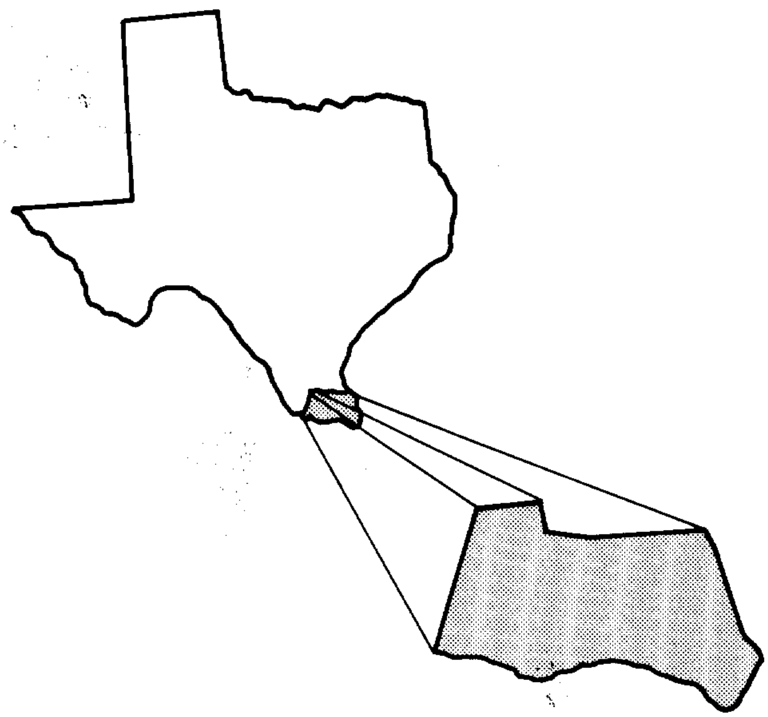
A RECONNAISSANCE LEVEL STUDY OF WATER SUPPLY AND WASTEWATER DISPOSAL NEEDS OF THE COLONIAS OF THE LOWER RIO GRANDE VALLEY



TEXAS WATER DEVELOPMENT BOARD

JANUARY 1987

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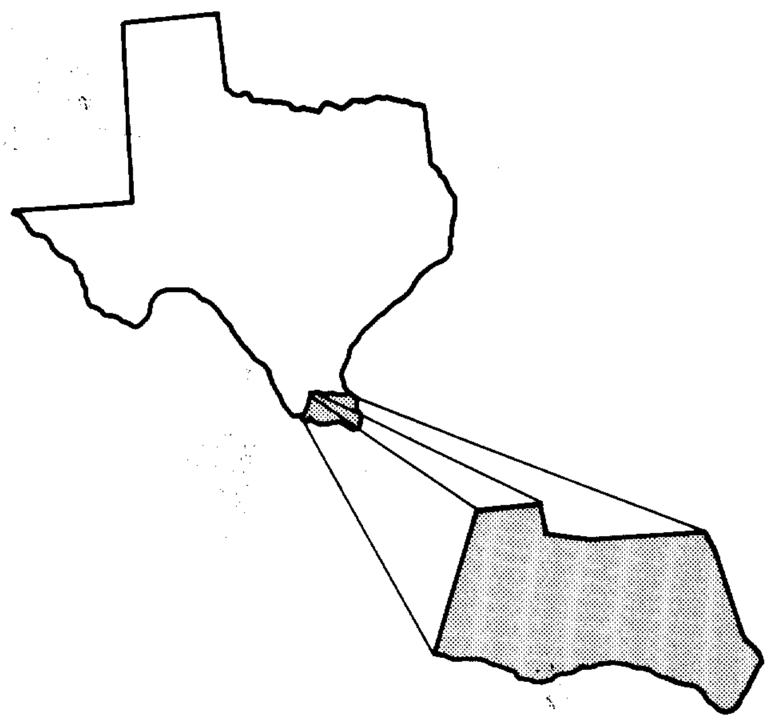

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This report presents the results of a reconnaissance-level study to evaluate the water and wastewater needs of the colonias in the Lower Rio Grande Valley. A planning period of 1986 through 2010 has been designated as a means of defining the magnitude of the needs of the colonias.

For purposes of this study, a colonia is defined as an unincorporated area populated as a primarily residential development with at least some substandard housing and without benefit of adequate water supply or wastewater services. The study was sponsored by the Texas Water Development Board, under whose overall management the study objectives and study approach were developed. The study comprised an inventory phase and a technical/financial alternatives phase. This report summarizes the findings of both phases of the project.

The study area encompasses the tri-county area of Cameron, Willacy, and Hidalgo counties. Of a total 770 unincorporated communities in the study area, 435 were identified as falling within the definition of a colonia. An estimated 71,478 persons reside in these colonias.

On a county-by-county basis, Hidalgo County was found to contain the majority of colonia developments and hence the largest colonia population. Using a field survey as verification, the study identified the following number of colonias and estimated population by county.

County	Summer of 1986 Number of Colonias	Estimated Population
Hidalgo County	366	51,804
Cameron County	65	17,037
Willacy County	4	2,637
TOTAL	435	71,478

Data compiled by the Lower Rio Grande Valley Development Council, supplemented by field surveys performed by the Texas Water Development Board, indicate that, of the total number of colonias identified, approximately 373 receive water into the colonias, but not necessarily to individual dwelling units within each colonia, through some recognized and publicly authorized water supplier, generally a nonprofit water supply corporation. An additional 57 colonias receive water from undetermined sources. The remaining 5 colonias have no water supply.

The available information shows that all 435 colonia units dispose of sanitary waste through onsite methods such as latrines, or septic tanks per individual dwellings. In virtually all cases, the current method of waste disposal is considered inadequate.

To address the problem of water and wastewater needs at a reconnaissance level, the colonias were grouped into five classifications based on common characteristics of population, population density, and location. Only 5 percent of the colonias were identified as having no water service available. However, approximately 13 percent of the residences in colonias with water service were not directly connected to the system and are receiving water by some other means. Inadequate wastewater disposal was found to be a much more widespread problem in the colonias than the lack of potable water. As a result, however, in colonias with water service, approximately 13 percent of the residences were not connected to the system and are receiving potable water by some other means. The alternatives evaluated for water service were limited to the extension of existing sources via water supply corporations, municipalities, or utility districts. Water supply via the allocation of water rights was found to be a limiting factor in providing service to the colonias more so than the cost of expanding water facilities. This is particularly true in municipalities when, due to a 1971 State Court ruling, allocations may already have been committed.

Inadequate wastewater disposal was found to be a much more widespread problem in the colonias than the lack of potable water. As a result, this study emphasizes wastewater disposal alternatives.

