947	0946	66	62.33	3.7	66	59.69	2.64	6.3	5.0	8	0.0044	600	2.75	5,000	13,750	2.61	1,567
0946	0949	66	52.84	13.2	66.5	52.46	0.38	14.0	13.6	15	0.0019	200	0.00	5,000	0	9.18	1,836
0949	WWTP2	66.5	52.46	14.0	66.5	51.60	0.86	14.9	14.5	15	0.0019	450	6.08	5,000	30,400	9.18	4,131
0948	WWTP2	66.5	62.83	3.7	66.5	59.97	2.86	6.5	5.1	8	0.0044	650	1.49	5,000	7,450	2.61	1,697
Total													48,650	466.29	5,000	2,331,450	256,085

**TABLE 14
SANITARY SEWER SYSTEM DESIGN CALCULATIONS IN ALDINE ID**

Start Node	End Node	Gr. El. Start	Inv. El. Start	Depth Start (ft)	Gr. El. End	Inv. El. End	Change Invert (ft)	Depth End (ft)	Avg. Depth (ft)	Pipe Size (in)	Slope (%)	Length (ft)	Area Served (AC)	Accum. Acres	Gal./Acre/Day	Gal./Day	Accum. Gal./Day	Pipe Vol./ft (gal./ft)	Pipe Vol. (gal.)
SZ-11																			
1058	1034	64	60.00	4.0	64	56.75	3.25	7.3	5.6	12	0.0026	1250	53.95		5,000	269,750		5.87	7,343
1034	1000	64	56.75	7.3	61.5	52.76	3.99	8.7	8.0	15	0.0019	2100	25.71	79.66	5,000	128,550	398,300	9.18	19,277
1059	1000	61	57.00	4.0	61.5	53.23	3.77	8.3	6.1	12	0.0026	1450	12.86		5,000	64,300		5.87	8,518
1000	1063	61.5	52.76	8.7	61.5	52.00	0.76	9.5	9.1	15	0.0019	400	0	92.52	5,000	0	462,600	9.18	3,672
1067	1063	60.5	56.50	4.0	61.5	52.34	4.16	9.2	6.6	12	0.0026	1,600	13.09		5,000	65,450		5.87	9,400
1063	1064	61.5	52.00	9.5	61	51.34	0.67	9.7	9.6	15	0.0019	350	0.00	105.61	5,000	0	528,050	9.18	3,213
1061	1064	60	56.00	4.0	61	51.32	4.68	9.7	6.8	12	0.0026	1,800	13.10		5,000	65,500		5.87	10,575
1064	1065	61	51.34	9.7	60.5	50.77	0.57	9.7	9.7	15	0.0019	300	0.00	118.71	5,000	0	593,550	9.18	2,754
1106	1065	59	55.00	4.0	60.5	50.06	4.94	10.4	7.2	12	0.0026	1,900	13.10		5,000	65,500		5.87	11,162
1065	1066	60.5	50.06	10.4	60	48.49	1.58	11.5	11.0	18	0.0015	1,050	0.00	131.81	5,000	0	659,050	13.22	13,879
1066	1098	60	48.49	11.5	59	48.19	0.30	10.8	11.2	18	0.0015	200	0.69		5,000	3,450		13.22	2,644
1098	1085	59	48.19	10.8	59	47.81	0.38	11.2	11.0	18	0.0015	250	0.69		5,000	3,450		13.22	3,305
1085	1081	59	47.81	11.2	56	45.49	2.33	10.5	10.9	18	0.0015	1,550	12.45	145.64	5,000	62,250	728,200	13.22	20,488
1099	1108	59.5	55.50	4.0	59	51.86	3.64	7.1	5.6	12	0.0026	1,400	8.67		5,000	43,350		5.87	8,225
1108	1082	56	51.86	4.1	56	50.43	1.43	5.6	4.9	12	0.0026	550	0.80	9.47	5,000	4,000	47,350	5.87	3,231
1084	1082	59	55.33	3.7	56	50.93	4.40	5.1	4.4	8	0.0044	1,000	7.46		5,000	37,300		2.61	2,611
1082	1081	56	50.43	5.6	56	49.65	0.78	6.4	6.0	12	0.0026	300	0.69	17.62	5,000	3,450	88,100	5.87	1,762
1086	1080	59	55.00	4.0	56	50.84	4.16	5.2	4.6	12	0.0026	1,600	12.86		5,000	64,300		5.87	9,400
1087	1079	59	55.00	4.0	56	50.71	4.29	5.3	4.6	12	0.0026	1,650	10.33		5,000	51,650		5.87	9,693
1088	1090	59	55.33	3.7	57	52.69	2.64	4.3	4.0	8	0.0044	600	3.44		5,000	17,200		2.61	1,567
1097	1089	59	55.00	4.0	59	51.88	3.12	7.1	5.6	12	0.0026	1,200	6.43		5,000	32,150		5.87	3,819
1089	1090	59	51.88	7.1	57	50.19	1.69	6.8	7.0	12	0.0026	650	2.93	14.53	5,000	14,650	72,650	5.87	3,819
1090	1079	57	50.19	6.8	56	47.33	2.86	8.7	7.7	12	0.0026	1,100	5.17	46.33	5,000	25,850	231,650	5.87	6,462
1096	1092	58	54.00	4.0	58	50.88	3.12	7.1	5.6	12	0.0026	1,200	25.48		5,000	127,400		5.87	7,050
1092	1093	58	50.88	7.1	57	48.60	2.28	8.4	7.8	15	0.0019	1,200	15.52	41.00	5,000	77,600	205,000	9.18	11,015
1110	1093	56.5	52.83	3.7	57	51.07	1.76	5.9	4.8	8	0.0044	400	22.96		5,000	114,800		2.61	1,044
1093	1094	57	48.60	8.4	57	48.03	0.57	9.0	8.7	15	0.0019	300	0.00	63.96	5,000	0	319,800	9.18	2,754
1091	1094	58	54.00	4.0	57	51.27	2.73	5.7	4.9	12	0.0026	1050	9.64		5,000	48,200		5.87	6,169
1094	1078	57	48.03	9.0	56	44.42	3.61	11.6	10.3	15	0.0019	1900	17.45	91.05	5,000	87,250	455,250	9.18	17,441
1078	1079	56	44.42	11.6	56	44.14	0.29	11.9	11.7	15	0.0019	150	0.00		5,000	0		9.18	1,377
1079	1080	56	44.14	11.9	56	43.57	0.57	12.4	12.2	15	0.0019	300	0.69	91.74	5,000	3,450	458,700	9.18	2,754
1080	1081	56	43.57	12.4	56	43.00	0.57	13.0	12.7	15	0.0019	300	0.69	92.43	5,000	3,450	462,150	9.18	2,754
1081	1072	56	43.00	13.0	60	42.40	0.60	17.6	15.3	18	0.0015	400	0.00	92.43	5,000	0	462,150	13.22	5,287
1071	1072	60	56.33	3.7	60	52.37	3.96	7.6	5.6	8	0.0044	900	4.07		5,000	20,350		2.61	2,350
1077	1072	58	54.33	3.7	58	49.93	4.40	8.1	5.9	8	0.0044	1,000	4.82		5,000	24,100		2.61	2,611
1072	1073	58	42.40	15.6	62	41.65	0.75	20.4	18.0	18	0.0015	500	1.03	102.35	5,000	5,150	511,750	13.22	6,609
1111	1103	58	54.33	3.7	61	53.01	1.32	8.0	5.8	8	0.0044	300	2.75		5,000	13,750		2.61	783
1075	1103	61	57.33	3.7	61	54.69	2.64	6.3	5.0	8	0.0044	600	4.13		5,000	20,650		2.61	1,567
1103	1076	61	53.01	8.0	61	52.23	0.78	8.8	8.4	12	0.0026	300	3.21	10.09	5,000	16,050	50,450	5.87	1,762
1109	1095	62	58.00	4.0	65	56.70	1.30	8.3	6.2	12	0.0026	500	35.35		5,000	176,750		5.87	2,937