Corresponding to the five classifications of colonias were five approaches to sanitary waste disposal, namely:

- Expansion of Existing Regional Systems
- Developing Centralized Systems for One or More Colonias
- Developing Cluster Systems Within a Colonia
- Maintaining or Developing Individual Onsite Septic Disposal
- Maintaining an Improved Latrine System

A basic assumption of the study was that water service will be available to all the colonias by the year 2010. Thus, the use of latrine systems is viable only for the near-term in colonias not currently serviced by water, and a wastewater treatment-disposal system compatible with greater water use must be provided by the year 2010 for all colonias.

Although a wastewater management approach is defined for each colonia identified, it is not the intent of this reconnaissance-level study to recommend an exact solution for each colonia. Rather, the intent is to define, at a level compatible with the data available, a range of possible solutions and to provide the magnitude of cost to supply these services to serve as a basis for further planning.

A solution matrix of technical and economic decisions was developed which resulted in the following distribution of potential solutions.

Wastewater Alternative	Year 2010 Number of Colonias
Expand Existing Regional Facilities	137
Install Centralized Systems	214
Install Cluster Systems	54
Maintain Individual Onsite Septic Systems	30
TOTAL	435

The probable cost needed to provide the water service improvements identified is approximately $46 million. Probable cost to provide wastewater service to all colonias can be expected to range from $93 million to $152 million, depending on specific regulatory and technical requirements as applied to the colonias.

Although several of the colonias are relatively large and urban in character, the colonias identified in this study average about 25 acres in size and 260 persons in population. The average lot size is approximately 8,000 square feet. In addition to the 435 colonias identified, several hundred more have been platted but are not physically occupied. Many of the residences in the colonias do not appear to have in-house plumbing. Yard taps for water supply are common, as are latrines for human waste disposal. Implementation of the water/wastewater systems will require some consideration of providing in-house plumbing as part of the implementation cost.

Water service to the colonias is not limited by the economic cost of expanding facilities but is tied with the availability of water rights, an issue that is beyond the scope of this current study. Ultimately the most likely provider of water service to the colonias appears to be the existing water supply corporations. These corporations currently serve a majority of the colonias and do not appear as limited in water resources, as are municipalities.

Wastewater disposal is a far more widespread problem for the colonias than is water supply. The current practice of septic tank and latrine installation frequently goes unmonitored by the county health departments. As a result, their effectiveness is questionable. The proposed ruling by the Texas Water Commission to limit septic tanks to lots larger than one-half acre will almost certainly mean some alternative waste disposal means will be required for all the colonias before the end of the planning period. Their relative small size, combined with somewhat remote locations, makes the implementation of large regional facilities difficult both from a cost and operational viewpoint. Subregional or centralized type systems serving two or three colonias appears to be a viable solution that limits the number of treatment plants required and eliminates the dependence on onsite septic tank or latrine systems. Innovative/alternative (I/A) system technologies will be necessary to reduce the capital and maintenance costs of the wastewater systems. This study identifies several I/A systems applicable to the colonia problem.

In addition to the 435 colonias addressed by this study, there exists approximately 335 rural communities with some potential wastewater needs. Planning efforts should be expanded to incorporate the total number of communities in the planning area. The noncolonia developments will expand the tax base, potentially assisting the financial feasibility of the water/wastewater system of implementation. The full participation of the residents will be a factor in the financial and operational success of the facilities. Alternative incentive programs, such as providing in-house plumbing, should be developed to encourage participation in the utility after it is in operation.

This study addresses several alternatives to a conventional gravity sewer and treatment plant system. The cost analysis performed in this study indicates, however, that the conventional system is cost-effective in densely populated areas. However, selection of the system most applicable to each specific colonia can result only after more site-specific analysis. A demonstration program should be performed of several of the alternative systems at selected colonias as a means of defining the construction, operation, and maintenance requirements for these systems and their applicability to the colonias.

A single colonia is, on the average, too small to justify creation of a collective fiscal body to merge a wastewater system. Using the grouping identified in this study would still result in numerous organizations such as LIDs, MUDs, etc. This management approach would increase the need for professional assistance to manage and operate the facilities. A single authority to manage the wastewater system would appear to be a reasonable approach to consolidating the professional and technical expertise needed to properly administer a program for implementation. The Rio Grande Valley Pollution Control Authority, established in 1967 by the State Legislature, appears to have the authority to function in this capacity.

SECTION I - INTRODUCTION

PROJECT OVERVIEW

Throughout the Rio Grande Valley of Texas there has been a history of rural subdivision development, which has accelerated during the past decade. These primarily residential subdivisions have been and still are sometimes referred to as "colonias," although a number of the older subdivisions have matured into recognized communities or cities. This study addresses the water and wastewater needs of the colonias located in the three counties of Hidalgo, Cameron, and Willacy in South Texas. The development considered is limited to those which have certain common characteristics:

- The subdivision is located outside of the corporate limits of any city or town or outside the limits of a utility district providing water and sewer service.
- The residential community includes at least some substandard housing.
- The subdivision is not currently served by a sewer collection line.

PROJECT OBJECTIVES

The primary objectives of this project are to identify the magnitude of the water supply and sewage service needs for the colonias in Hidalgo, Cameron, and Willacy counties and to identify potential solutions to meet those needs. The study was limited to the colonias with the above-identified characteristics for a variety of reasons:

- A location outside an incorporated city or outside a utility district would be indicative that the residents may lack the legal authority to fund (by taxation, user fees, or receipt of grants) improvements necessary to solve water and wastewater problems.

- The presence of significant substandard housing may be indicative of the financial ability of the residents to pay for either capital funding requirements or operation and maintenance costs, even if the subdivision had, or obtained, the legal authority needed.

- It was assumed that subdivisions with wastewater utilities in place were currently served and had the ability to expand or upgrade its system to meet future needs.

The planning period for the study has been established as the 25-year period of 1986 (current) through 2010.

Specifically, five project objectives are addressed:

- Identify the needed water and sewage services requirements for the colonias of the Lower Rio Grande Valley.

- Identify alternative systems that are potential solutions to the problems defined above.

- Estimate the probable capital costs and annual operating and maintenance costs associated with each potential solution.

- Identify possible financial assistance programs and operating entities to implement the potential solutions.

- Prepare and submit written and oral reports of the project's findings.

PROJECT APPROACH

This study is designed as a reconnaissance-level investigation intended to locate and identify the subdivisions or colonias not currently provided with adequate water and wastewater utilities. Also, this study attempts to define potential solutions to satisfy those utility needs and to present order-of-magnitude costs required to implement potential solutions. Emphasis is placed on technical feasibility. The magnitude of the problem is estimated using currently available data and very limited overview levels of field investigation. Cost estimates are based on office studies using unit cost estimates often related to system size as opposed to itemized system components. To accomplish the objectives listed above, the colonias of the Lower Rio Grande Valley were classified, through use of the colonia data base, into one of five classifications based on size, location, housing density, and existing water and sewage systems. Projections of 2010 populations are based on growth factors developed by the Texas Water Development Board (TWDB) representing total population growth in each of the three counties. Water demands are extrapolated from per capita water consumption estimates using current water consumption experience in the area and applicable industry standards.