**TABLE 14
SANITARY SEWER SYSTEM DESIGN CALCULATIONS IN ALDINE ID**

1095	1074	65	56.70	8.3	62	55.79	0.91	6.2	7.3	12	0.0026	350	0.00	5,000	0	5.87	2,056										
1074	1076	62	55.79	6.2	61	55.40	0.39	5.6	5.9	12	0.0026	150	0.52	5,000	2,600	5.87	881										
1076	1073	61	52.23	8.8	62	51.33	0.90	10.7	9.7	18	0.0015	600	4.13	5,000	20,650	13.22	7,931										
1102	1035	66.5	62.50	4.0	65	58.34	4.16	6.7	5.3	12	0.0026	1600	38.45	5,000	192,250	5.87	9,400										
1036	1035	65	61.33	3.7	65	59.13	2.20	5.9	4.8	8	0.0044	500	11.25	5,000	56,250	2.61	1,306										
1035	1045	65	58.34	6.7	62.5	54.64	3.71	7.9	7.3	15	0.0019	1950	4.65	5,000	23,250	9.18	17,900										
1039	1046	64.5	60.67	3.8	66	59.18	1.49	6.8	5.3	10	0.0033	450	19.28	5,000	96,400	4.08	1,836										
1046	1045	66	59.18	6.8	62.5	56.58	2.60	5.9	6.4	12	0.0026	1000	8.78	5,000	43,900	5.87	5,875										
1045	1062	62.5	54.64	7.9	61	51.22	3.42	9.8	8.8	15	0.0019	1,800	14.98	5,000	74,900	9.18	16,523										
1038	1037	63.5	59.67	3.8	62.5	57.03	2.64	5.5	4.7	10	0.0033	800	5.45	5,000	27,250	4.08	3,264										
1037	1041	62	57.03	5.0	62	56.25	0.78	5.8	5.4	12	0.0026	300	1.38	5,000	6,900	5.87	1,762										
1042	1041	63	59.17	3.8	62	56.69	2.48	5.3	4.6	10	0.0033	750	6.83	5,000	34,150	4.08	3,060										
1041	1043	62	56.25	5.8	61.5	55.47	0.78	6.0	5.9	12	0.0026	300	1.21	5,000	6,050	5.87	1,762										
1044	1043	62.5	58.67	3.8	61.5	56.19	2.48	5.3	4.6	10	0.0033	750	7.23	5,000	36,150	4.08	3,060										
1043	1062	61.5	55.47	6.0	61	54.95	0.52	6.1	6.0	12	0.0026	200	0.52	5,000	2,600	5.87	1,175										
1060	1062	61	57.33	3.7	61	55.79	1.54	5.2	4.4	8	0.0044	350	16.47	5,000	82,350	2.61	914										
1062	1057	61	51.22	9.8	60.5	50.65	0.57	9.9	9.8	15	0.0019	300	1.21	5,000	6,050	9.18	2,754										
1047	1057	65	61.33	3.7	60.5	53.63	7.70	6.9	5.3	8	0.0044	1,750	44.15	5,000	220,750	2.61	4,569										
1057	1068	60.5	50.65	9.9	60.5	50.36	0.29	10.1	10.0	15	0.0019	150	0.34	5,000	1,700	9.18	1,377										
1070	1068	60	56.25	3.8	60.5	54.71	1.54	5.8	4.8	8	0.0044	350	3.21	5,000	16,050	2.61	914										
1068	1056	60.5	50.36	10.1	60.5	50.27	0.10	10.2	10.2	15	0.0019	50	0.00	5,000	0	9.18	459										
1048	1056	64.5	60.83	3.7	60.5	53.79	7.04	6.7	5.2	8	0.0044	1,600	44.15	5,000	220,750	2.61	4,178										
1056	1069	60.5	50.27	10.2	60.5	49.89	0.38	10.6	10.4	15	0.0019	200	0.46	5,000	2,300	9.18	1,836										
1069	1055	60.5	49.89	10.6	60.5	49.79	0.10	10.7	10.7	15	0.0019	50	0.00	5,000	0	9.18	459										
1105	1069	60	56.33	3.7	60.5	54.57	1.76	5.9	4.8	8	0.0044	400	3.44	5,000	17,200	2.61	1,044										
1069	1055	60.5	49.89	10.6	60.5	49.79	0.10	10.7	10.7	15	0.0019	50	0.00	5,000	0	9.18	459										
1049	1055	64.5	60.83	3.7	60.5	54.23	6.60	6.3	5.0	8	0.0044	1,500	39.56	5,000	197,800	2.61	3,917										
1055	1053	60.5	49.79	10.7	60.5	49.41	0.38	11.1	10.9	15	0.0019	200	0.57	5,000	2,850	9.18	1,836										
1050	1053	64	60.33	3.7	60.5	55.49	4.84	5.0	4.3	8	0.0044	1,100	41.16	5,000	205,800	2.61	2,872										
1051	1052	63	59.33	3.7	60.5	54.71	4.62	5.8	4.7	8	0.0044	1,050	41.74	5,000	208,700	2.61	2,742										
1052	1053	60.5	54.71	5.8	60.5	53.83	0.88	6.7	6.2	8	0.0044	200	0.23	5,000	1,150	2.61	522										
1053	1054	60.5	49.41	11.1	60.5	48.84	0.57	11.7	11.4	15	0.0019	300	1.61	5,000	8,050	9.17933	2753.8										
1107	1054	60.5	56.83	3.7	60.5	55.73	1.10	4.8	4.2	8	0.0044	250	1.03	5,000	5,150	2.61101	652.753										
1054	1073	60.5	48.84	11.7	62	47.04	1.80	15.0	13.3	18	0.0015	1200	8.26	5,000	41,300	13.2182	15861.9										
1073	VWTP4	62	41.65	20.4	62	41.50	0.15	20.5	20.4	18	0.0015	100	0.00	5,000	0	13.22	1,322										
													84,800	1065.31													
													5,326,550														
													524,256														

**TABLE 15
ALDINE IMPROVEMENT DISTRICT
SEWER AND WATER CAPACITY REQUIREMENTS**

Service Zone	Sewer Area *(acres)	Water Area **(acres)	WWTP/ Design Capacity (mgd)	Average Surface Water Capacity (mgd)
1 & 2	1,038	1,038	1.30	1.04
3 & 4	1,678	1,751	2.10	1.75
5	630	1,041	0.79	1.04
6	259	360	0.32	0.36
7	189	311	0.24	0.31
8	1,028	2,803	1.29	2.80
9	144	478	0.18	0.48
10 & 11	1,065	1,065	1.33	1.07
Total	6,031	8,847	7.54	8.85 SW 1.77 GW
				10.62 Total

* Sewer area calculations are based on unserved areas.

** Water area calculations are based on total service zone areas.

(1) WWTP/ Design Capacity based on 1,250 gpd/acre

(2) Average Surface Water Capacity based on 1,000 gpd/acre

**TABLE 15.1
ALDINE WEST
SEWER AND WATER CAPACITY REQUIREMENTS**

Service Zone	Sewer Area *(acres)	Water Area *(acres)	WWTP/ Design Capacity (mgd)	Average Surface Water Capacity (mgd)
Aldine West	4,348	4,348	5.44	4.35
Total	4,348	4,348	5.44	4.35 SW 0.87 GW
				5.22 Total

*Sewer and Water areas based on total service area.

**TABLE 16
SUMMARY OF COST ESTIMATES FOR THE
ALDINE ID PUBLIC WATER AND WASTEWATER PLAN**

Service Zone	Wastewater Collection & Treatment Cost, \$	Water Supply & Distribution Cost, \$	Subtotal Water & Wastewater System Costs	Contingency @ 15%	Engineering Surveying & Testing	Site Acquisition Costs	Total Cost, \$
1	\$ 5,348,350	\$ 3,481,062	\$ 8,829,412	\$ 1,324,412	\$ 1,205,129	\$ 325,000	\$ 11,663,953
2	\$ 6,094,550	\$ 3,166,925	\$ 9,261,475	\$ 1,389,221	\$ 1,326,310	\$ 175,000	\$ 12,152,006
3	\$ 6,607,350	\$ 4,825,950	\$ 11,433,300	\$ 1,714,995	\$ 1,512,796	\$ 125,000	\$ 14,786,091
4	\$ 7,398,750	\$ 4,119,001	\$ 11,517,751	\$ 1,727,663	\$ 1,555,997	\$ 100,000	\$ 14,901,411
5	\$ 8,457,900	\$ 4,451,043	\$ 12,908,943	\$ 1,936,341	\$ 1,772,540	\$ 525,000	\$ 17,142,825
6	\$ 695,200	\$ 951,350	\$ 1,646,550	\$ 246,983	\$ 234,919	\$ 175,000	\$ 2,303,452
7	\$ 1,242,500	\$ 1,241,100	\$ 2,483,600	\$ 372,540	\$ 379,099	\$ 125,000	\$ 3,360,239
8	\$ 9,552,675	\$ 1,603,387	\$ 11,156,062	\$ 1,673,409	\$ 1,593,580	\$ 525,000	\$ 14,948,052
9	\$ 2,385,000	\$ 1,302,939	\$ 3,687,939	\$ 553,191	\$ 530,020	\$ 125,000	\$ 4,896,150
10	\$ 2,010,200	\$ 2,019,056	\$ 4,029,256	\$ 604,388	\$ 637,111	\$ 525,000	\$ 5,795,755
11	\$ 6,180,250	\$ 1,879,350	\$ 8,059,600	\$ 1,208,940	\$ 1,071,685	\$ 525,000	\$ 10,865,225
SUBTOTAL	\$ 55,972,725	\$ 29,041,163	\$ 85,013,888	\$ 12,752,083	\$ 11,819,187	\$ 3,250,000	\$ 112,835,158
Aldine West Water Transmission	\$ -	\$ 8,075,306	\$ 8,075,306	\$ 1,211,296	\$ 1,211,296	\$ 125,000	\$ 10,622,898
TOTAL	\$ 55,972,725	\$ 37,116,469	\$ 93,089,194	\$ 13,963,379	\$ 13,030,482	\$ 3,375,000	\$ 123,458,056