The following tasks were pursued in developing the information and conclusions set forth in this study.

Task 1 - Supplemental Data Collection

Under a separate contract with the TWDB, the Lower Rio Grande Valley Development Council (LRGVDC) assembled certain specified data relating to the colonias and the various entities currently providing water and sewer service to those colonias. That information was reviewed and, where practical, either verified or supplemented as part of the first task in this study. A number of interviews and site inspections were conducted as a part of this process.

A "drive-by survey" of each potential colonia location was conducted by the Texas Water Development Board to verify the location, supplement existing information, obtain missing information, and make generalized estimates regarding lot size, housing types, plumbing, and water service availability. These results were supplemented with interviews conducted with a sample of residents at selected colonias, both to verify the drive-by survey results and obtain additional data.

Informal coordination with interested local groups and individuals was maintained throughout the project. Because of the short-time schedule for completion of the project, a more formal coordination process was not practical. Representatives of the consultant team or the TWDB met from time to time with county leaders, colonia representatives, and utility suppliers to discuss the project.

Information on existing water supply and distribution facilities was compiled to supplement the data provided by LRGVDC. In addition, constraints and potentials that help define viable future system alternatives were identified.

Data were collected identifying various federal and state grant programs that might be available to assist in the funding of new or expanded potential systems. Information was also developed regarding the ability of various entities to qualify for grants or loans from these various programs.

Task 2 - Water and Sewage Service Needs

Per capita water demand of the average colonia resident was estimated based on information obtained from the water supply corporations and from the resident interviews. These demand estimates were applied to the colonia population projections to derive estimates of total water that will be required in future years. Wastewater flows were then computed from the water requirement estimates and were used in the analysis of alternative sewage systems.

Task 3 - Classification of Colonias

Each colonia included in this study was classified into one of five classifications according to their characteristics of location, size, density, and existing services. By grouping the colonias according to common characteristics, common solutions for each classification were able to be evaluated without requiring in-depth evaluation for each individual colonia. This method was chosen to accommodate the budget and time allotted for the study.

Task 4 - Analysis of Alternative Solutions

A series of practical alternative solutions were developed for each classification of colonia. The inventory of existing colonia conditions indicates that although only a fraction of the colonias suffer from inadequate or even nonexistent potable water facilities, more than 30 percent experience inadequate waste disposal techniques consisting of only a pit latrine (Garcia and Herrera, 1986). Also, according to the Texas Department of Health, many households have improperly designed septic systems. As a result, this study concentrates its analysis upon identifying and describing alternative sewage systems to meet the colonia wastewater disposal needs.

The general approach was to emphasize utilization of regional wastewater treatment facilities wherever this appears feasible and provide a potential development plan in which low-income colonias can move progressively from low to higher quality sewer service levels when characteristics of the colonia and economic circumstances allow. With this in mind, each colonia class was provided with the widest range of potentially feasible solutions from which individual colonias in that class can select the specific system components best suited to meet its individual needs at any point in time. From there, the colonia can move on to a higher service level alternative if and when conditions warrant.

Task 5 - Economics and Financing

The probable capital costs were calculated for each system alternative as it applied to each individual colonia to which that alternative was applicable. While the costing methodology is consistent with a reconnaissance-level study of this type, in that average unit costs under average conditions were applied, specific densities, line distances, site locations, and numbers of connections applicable to each individual colonia were used in preparing the cost calculations. Costing calculations take into account engineering design, land acquisition, legal, and construction costs. All costs are based on current (1986) costs of construction using labor and material rates for the South Texas area. Annual operating and maintenance costs were also calculated for each component of each system using average unit costs applicable to that component as applied to each system.

An analysis was made of the latest data available on current eligibility requirements and funding availability associated with those federal and state programs found to be potentially applicable for financial participation in the development of the alternative systems. An analysis was also made of the applicability of various entities to participate as operators of the alternative systems.

Task 6 - Presentation of Results

The results of this study are presented herein. In addition, there are oral presentations which make use of a 35 mm slide show to summarize the study. A computerized data base was developed incorporating all finalized colonia information. This data base is tied into digitized maps of the three-county area on which the location of each colonia analyzed in this study is defined. Finally, a one-page brochure is available which describes the objectives of the study, major findings of colonia need, and the overall benefits which can potentially be achieved through the implementation of an improved wastewater treatment program for the colonias of the Lower Rio Grande Valley.

LOWER RIO GRANDE VALLEY

The area included in this study contains the three Lower Rio Grande Valley counties of Hidalgo, Cameron, and Willacy located in the extreme southern part of Texas (see Figure II-1 located at the end of this section). Hidalgo and Cameron counties lie along the Rio Grande River, which separates them from the Republic of Mexico. Willacy County borders Cameron County to the north, and both are bordered to the east by the Gulf of Mexico. The three counties have a combined land area of 2,113,920 acres, or 3,303 square miles. Figure II-2 is a map of Hidalgo County and illustrates the major road network as well as the major cities. Figure II-3 illustrates the same for Cameron and Willacy counties.

Economy

One of the Lower Rio Grande Valley's most valuable resources is its mild climate, making agriculture critical to the economy of the study region. Much of the population works in agriculture-related jobs throughout the year as fruit and vegetable harvesters, packers, and clothing manufacturers.

The favorable climate is also responsible for making recreation a strong factor in the economy. A large number of retired persons spend winter months in numerous trailer communities and mobile home and trailer parks located in the region. Fishing and other coastal activities are also important ingredients in the role recreation plays in the economy of the area.

Notwithstanding its valuable resources and recent economic growth, the Lower Rio Grande Valley remains one of the poorest regions of America. Cameron County ranks among the poorest in the state in terms of per capita income, and according to a U.S. Department of Commerce report issued in 1980, the Brownsville-Harlingen-San Benito Metropolitan Statistical Area (MSA) was the third poorest nationwide.

According to the Texas Employment Commission, unemployment in the three-county region is currently 15 to 20 percent. High unemployment combined with uniformly low wages places over 30 percent of the population below the prescribed national poverty level.

Population and Land Use

Because of the area's mild climate, many of the residents are seasonal, some being migrant farm workers who make their winter homes in colonias while employed locally in agriculture and follow the harvest north in the summer. Others are retired persons spending winters in trailer and mobile home parks, moving to other areas during summer months. Many of these retired individuals make the Valley their permanent residence.