**TABLE 17.1
SCHEDULE OF CAPITAL PROJECTS & COSTS
YEAR 2015 WATER & WASTEWATER PLAN**

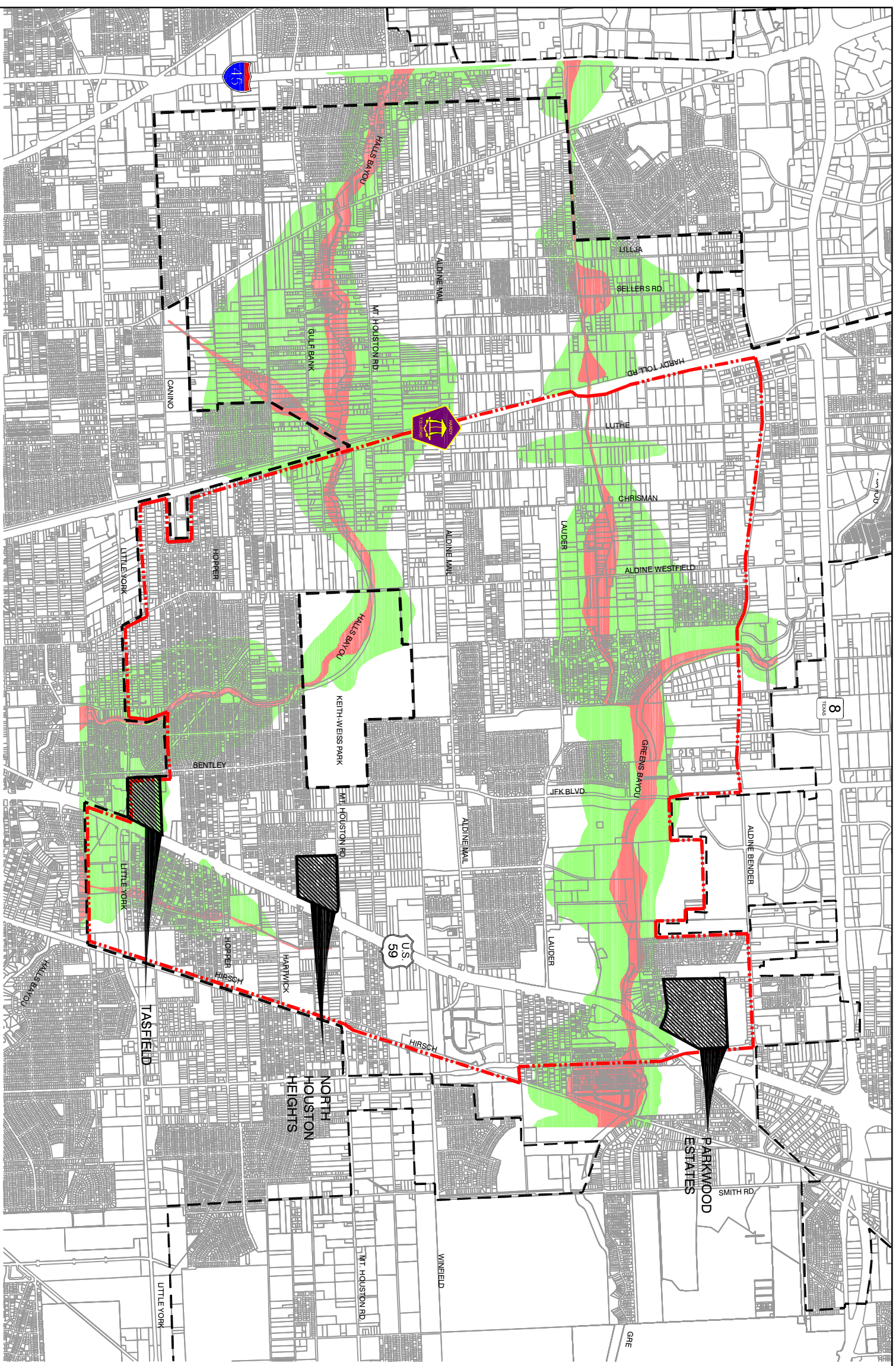
Item	Type Facility Water/Sewer	Service Zone(s)	Description	Location	Aldine ID Capital Cost	Exist Utilities Capital Cost	Aldine West Capital Cost	Total Capital Cost
10.01	Water	1, 2, 3, 4 & 8	24 Inch Transmission Line	Lauder @ Hirsch to Lauder @ Reeveston	\$15,873,792	\$4,020,863		\$19,894,655
10.02	Water	5&8	20 Inch Transmission Line	Mt. Houston @ Hirsch to Keith Weiss Park @ Aldine Westfield	\$12,791,644	\$1,470,656		\$14,262,300
10.03	Water	2	Aldine Place Water Dist. Lines	Aldine Place	\$850,000			\$850,000
10.04	Water	5	Allen & Fondren Water Dist Lines	Allen & Fondren	\$105,000			\$105,000
10.05	Water	11	Benton/Emerson Pl Water Dist Lines	U.S. 59 & Mohawk	\$550,000			\$550,000
10.06	Water	11	Inwood Water Dist Lines	South of Benton/Emerson Place	\$650,000			\$650,000
10.07	Water	11	Darden/Melwood Pl Water Dist Lines	South of Benton/Emerson Place	\$850,000			\$850,000
10.08	Water	10	Lyncrest Water Dist Lines	South East corner of U.S.59 & Mount Houston Road	\$1,500,000			\$1,500,000
10.09	Water	8	No. Hou Heights Water Dist Lines	North Houston Heights	\$1,350,000			\$1,350,000
10.10	Water	7	Parkwood Est Water Dist Lines	South West corner of Aldine Bender & Lee Road	\$2,363,151			\$2,363,151
10.11	Water	11	Sherwood/Benton Pl Water Dist Lines	East of U.S. 59 @ Little York Road	\$1,800,000			\$1,800,000
10.12	Water	5	Stettner Water Dist Lines	Stettner	\$250,000			\$250,000
10.13	Water	11	Wright Ln & Sec Water Dist Lines	East of U.S. 59 on Hopper	\$1,250,000			\$1,250,000
10.14	Water	11	Gish Subn Water Dist Lines	East of U.S. 59 on Hopper	\$1,400,000			\$1,400,000
10.15	Water	2	SZ-2 Water Plant w/ Well	Aldine Place	\$2,706,865			\$2,706,865
10.16	Water	5	SZ-5 Water Plant w/ Well	Aldine Westfield @ Hartwick	\$5,254,282			\$5,254,282
10.17	Water	7	SZ-7 Water Plant w/o Well	Parkwood Estates	\$1,743,151			\$1,743,151
10.18	Water	8	SZ-8 Water Plant w/o Well	North Houston Heights	\$3,056,765			\$3,056,765
10.19	Water	10	SZ-10 Water Plant w/o Well	Lyncrest	\$2,972,412			\$2,972,412
10.20	Water	11	SZ-11 Water Plant w/o Well	Hirsch @ Hopper	\$5,103,475			\$5,103,475
10.21	Sewer	8	North Hou Heights Sewer System	North Houston Heights	\$4,500,000			\$4,500,000
10.22	Sewer	8	Tasfield Sewer System	West of U.S. 59 @ Little York Road	\$1,150,000			\$1,150,000
10.23	Sewer	8	construct Vickery WWTP (0.1 MGD)	Mount Houston @ Vickery	\$400,000			\$400,000
10.24	Sewer	7	Parkwood Estates sewer system	South West corner of Aldine Bender & Lee Road	\$2,115,221			\$2,115,221
10.25	Water	9	SZ-9 water distribution lines	Kenwood Place, Carol Place,	\$1,625,277			\$1,625,277
10.26	Water	9	SZ-9 Water Plant w/o well		\$1,000,000			\$1,000,000
10.27	Water	5	SZ-5 (12") Trans. Line	Aldine Westfield @ K-W Park to Aldine Westfield @ Breacrest	\$368,267	\$81,733		\$450,000
SUMMARY OF CAPITAL COSTS					\$73,579,302	\$5,573,252	\$0	\$79,152,554