Due to its proximity to Mexico, about half of the area's population have Spanish surnames and many speak Spanish as their primary language. The major population centers in the study area are Brownsville, McAllen, Edinburg, Mission, Pharr, San Juan, Harlingen, and San Benito. A breakdown of the current population by counties and major cities, as well as population projections for intermediate dates throughout the study period, are shown in Table II-1 located at the end of this section in the report. Population projections were made using 2010 population projections derived by the Texas Water Development Board from the 1980 U.S. Census base year data. New growth factors were derived from a 1985 base year which were applied to 1985 U.S. Census population estimates for each county to generate new 2010 estimates.

Land use is predominantly cropland, improved pastureland, and rangeland. It is intensely farmed and highly specialized, reflecting the importance of agriculture in the area. Approximately 556,000 acres in the three counties are irrigated with water from the Rio Grande.

Many areas that were once cropland and orchards have been converted to single-family home residential areas. This trend is expected to continue to accommodate the fast-growing population in both the urban areas and the rural colonias.

Topography, Hydrology, and Soils

The topography of the study area is characterized by a flat coastal plain. Elevations range from sea level in the eastern sections of Cameron and Willacy counties to approximately 350 feet in the western section of Hidalgo County. Most of the region, however, is below 100 feet in elevation.

The hydrology of the study area is characterized by the Rio Grande, numerous canals for the movement of water from the Rio Grande to the farms and cities, the Arroyo Colorado River, several coastal bays and estuaries, major drainage channels such as the North Floodway, and many drainage ditches. Diversion of water across drainage boundaries is not uncommon.

Although shallow wells serving individual residences are common, most of the significant underground water is too saline for practical use. As a result, the Rio Grande is the major source of domestic and agricultural water.

Soils of the study area are characterized by a low percolation rate and high moisture content due to a high groundwater table, making septic/absorption fields difficult to use for wastewater disposal. Figure II-4 illustrates the general areas within the study region possessing soil conditions that are generally unsuitable for this method of waste disposal.

The poor drainage and high water table also create soil salinity problems. As Rio Grande water is applied to crops and is either evaporated or used by the crops, the salts in solution remain behind. These salts often reach harmful levels in short periods of time. Most of the Rio Grande Valley is plagued by soil salinity problems. Only the western sections of Hidalgo County are relatively free from this problem.

THE COLONIAS

The colonias of the Lower Rio Grande Valley are rural subdivisions characterized by substandard housing and inadequate plumbing. Most began as subdivisions of 5- to 50-acre agricultural tracts. While most were in rural parts of the valley when originally developed, the cities have grown to meet and annex several colonias in the last few years.

Colonias are not a new phenomenon in the Valley, dating back to the early 1900s, although their growth and development has greatly accelerated during the 1970s and 1980s. Several of the older colonias have developed into small towns, both incorporated and unincorporated, throughout the Valley.

There have been several studies made of the colonia development in Cameron County during the last few years and as a result a considerable amount of information regarding the location and character of many of the Cameron County colonias is available. However in Hidalgo County, where most of the colonias are located, little data were available. Even data regarding the number and location of the County's colonia were limited. While it was not the purpose or intent of this study to generate a detailed data base of colonia development in the Valley, some basic information was needed for this reconnaissance-level analysis. The collection of supplemental data began with the water supply corporations (WSCs).

Developing A Data Base

The Lower Rio Grande Valley Development Council, under separate contract with the Texas Water Development Board (TWDB), collected data from the account records of the water supply corporations (WSCs) serving the areas, county subdivision plattings, tax records, and previous studies in Cameron County, and developed a listing of all known cities, towns, villages, and subdivisions within the three-county area. County-wide aerial photography was then used to locate and, to the extent possible, determine the size, housing, and utility information for approximately 1,150 entities throughout the three-county area. A computerized tabulation was made listing this information and, where possible, the location of each was identified on 7.5-minute U.S. Geological Survey (USGS) topographic maps. Because the account records of the various WSCs were an important data source from which the initial listing of potential colonias was derived, any residential developments not serviced by these corporations may have been excluded from that initial list and not located on the topographic maps.

Validating the Data Base

Following compilation of the initial listings, all incorporated cities, and those subdivision sites located within corporate city limits or within a wastewater treatment service area were removed from the list and were not considered further in this study. Full water and sanitary services are currently available, or at least accessible, to those residents at these locations, which excluded them from further analysis in this study regarding solutions to water supply or wastewater disposal problems. Approximately 380 sites were eliminated from the list for this reason, lowering the number of potential colonias to 770.

Further investigation into the remaining sites indicated that many were modern suburban residential areas of above-average home value or mobile home and trailer parks, none of which qualify as colonias. Based on these findings, it was decided that an onsite overview inspection of each site was necessary, if only to assure each qualified as a colonia.

Members of the TWDB staff, working with the consultants, developed an expedited drive-by "windshield" survey which included each of the 770 locations in the three counties. For each colonia the surveys provided, by visual inspection, information regarding location, size, housing types, and utilities. The drive-by survey, conducted by the TWDB staff, supplemented data provided by the Lower Rio Grande Valley Development Council (LRGVDC) and became the foundation of the data base used in this study.

As a result of the surveys, 335 sites were discounted as colonias. Upon inspection it became evident that many were recreation vehicle (RV) parks, mobile home parks, farms, standard or above-standard subdivisions, or platted but undeveloped subdivisions. Several sites could not be found or verified at all and a few new colonias not on the original list were located by the surveyors. Also a colonia, which may indeed exist, may have been excluded from this study since records of it could not be found and the drive-by surveyors did not happen to locate it. The result was a final list of 435 colonias in the three-county area.

While this study is focused on the colonias and their water utility needs, other subdivisions were identified in the area that currently have no apparent offsite wastewater disposal. While not colonias, these subdivisions are candidates for new sewer serivce brought into the area. As such, these subdivisions can be important to the overall economics and general feasibility of a proposed project. The map in Figures II-5 and II-6 illustrate the dispersion of these other residential and mobile home locations among the colonias.

Colonia Characteristics

The total number of colonias identified in the study area is 435 (Table II-2). There are 366 colonias located in Hidalgo County (concentrated mainly in the southern portions of the county), 65 located in Cameron County, and 4 located in Willacy County.

Population

The colonias presently range in size from one housing unit to more than 350 single-family dwellings and from under 5 to over 1,600 in population. The total number of housing units comprising the colonias is estimated to be 15,884, housing 71,478 persons. The following tabulation shows the current and projected estimated population in the three counties.

	1986 Colonia Population	2010 Colonia Population
Hidalgo County	51,804	115,782
Cameron County	17,037	31,621
Willacy County	2,637	3,499
TOTAL	71,478	150,902

Housing

The following tabulation shows the current and projected breakdown of colonia housing units in the three counties.