**TABLE 17.2
SCHEDULE OF CAPITAL PROJECTS & COSTS
YEAR 2035 WATER & WASTEWATER PLAN**

Item	Type Facility Water/Sewer Service Zone(s)	Description	Location	Aldine ID Capital Cost	Exist Utilities Capital Cost	Aldine West Capital Cost	Total Capital Cost
20.01	water	water dist. lines for SZ-8	all areas in SZ-8 not yet completed	\$7,300,000			\$7,300,000
20.02	water	water dist. lines for SZ-6	Aldine City, West of JFK on Aldine Bender	\$793,196			\$793,196
20.03	water	SZ-6 Water Plant w/o well	Aldine City, West of JFK on Aldine Bender	\$720,000			\$720,000
20.04	water	water dist. lines for SZ-5	far South West corner of Aldine ID	\$5,254,282			\$5,254,282
20.05	water	water trans. line (24")	Keith Weiss Park @ Aldine Westfield to Isom @ Chrit	\$412,079		\$2,035,422	\$2,447,501
20.06	water	SZ-3 Water Plant w/o well	Isom @ Chrisman	\$3,600,000			\$3,600,000
20.07	water	water trans. line (12") to Aldine PL. W	from Lauder TL to Gault to Aldine Place WP	\$1,300,000			\$1,300,000
20.08	water	water dist. lines for SZ-2	South of Aldine Bender, East of Chrisman (SZ-2)	\$2,706,865			\$2,706,865
20.09	water	water dist. lines for SZ-3	Hardy frontage and Hill Rd.	\$1,200,000			\$1,200,000
20.10	sewer	SZ-9 sewer system	Kenwood Place, Carol Place, etc...	\$1,404,594			\$1,404,594
20.11	sewer	SZ-6 sewer system	Aldine City	\$2,226,157			\$2,226,157
20.12	sewer	expand Vickery WWTP (to 1.0 MGD)	Mount Houston Road @ Vickery	\$3,680,000			\$3,680,000
20.13	sewer	SZ-8 sewer system	all areas in SZ-8 not yet completed	\$4,200,000			\$4,200,000
20.14	sewer	construct Halls Bayou WWTP (2.5 MGD)	Aldine Westfield @ Keith Weiss Park	\$10,000,000			\$10,000,000
20.15	sewer	SZ-5 sewer system	far South West corner of Aldine ID	\$5,457,380			\$5,457,380
20.16	sewer	SZ-10 and SZ-11 sewer system	E of U.S.59, W of Hirsch, S of Isom, N of Little York	\$4,547,310			\$4,547,310
20.17	sewer	construct SZ-10 WWTP (1.3 MGD)	East of U.S.59 on Mount Houston Rd.	\$5,200,000			\$5,200,000
20.18	sewer	SZ-3 sewer system	Aldine City, West of JFK on Aldine Bender	\$7,300,000			\$7,300,000
SUMMARY OF CAPITAL COSTS							
				\$67,301,863	\$0	\$2,035,422	\$69,337,285

**TABLE 17.3
SCHEDULE OF CAPITAL PROJECTS & COSTS
YEAR 2055 WATER & WASTEWATER PLAN**

Item	Type Facility Water/Sewer	Service Zone(s)	Description	Location	Aldine ID Capital Cost	Exist Utilities Capital Cost	Non-Aldine ID Capital Cost	Total Capital Cost
50.01	water	3	SZ-3 Water Plant w/o well	Lauder @ Reeveston	\$3,600,000			\$3,600,000
50.02	water	3	water dist. lines for SZ-3	the remainder of SZ-3 not yet completed	\$3,400,000			\$3,400,000
50.03	water	3	water trans. line (24")	Isom @ Easement to Lauder @ Easement	\$457,500		\$1,000,000	\$1,457,500
50.04	water	1	water dist. lines for SZ-1	far NW corner of Aldine ID	\$2,840,918			\$2,840,918
50.05	water	4	water dist. lines for SZ-4	SE corner of Aldine Westfield and Lauder	\$2,650,586			\$2,650,586
50.06	sewer	5	expand Halls Bayou WWTP to (5.0 MGD)	Aldine Westfield @ Keith-Weiss Park	\$20,000,000			\$20,000,000
50.07	sewer	1	SZ-1 sewer system	far NW corner of Aldine ID	\$4,784,000			\$4,784,000
50.08	sewer	2	SZ-2 sewer system	SZ-2 including Aldine Place	\$4,006,495			\$4,006,495
50.09	sewer	4	SZ-4 sewer system	SE corner of Aldine Westfield and Lauder	\$4,594,969			\$4,594,969
50.10	sewer		42" micro tunnel	from Hirsch Rd. to Suburban on Mount Houston Road	\$3,840,000			\$3,840,000
50.11	sewer		42" micro tunnel	from Vickery WWTP to Hirsch tunnel	\$2,560,000			\$2,560,000
SUMMARY OF CAPITAL COSTS					\$52,734,468	\$0	\$1,000,000	\$53,734,468



LEGEND	
	Aldine Improvement District Boundary
	City of Houston Boundary
FLOOD PLAIN INFORMATION	
	Base Flood Elevations Determined
	Floodway Areas in Zone AE
Flood Plain Data based on 1996 FEMA Maps	

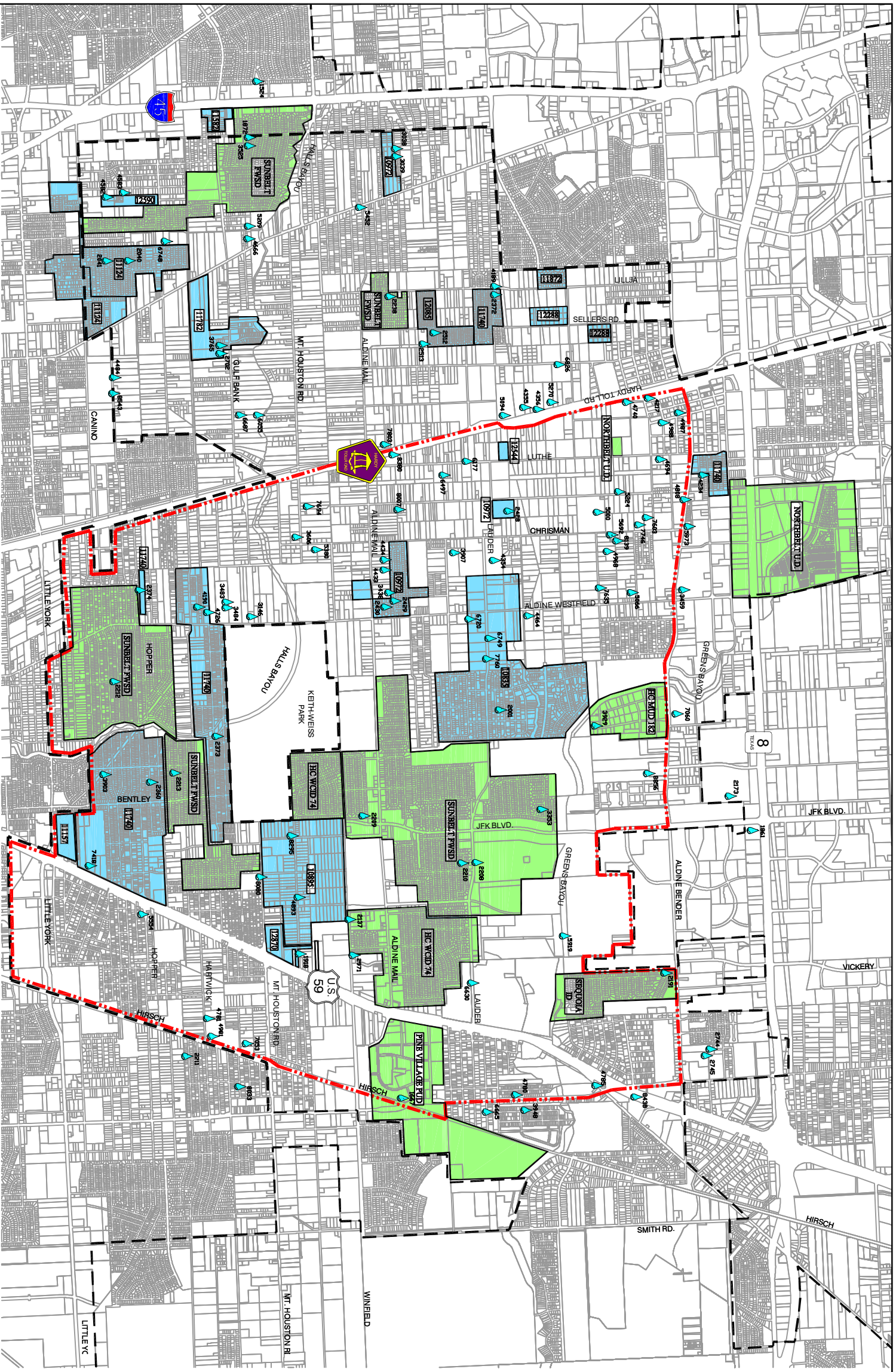
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Water & Wastewater Treatment Consultants

ALDINE ID WATER & WASTEWATER PLANNING STUDY	
STUDY AREA MAP	
DECEMBER 2004	EXHIBIT 1



WATER CCN 10736 - GALCO UTILITIES
 WATER CCN 10833 - SUBURBAN UTILITY COMPANY
 WATER CCN 10972 - CHAMPS WATER COMPANY INC.
 WATER CCN 11124 - NITSCH & SON UTILITY COMPANY, INC.
 WATER CCN 11157 - AQUA UTILITY, INC.
 WATER CCN 11549 - NORTH PREVIEW CENTER
 WATER CCN 11740 - SOUTHWEST UTILITIES, INC.
 WATER CCN 11782 - SUTFIELD WATER, INC.
 WATER CCN 11872 - SUTFIELD WATER, INC.
 WATER CCN 12085 - SUTFIELD WATER, INC.
 WATER CCN 12544 - GREENWOOD PLACE CIVIC CLUB, INC.
 WATER CCN 12590 - COUNTRY LIVING APARTMENTS
 WATER CCN 12870 - MOUNT HOUSTON UTILITIES
 WATER CCN 10895 - ORANGE GROVE WATER SUPPLY

HARRIS COUNTY M.U.D. NO. 182
 HARRIS COUNTY W.C.I.D. NO. 74
 NORTHBELT U.D.
 PINE VILLAGE P.U.D.
 SEQUOIA U.D.
 SUNBELT F.W.S.D.

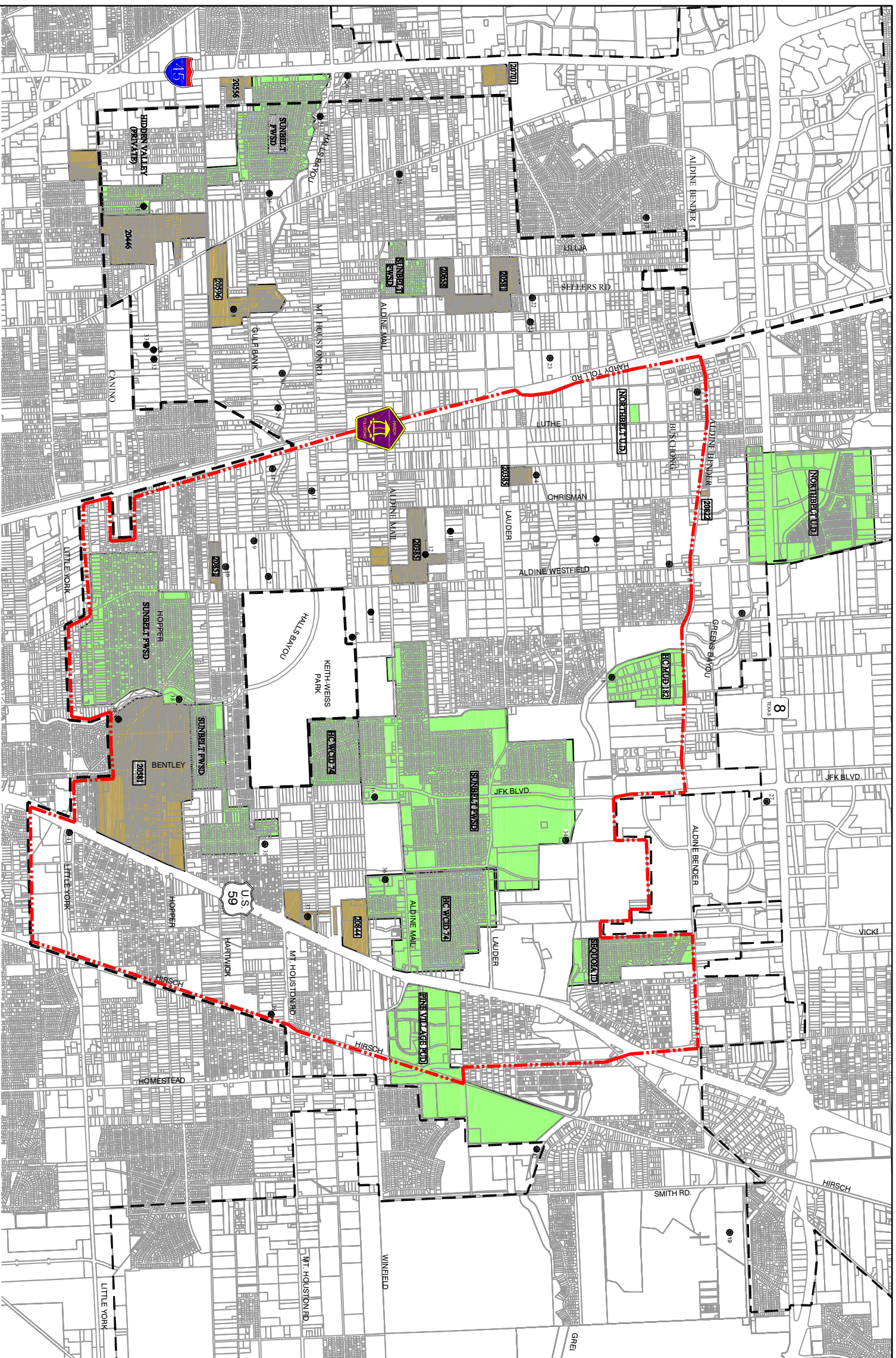
REFER TO TABLES

LEGEND

- Aldine Improvement District Boundary
- City of Houston Boundary
- Public Utility District Service Areas
- Investor Owned Utility Service Areas
- Water CCN Number
- Existing Public Water Wells

0 2000' 4000'
 SCALE 1" = 4000'
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ALDINE
 IMPROVEMENT DISTRICT
 ALDINE ID
 WATER & WASTEWATER
 PLANNING STUDY
 WATER WELLS, WATER CCN,
 & UTILITY DISTRICT MAP
 DECEMBER 2004 EXHIBIT 2



INVESTOR OWNED UTILITIES

- SEWER CCN 20385 - CHAVIS WATER COMPANY, INC.
- SEWER CCN 20446 - GALCO UTILITIES COMPANY, INC.
- SEWER CCN 20496 - GALCO UTILITIES COMPANY, INC.
- SEWER CCN 20556 - NORTH REEFWAY CENTER
- SEWER CCN 20658 - C & P UTILITIES, INC.
- SEWER CCN 20581 - SOUTHWEST UTILITIES, INC.
- SEWER CCN 20596 - WESTFIELD MHP, INC.
- SEWER CCN 20701 - WEST ROAD W.S.C.
- SEWER CCN 20854 - MOUNT HOUSTON UTILITIES
- SEWER CCN 20851 - HARTWICK GREEN WASTEWATER COMPANY

PUBLIC UTILITY DISTRICTS

- HARRIS COUNTY M.I.D. NO. 74
- NORTHBELT U.D.
- PINE VILLAGE P.U.D.
- SPROUTA I.D.
- SINBELT W.S.D.

EXISTING WASTEWATER TREATMENT PLANTS

- 1 ALDINE I.S.D.
- 2 BORING SPECIALTIES
- 3 CHAVIS WATER COMPANY, INC.
- 4 CHAVIS - ALDINE FOREST
- 5 SANDRA GOODWIN - KOA
- 6 BAYOU FOREST VILLAGE
- 7 KARBAU SUNDOWN MHP
- 8 WESTFIELD MHP
- 9 HOOKS MHP
- 10 MCULLOCH - HARTWICK
- 11 ANA JOHNSON
- 12 HOPPER
- 13 ALDINE S.S. CHRISTMAN
- 14 ASHBROOK CORROSION
- 15 WOODLOCH - MHP (ERWIN)
- 16 SINBELT F.S.W.D. (HIGH MEADOWS)
- 17 CITY OF HOUSTON - (IMPERIAL VALLEY)
- 18 HC MID 82
- 19 CITY OF HOUSTON - (NORTHBELT)
- 20 E.H. LOWENSTEIN - BERTHA B. CORP.
- 21 SINBELT F.W.S.D. - NORTHLINE
- 22 DORLINE ANYOUNG
- 23 CARP UTILITIES - ALDINE VILLAGE
- 24 HAVARIST COMMUNITIES
- 25 BALABAN, EMM
- 27 FELCOR AIRPORT UTILITIES - HOLIDAY INN
- 28 SOUTHOU, HOUSHANG - PIN OAK
- 29 FATIMA FAMILY VILLAGE
- 30 SOUTHOU BAHRAN - ROSEWOOD MHP
- 31 NITSCHE & SON - DJURKEE
- 32 SOUTHOU, HOUSHANG - MARI ROSE
- 33 SINBELT F.W.S.D. - FAIRGREEN
- 34 SINBELT F.W.S.D. - ORANGE GROVE
- 35 ALDINE I.S.D. - ORANGE GROVE
- 36 HC WCID 74
- 37 MOUNT HOUSTON UTILITIES
- 38 SINBELT F.W.S.D. - OAKWIDE
- 39 SINO ACCORN LLC - ACCORN MHP
- 40 SOUTHWEST UTILITIES - GREENWOOD
- 41 HARTMAN, JAMES - MCDONALDS
- 42 CITY OF HOUSTON WCID 76

LEGEND

- Aldine Improvement District Boundary
- City of Houston Boundary
- Public Utility District Sewer Service Area
- Investor Owned Utility Sewer Service Area
- Existing Wastewater Treatment Plants