	1986 Colonia Housing Units	2010 Colonia Housing Units
Hidalgo County	11,512	25,729
Cameron County	3,786	7,027
Willacy County	586	778
TOTAL	15,884	33,534

Housing types within the colonias is characterized as follows:

- 5 percent shacks
- 20 percent frame construction in poor condition
- 45 percent frame construction in good condition
- 15 percent brick or block construction
- 15 percent mobile homes

Plumbing

An estimated 75 percent of the homes are equipped with indoor plumbing (both water and waste disposal). Twenty-four percent utilize yard taps for water supply, while less than one

(1) percent have no water at all. Approximately 25 percent of the homes made use of a privy for sanitary waste disposal.

Density

The average colonia area is 25 acres and the average housing density in a colonia is currently 2.2 housing units per acre. Lot size within the colonias averages almost 8,000 square feet, typical of rural property. However, multiple houses on a single lot are not uncommon.

Location

Table A-1 in Appendix A lists each of the 435 colonias analyzed in this study by county and by map number. The map numbers are referenced to the location maps found on Tables A-1 through A-13 in Appendix A.

The following are column-by-column descriptions of the table entries:

- Column 1

  Number on map indicating location of corresponding colonia, as shown in Figures A-1 through A-13 in Appendix A.

- Column 2

  Name of colonia (if known) included as a reference for readers of this report who are intimate with the study area. Because colonia boundaries are not clearly delineated, some names may include groupings of more than one colonia and therefore names familiar to some may not be included.

- Column 3

  The water supply corporation or district serving the colonia.

- Column 4

  Current estimate of the number of housing units in colonia determined in drive-by survey.

- Column 5

  Projected number of housing units in colonia by 2010 [(Column 7) ÷ 4.5].

- Column 6

  Current colonia population estimated by multiplying occupancy factor of 4.5 persons/household (verified in resident interview summary) by the current estimate of the number of housing units [4.5 x (Column 4)].

- Column 7

  Colonia population projection for 2010, based on current colonia population estimated in Column 6 multiplied by growth factors developed by the Texas Water Development Board (TWDB) for each individual county.

- Column 8

  Colonia size in acres. If data concerning colonia size were unavailable, the colonia acreage was estimated by multiplying the average lot size by the number of lots or 2010 housing units, whichever is greater.

- Column 9

  The current density of housing units in the colonia, expressed in units/acre [(Column 4) ÷ (Column 8)].

- Column 10

  The projected density of housing units in the colonia by 2010, expressed in units/acre [(Column 5) ÷ (Column 8)].

Resident Survey

In order to further supplement and verify the information obtained from the LRGVDC and the survey, a series of interviews was held with colonia residents.

Twenty-three colonias were selected as representating a cross-section of all colonias based on size, location, and socio-economics. The colonias included are:

Lull	La Sara	Arco Iris #2
Los Indios	Faysville	Sevilla Park
Heidelburg	Capisalla Park	La Paloma 1 and 2
Scissors	Mila Doce	Barbosa
Del Mar Heights	Cameron Park	Nuevo Alton
Abram	Sevilla Park	Lopez Delnureste
Madero	El Chaero	Aldamas #2
Sunrise #2	Mesquite Acres	

Two to 15 households were interviewed in each colonia, based on availability and cooperation of the occupants.

The resident interviews sought information on housing type, house and lot value, water and wastewater services, monthly payments for house and utilities, monthly income, number of occupants, occupation, and months per year in residence.

The data collected from the interviews generally support the results of the drive-by survey. The results of both surveys concerning the various types of housing, water supply sources, and wastewater disposal systems were proportionally similar.

The average house and lot value roughly estimated by the surveyors is about $14,000. It appeared that nearly all the residents own their homes, and the average monthly house and lot payment for those who make monthly payments is just over $100. Monthly water bills average $20 and monthly electric bills average $33. Seven respondents reported not having electricity.

Of the households inverviewed, 73 are headed by an unskilled worker, while 53 are unemployed or receiving social security or welfare. Fifty-seven percent of the households reported a monthly income of less than $500, including welfare and social security. Only 2 percent reported monthly incomes over $1,000. Forty-six of the 169 respondents reported that they reside at the interview location less than 12 months per year, with 32 of those residing there eight months or less. The average number of people occupying the households interviewed is 4.7.

TABLE II-1 - LOWER RIO GRANDE VALLEY POPULATION PROJECTIONS (1980-2010)

	Year 1980*	1985*	1990	2000	2010
Hidalgo County	283,229	352,208	431,842	599,636	808,293
Cities					
Alamo	5,831		8,697	11,749	15,838
Alton	2,732		4,165	5,784	7,796
Donna	9,952		14,099	18,612	25,089
Edcouch	3,092		3,912	4,737	6,385
Edinburg	24,075		32,785	42,763	57,643
Elsa	5,061		7,656	10,121	13,643
Hidalgo	2,288		3,959	5,813	7,836
La Joya	2,018		5,065	8,104	10,924
La Villa	1,442		1,921	2,386	3,217
McAllen	66,281		112,503	164,180	221,310
Mercedes	11,851		14,095	16,777	22,616
Mission	22,589		33,856	47,299	63,758
Pharr	21,381		33,571	46,240	62,331
San Juan	7,608		12,532	17,806	24,002
Weslaco	19,331		26,536	34,110	45,979
Balance of County	77,697		116,490	163,155	219,926
Cameron County	209,727	249,787	305,522	399,480	482,233
Cities					
Brownsville	84,995		138,440	189,738	229,042
Combes	1,441		2,099	2,744	3,313
Harlingen	43,543		53,334	63,235	76,335
LaFeria	3,495		4,598	5,662	6,835
Los Fresnos	2,173		3,424	4,659	5,625
Port Isabel	3,769		4,726	5,612	6,775
Primera	1,380		2,010	2,628	3,173
Rio Hondo	1,673		2,285	2,896	3,496
San Benito	17,988		23,812	28,846	34,822
Santa Rosa	1,889		2,612	3,277	3,956
Balance of County	47,381		68,182	90,183	108,861

TABLE II-1 (Cont'd)

	Year 1980*	1985*	1990	2000	2010
Willacy County	17,495	18,868	19,392	21,830	24,733
Cities					
Lyford	1,618		1,982	2,314	2,622
Raymondville	9,493		11,304	13,136	14,883
Balance of County	6,384		6,106	6,380	7,228
THREE-COUNTY TOTAL	510,451		756,756	1,020,946	1,315,259

*U.S. Bureau of Census

Sources: Texas Water Development Board, 1986
U.S. Department of Commerce, Bureau of the Census, 1986
Bureau of the Census, 1983