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ALDINE

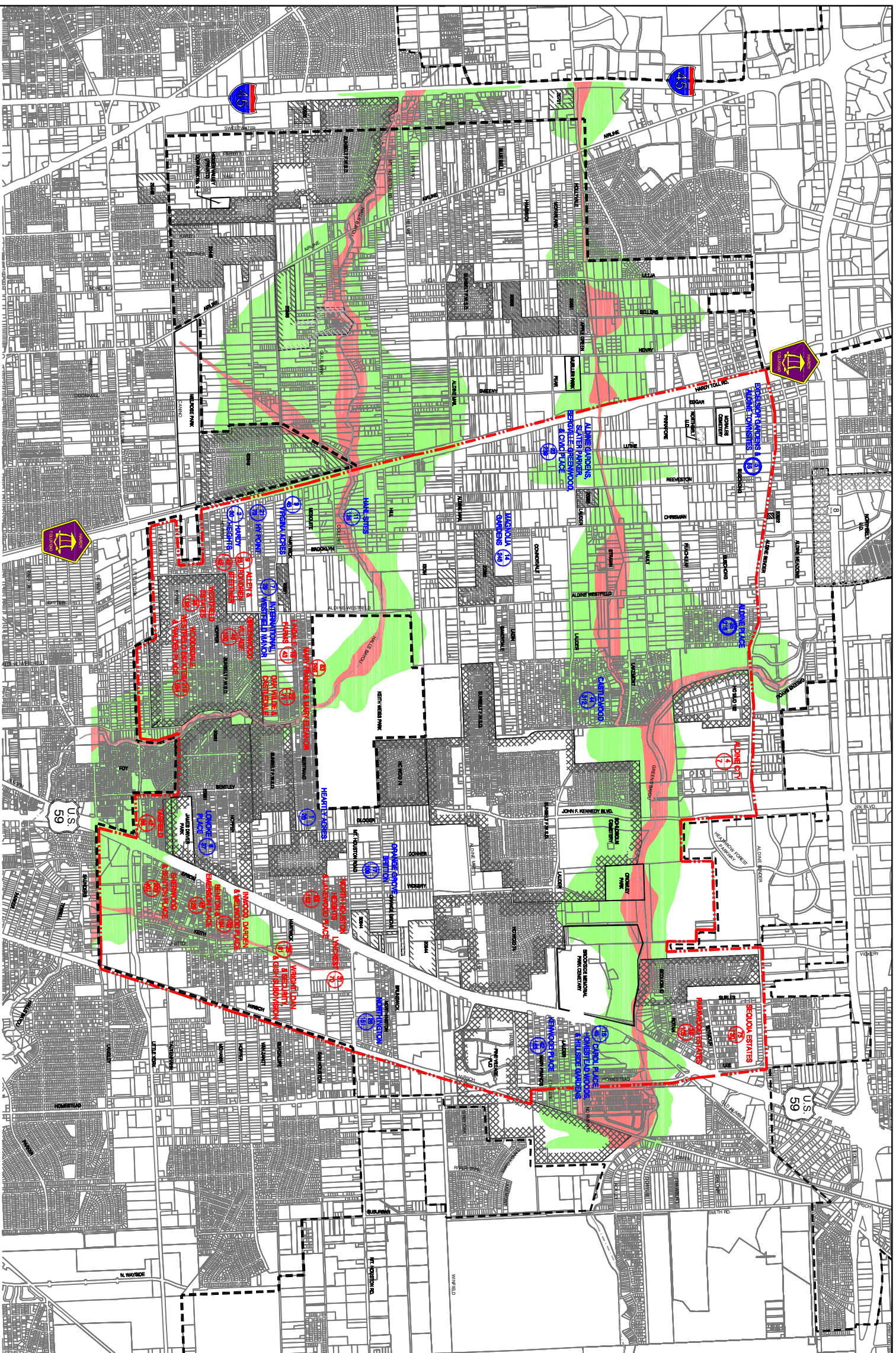
IMPROVEMENT DISTRICT

ALDINE ID
WATER & WASTEWATER
PLANNING STUDY

EXISTING SEWER SERVICE AREAS & WASTEWATER TREATMENT PLANT LOCATIONS

DECEMBER 2004

EXHIBIT 3



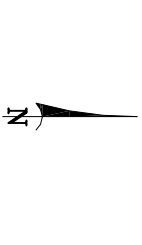
FLOOD PLAIN INFORMATION

- Base Flood Elevations Determined
- Floodway Areas in Zone AE

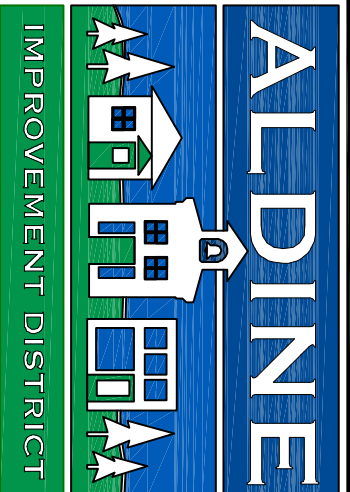
LEGEND

- City of Houston Boundary
- Aldine Improvement District Boundary
- 1 Number of Systems Failing
Number of Systems Evaluated
- 2 Number of Systems Failing
Number of Systems Evaluated
- 3 Number of Systems Failing
Number of Systems Evaluated

Flood Plain Data based on 1996 FEMA Maps



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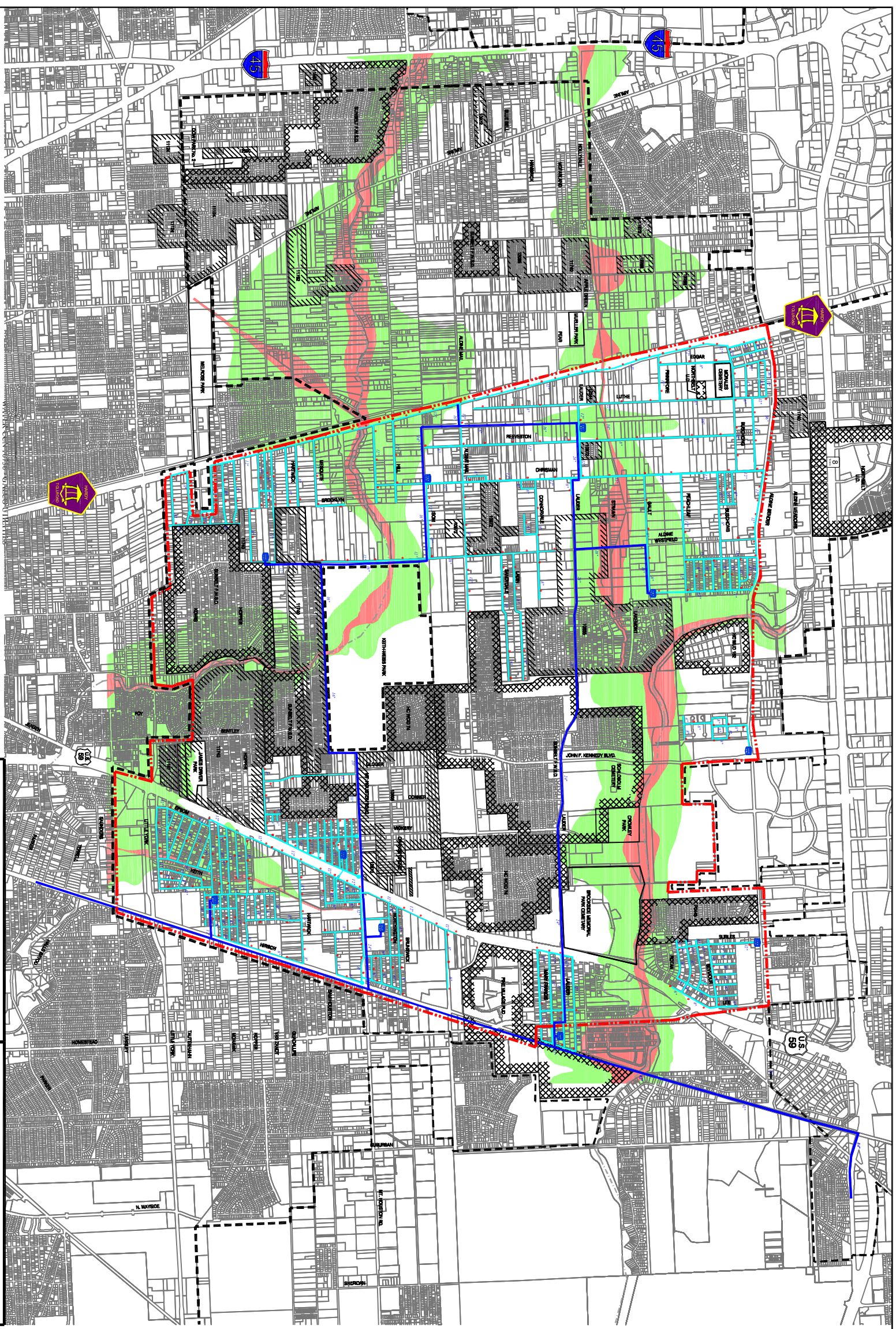
ALDINE ID
WATER & WASTEWATER
PLANNING STUDY

EXISTING ON-SITE SEWER
SYSTEM EVALUATION MAP

DECEMBER 2004

EXHIBIT 4

0 2000' 4000'
 SCALE 1" = 4000'
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- WATER CCN 10833 - SUBURBAN UTILITY COMPANY
- WATER CCN 10835 - SUBURBAN UTILITY COMPANY
- WATER CCN 10972 - CHAMPS WATER COMPANY, INC.
- WATER CCN 11124 - NITSCH & SON UTILITY COMPANY, INC.
- WATER CCN 11157 - ADUSORBE UTILITY INC.
- WATER CCN 11157 - ADUSORBE UTILITY INC.
- WATER CCN 11720 - SOUTHERN UTILITIES, INC.
- WATER CCN 11792 - WESTFIELD MHP, INC.
- WATER CCN 11872 - SWEAGARDENS ESTATES
- WATER CCN 12085 - C & P UTILITIES, INC.
- WATER CCN 12288 - SELLERS WATER COMPANY
- WATER CCN 12544 - GREENWOOD PLACE CIVIC CLUB, INC.
- WATER CCN 12590 - COUNTRY LIVING APARTMENTS
- WATER CCN 12870 - MOUNT HOUSTON UTILITIES
- WATER CCN P0445 - SEQUOIA I.D.
- WATER CCN 10895 - ORANGE GROVE
- WATER CCN P0380 - NORTHBELT I.D.

FLOOD PLAIN INFORMATION

- Base Flood Elevations Determined
- Floodway Areas in Zone AE
- Public Utility District Service Areas
- Investor Owned Utility Service Areas

LEGEND

- Aldine Improvement District Boundary
- City of Houston Boundary
- Proposed Water Storage Plant
- Proposed Water Transmission Line
- Proposed Water Distribution Line
- Proposed Fire Hydrant

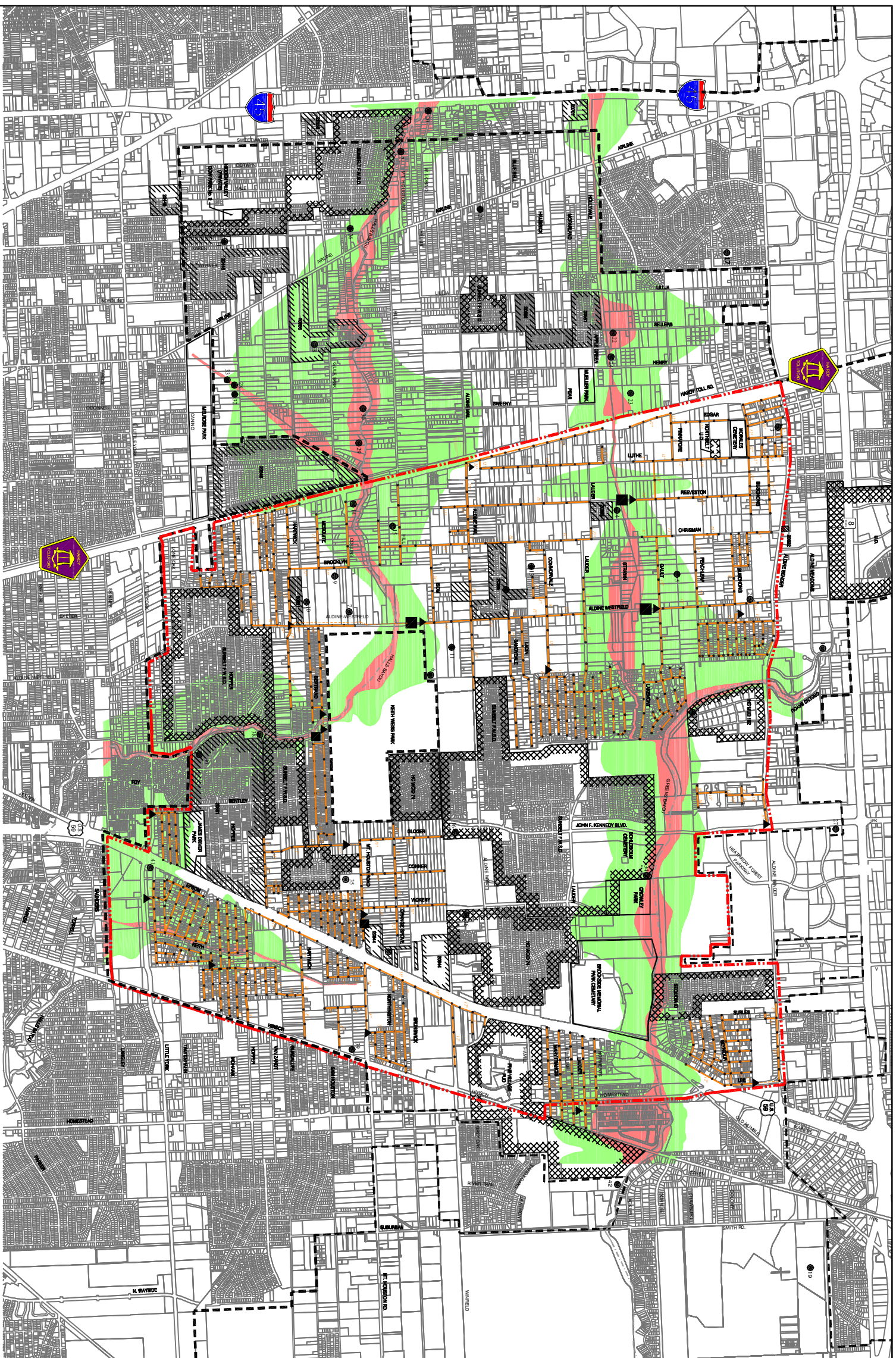
ALDINE

IMPROVEMENT DISTRICT

ALDINE I.D.
 WATER & WASTEWATER
 PLANNING STUDY

**PROPOSED WATER TRANSMISSION
 AND DISTRIBUTION PLAN**

DECEMBER 2004 EXHIBIT 5



FLOOD PLAIN INFORMATION

- Base Flood Elevations Determined
- Floodway Areas in Zone AE

LEGEND

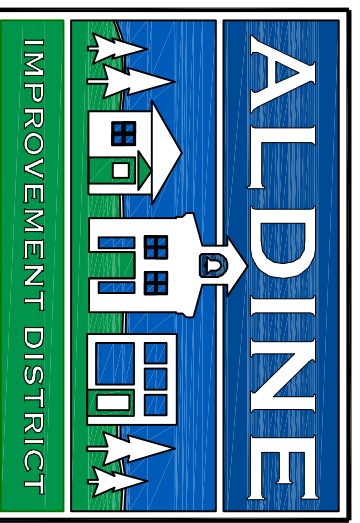
- Aldine Improvement District Boundary
- City of Houston Boundary
- Proposed Sanitary Sewer Line
- Proposed Sanitary Sewer Force Main
- Proposed Sanitary Sewer Manhole
- Proposed Sanitary Sewer Lift Station
- Proposed Wastewater Treatment Facility
- Public Utility District Service Areas
- Investor Owned Utility Service Areas
- Existing Wastewater Treatment Plants

Flood Plain Data based on 1996 FEMA Maps



0 2000' 4000'
SCALE 1" = 4000'

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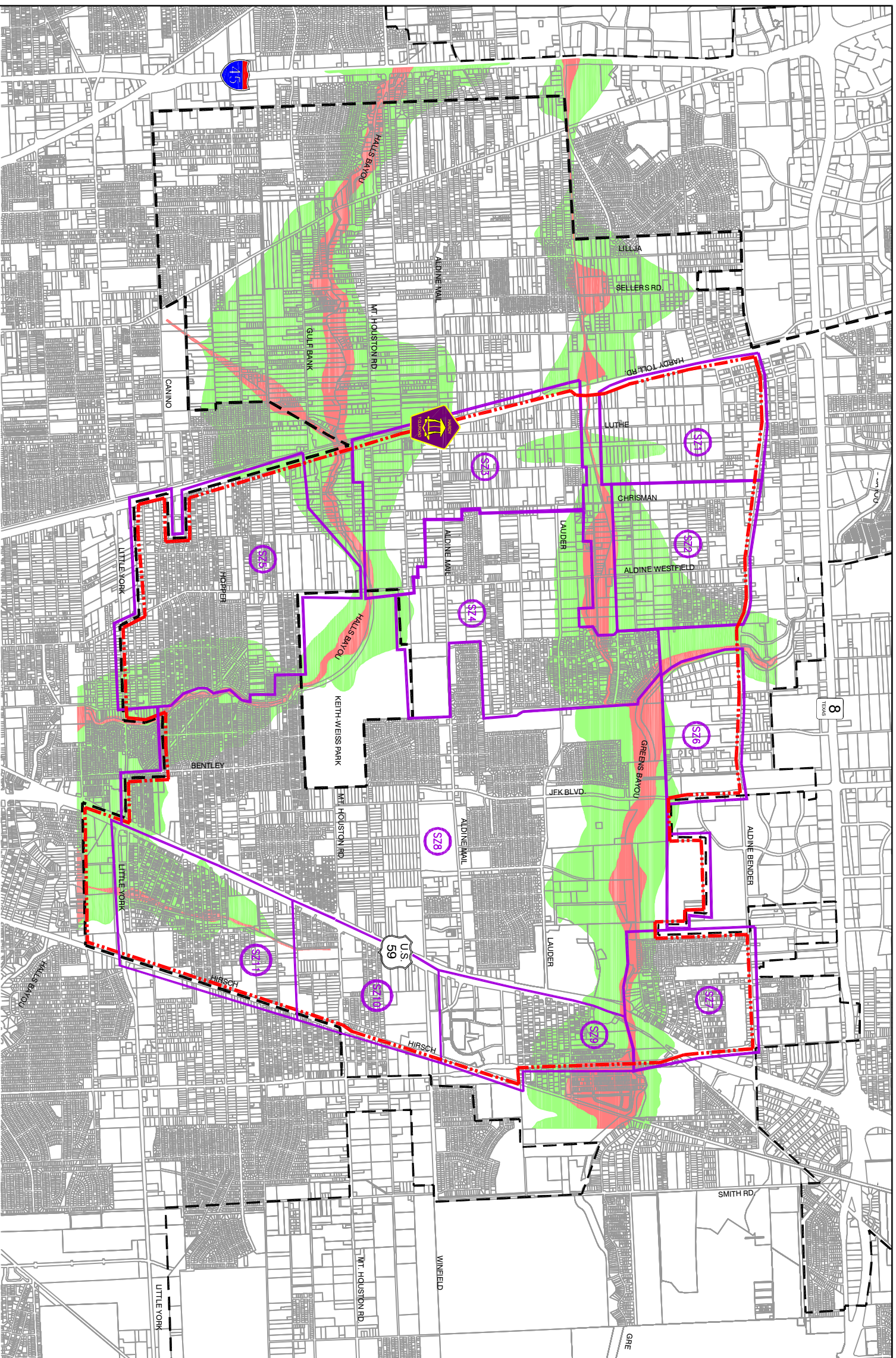