TABLE II-2 - COLONIA CHARACTERISTICS SUMMARY

Number of Colonias	435
Number of Housing Units	
1986	15,884
2010	33,534
Population	
1986	71,478
2010	150,902
Average Area	24.9 acres
Average Colonia Density	
1986	2.2 per acre
2010	4.6 per acre
Housing	
Shack	625
Frame Construction, Poor Condition	3,928
Frame Construction, Good Condition	7,229
Brick or Block	2,400
Mobile Home	1,702
Water Supply	
Indoor	12,265
Outdoor Only	3,346
Common Supply	138
No Apparent Supply	135
Waste Disposal	
Outdoor	3,661
Indoor	12,223

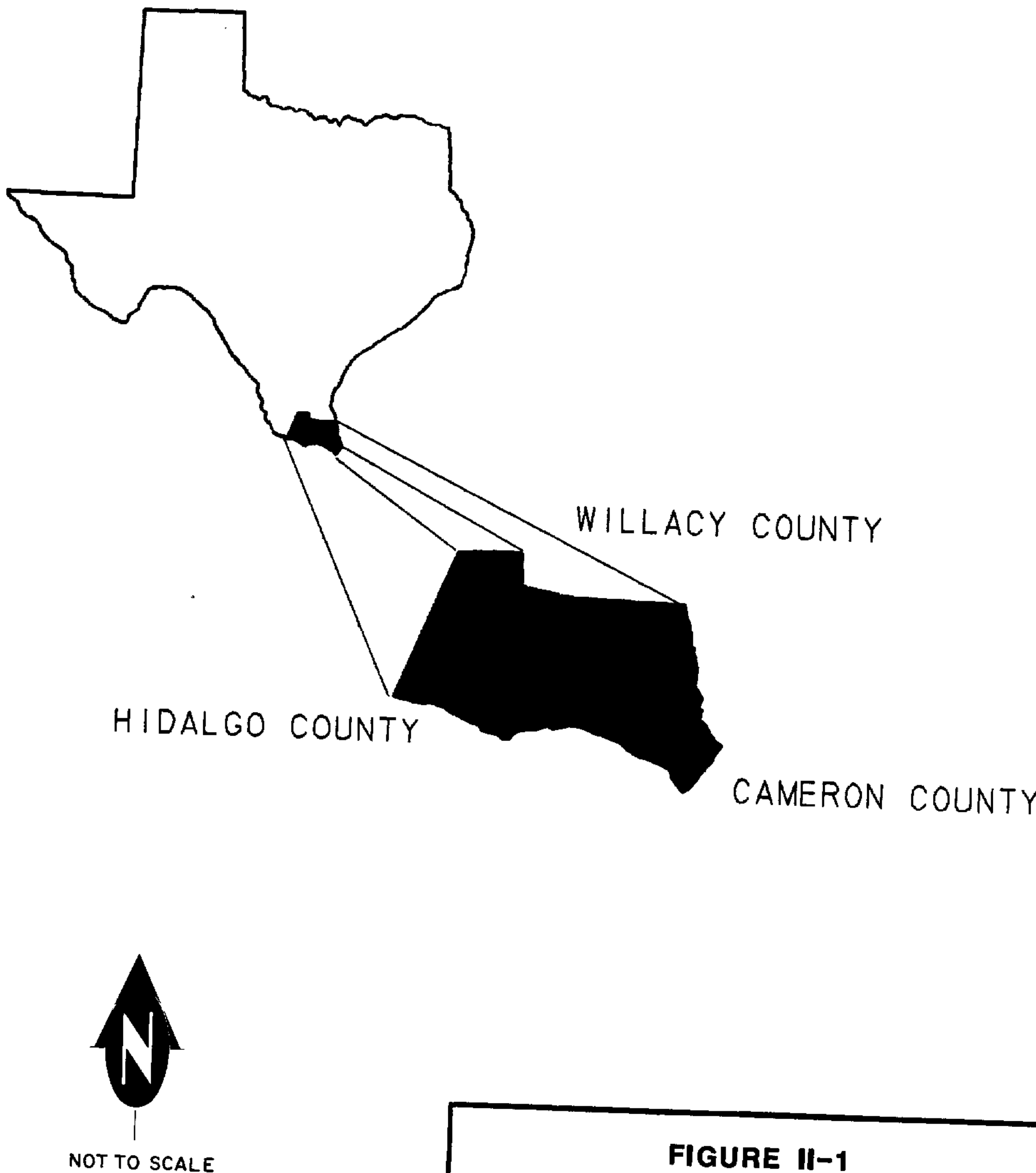

FIGURE II-1

LOWER RIO GRANDE VALLEY
STUDY AREA

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FIGURE II-2

HIDALGO COUNTY

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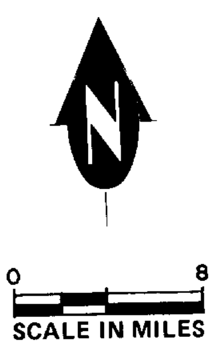