ALDINE ID
WATER & WASTEWATER
PLANNING STUDY

**PROPOSED WASTEWATER COLLECTION
AND TREATMENT PLAN**

DECEMBER 2004

EXHIBIT 6




FLOOD PLAIN INFORMATION

- Base Flood Elevations Determined
- Floodway Areas in Zone AE

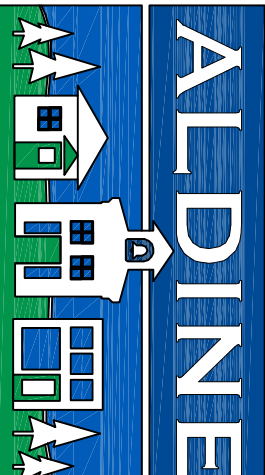
LEGEND

- Aldine Improvement District Boundary
- City of Houston Boundary
- Service Zone Boundary
- Service Zone Designation

Flood Plain Data based on 1996 FEMA Maps


 0 2000' 4000'
 SCALE 1" = 4000'
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Water & Wastewater Treatment Consultants

ALDINE



IMPROVEMENT DISTRICT

ALDINE ID
WATER & WASTEWATER
PLANNING STUDY










**STUDY AREA &
SERVICE ZONE MAP**

DECEMBER 2004

EXHIBIT 7



LEGEND & NEIGHBORHOOD INFORMATION

	Property Structure	Total Average:	63.9 ac.
	Proposed Waterline	Total Lots:	302
	Proposed Sewer Line	Occupied Lots:	126
	Proposed Force Main	No. of Manholes:	42
	Neighborhood Boundary	No. of Fire Hydrants:	23
	Proposed Manhole	Avg. Lot Size:	0.112 ac.
	Proposed Gate Valve		(5022 sq. ft.)
	Proposed Fire Hydrant		
	Proposed Lift Station		

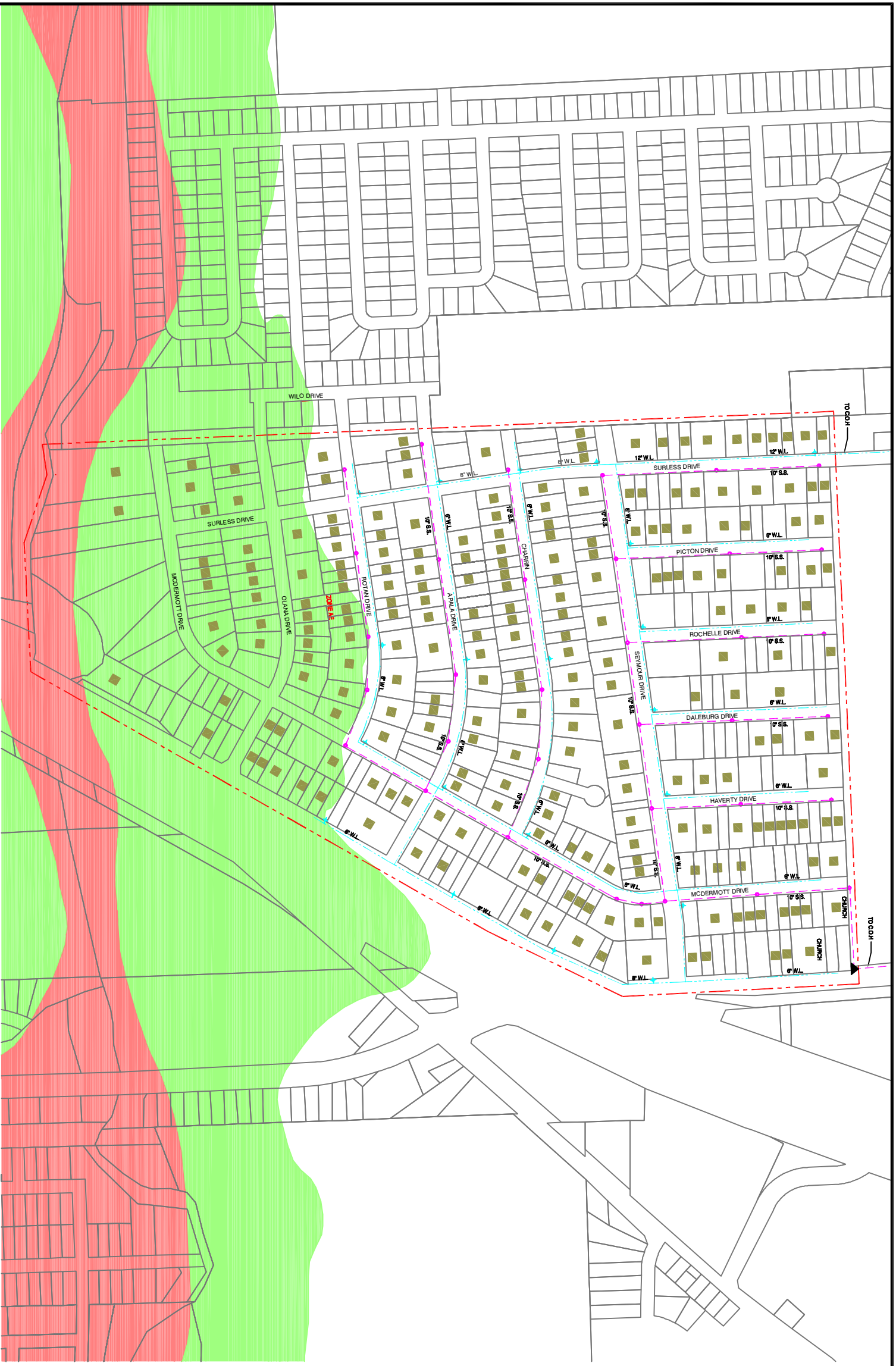











ALDINE
IMPROVEMENT DISTRICT

ALDINE ID
WATER & WASTEWATER
PLANNING STUDY

**NORTH HOUSTON HEIGHTS
WATER & WASTEWATER SERVICE PLAN**

DECEMBER 2004
EXHIBIT 8




FLOOD PLAIN INFORMATION		LEGEND & NEIGHBORHOOD INFORMATION	
	Base Flood Elevations Determined		Property Structure
	Floodway Areas in Zone AE		Proposed Waterline
			Proposed Sewer Line
			Neighborhood Boundary
			Proposed Manhole
			Proposed Lift Station
			Proposed Fire Hydrant
			Total Acreage: 152.75 ac.
			Total Lots: 406
			Occupied Lots: 240
			No. of Manholes: 36
			No. of Fire Hydrants: 21
			Avg. Lot Size: 0.117 ac. (7201 sq. ft.)



ALDINE
IMPROVEMENT DISTRICT

ALDINE ID WATER & WASTEWATER PLANNING STUDY	
PARKWOOD ESTATES WATER & WASTEWATER SERVICE PLAN	
DECEMBER 2004	EXHIBIT 9



















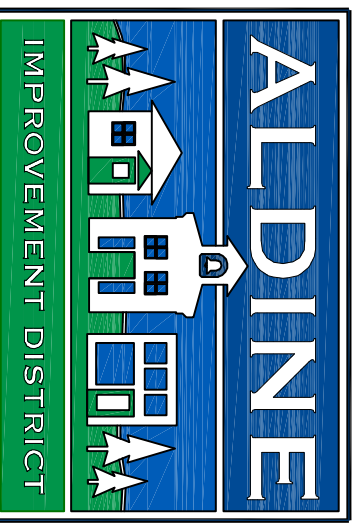
0 250' 500'
SCALE 1" = 500'

Water Engineers, Inc.
Water & Wastewater Treatment Consultants

Flood Plain Data based on 1996 FEMA Maps



FLOOD PLAIN INFORMATION		LEGEND & NEIGHBORHOOD INFORMATION	
	Base Flood Elevations Determined		Property Structure
	Floodway Areas in Zone AE		Neighborhood Boundary
			Proposed Watertline
			Existing Watertline
			Proposed Sewer Line
			Existing Sewer Line
			Proposed Force Main
			Existing Force Main
			Proposed Manhole
			Existing Manhole
			Proposed Fire Hydrant
			Proposed Lift Station
			Existing Lift Station
			Existing Master Meter
			Total Acreage: 40.44 ac.
			Total Lots: 192
			Occupied Lots: 86
			No. of Manholes: 15
			No. of Fire Hydrants: 21
			Avg. Lot Size: 0.1 ac. (4356 sq. ft.)



ALDINE ID
 WATER & WASTEWATER
 PLANNING STUDY

TASFIELD
 WATER & WASTEWATER SERVICE PLAN

DECEMBER 2004 EXHIBIT 10