FIGURE II-3

CAMERON AND WILLACY COUNTIES

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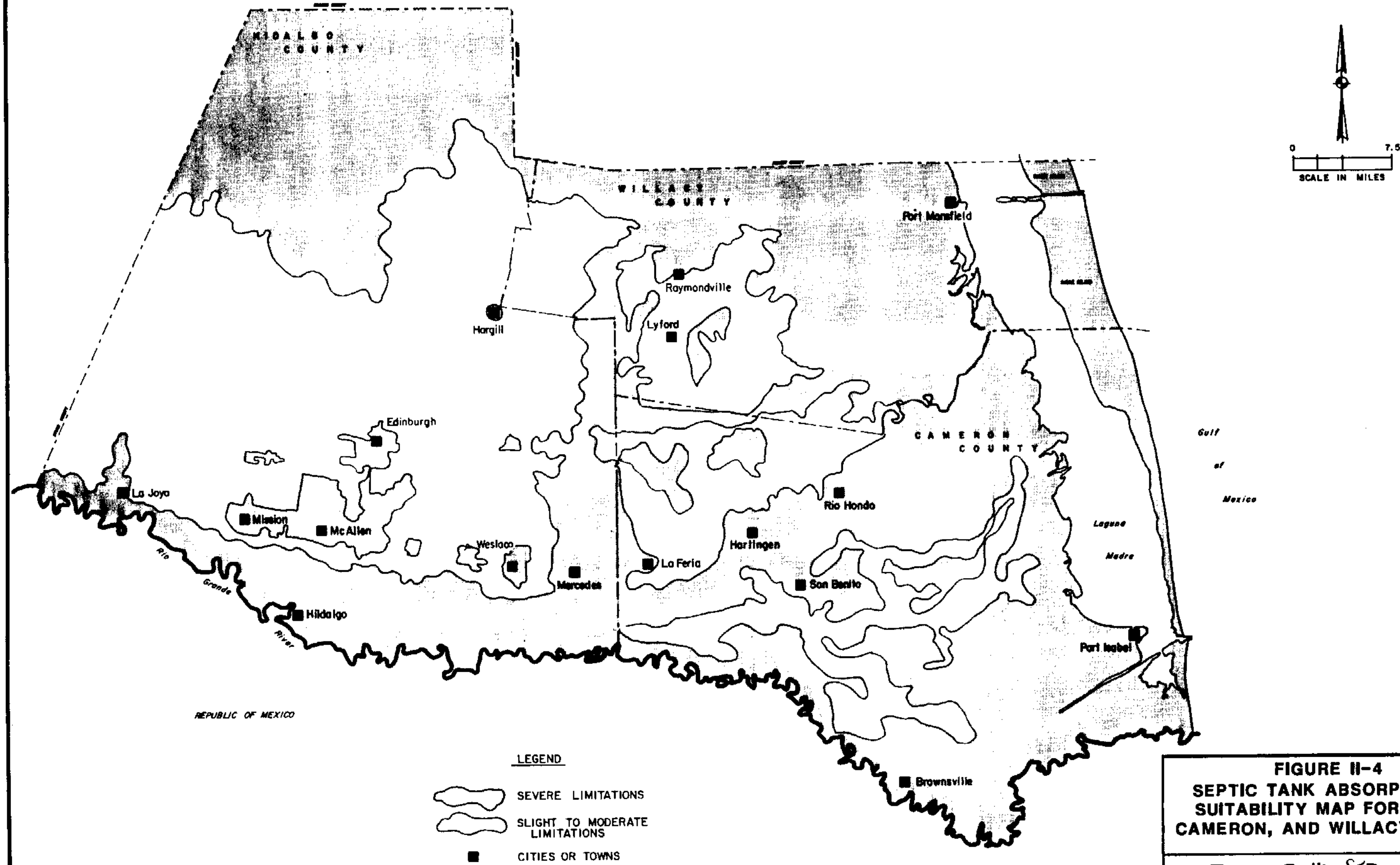

MAP SOURCE: U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, 1983

FIGURE II-4
SEPTIC TANK ABSORPTION FIELD SUITABILITY MAP FOR HIDALGO, CAMERON, AND WILLACY COUNTIES

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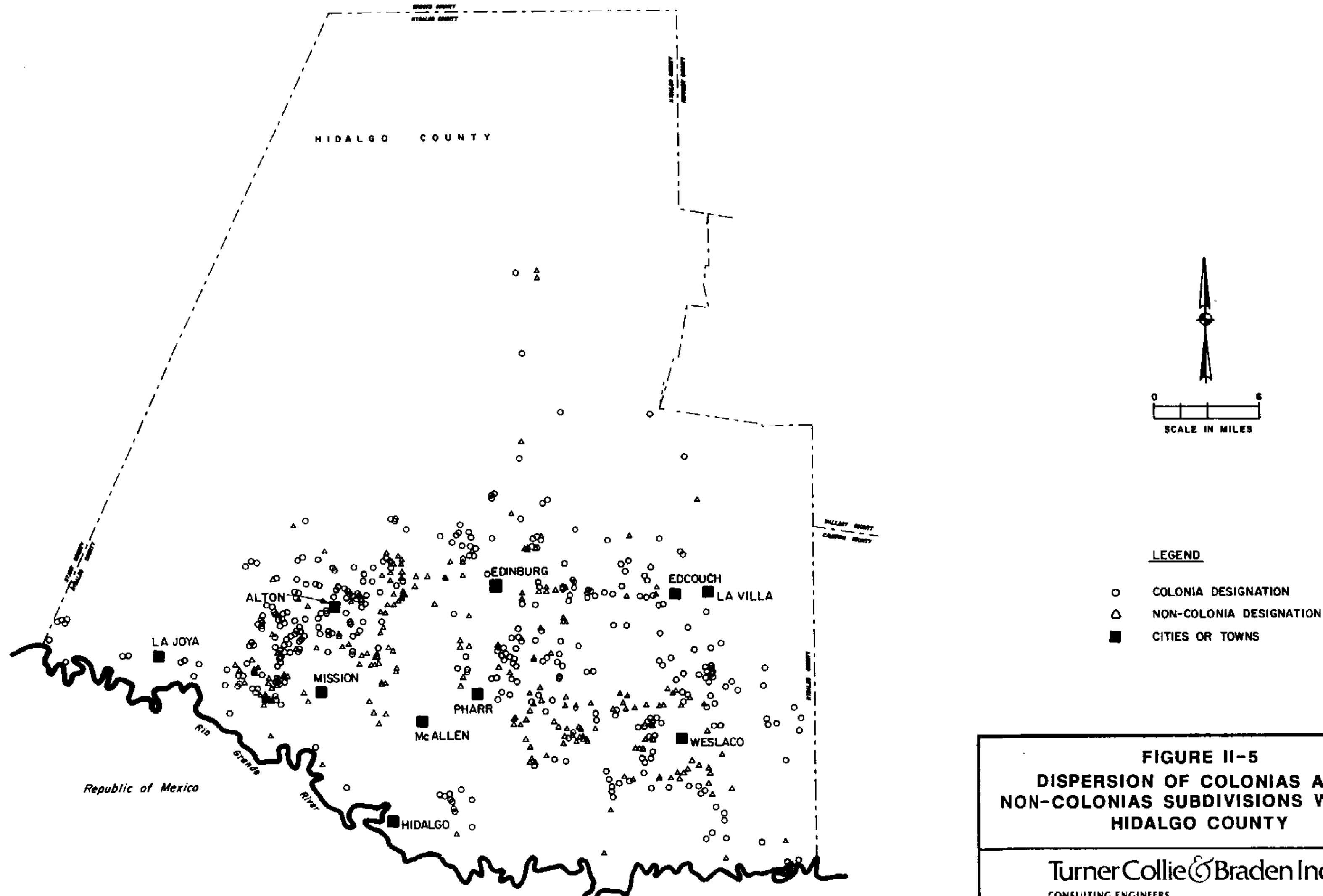

FIGURE II-5
DISPERSION OF COLONIAS AND NON-COLONIAS SUBDIVISIONS WITHIN HIDALGO COUNTY

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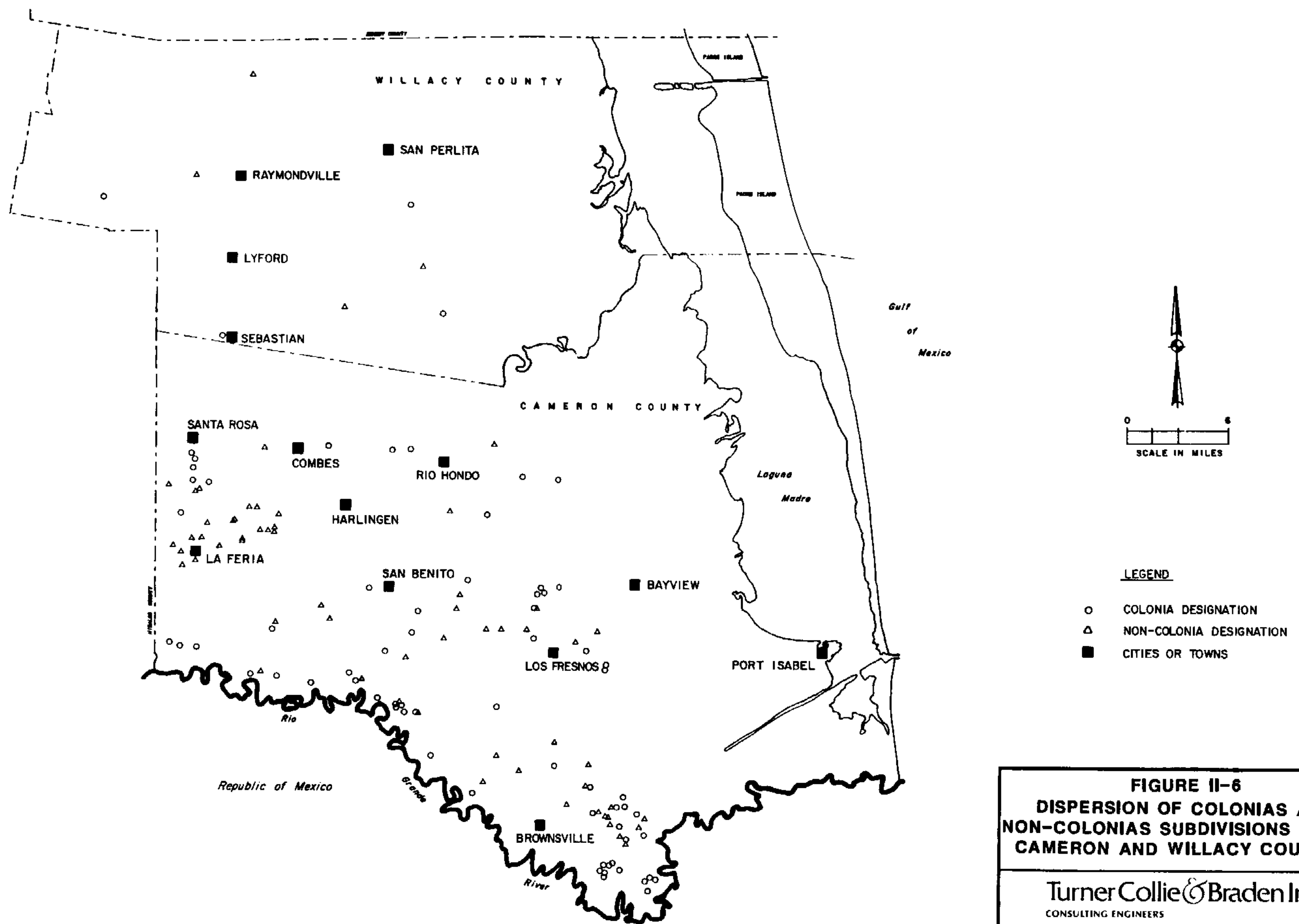

FIGURE II-6
DISPERSION OF COLONIAS AND NON-COLONIAS SUBDIVISIONS WITHIN CAMERON AND WILLACY COUNTIES

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Job No. 11-00150-001 Date JANUARY 1987

WATER RIGHTS

Although there is some groundwater used for potable purposes in the Lower Rio Grande Valley, most of the water, for both potable and irrigation uses, comes from the Rio Grande.

Water supplies to the subdivisions and other urban developments in the Valley use the water rights of the property to be served to obtain raw water for treatment and resale. Thus, when a new colonia is subdivided, the water rights associated with the land being subdivided (rights originally used to irrigate the land prior to subdivision) are "loaned" to the water supplier, who uses the rights to acquire raw water. If land is subdivided and sold without accompanying water rights, rights need to be purchased separately in order for the water supplier to serve the colonia.

WATER SERVICE TO THE COLONIAS

The water supply sources currently serving the colonias are summarized in Table III-1. Based on observations from the drive-by survey, only five of the colonia observed in this study show signs of having no water service. It is important to emphasize that there may be additional subdivisions without water service for which no records were found in this study. The service records of the various water supply corporations were an important data source from which the initial listing of potential colonias was derived and may not include colonias not served.

The water supply corporations supply water to 345 of the 435 colonias included in this study. Figures III-1 and III-2 present an overview of the service boundaries of the water supply corporations and municipalities that supply potable water to the colonias. Of those 90 colonias remaining, 58 had no known source but visual inspections indicated, with the exception of 5, at least some water service is available in each. The remainder are served by city systems, individual wells, or miscellaneous small suppliers.

Table III-2 shows the numbers of colonias and total connections (colonia and noncolonia) served by each major water supplier. Monthly water service costs for a typical residential user served by each supplier are also shown.

While the water service rates vary somewhat among the various water supply corporations, Table III-2 shows the average residential unit pays over $20 per month for water. For many, the average monthly bill is about $30. While these include both colonias and other subdivision residents, the home interviews with colonia residents conducted for this study showed an average monthly water bill of just over $20.

COLONIA WATER SUPPLY NEEDS

Colonias Without Water

The lack of a water supply line to each individual colonia does not appear to be a serious problem for the colonias as a whole. Existing water supply line locations indicate that nearly all of the known colonia locations have a water supply line at least within one-quarter mile of the colonia site. This includes the five colonias found to have no apparent water on site.

Residences Without Water

Of somewhat greater concern are the 273 individual residences noted in the drive-by survey that have no apparent water source at the house or in the yard (Table III-3), even though the colonias themselves appear to have water available. About half of these units appeared to obtain water from their neighbors, often by using garden hoses. While 273 is less than 2 percent of the total residences observed, for those residents without water the situation should be considered substandard and burdensome. In addition, there is good reason to believe that some colonias have water that is of poor quality, either because of its source (irrigation canals) or improper plumbing.

Water Supply

The water allocation from the Rio Grande is regulated by the International Boundary Commission which has jurisdiction both in the United States and Mexico. The U.S. water allocations are governed by a treaty between Mexico and the U.S. Individual rights to these allocations are defined by a Texas State Court adjudication and judgment in 1971, commonly referred to as the

Stanley Decision (Valley Water Suit Judgment). The Stanley Decision allocated the Rio Grande water rights among Water Control and Improvement Districts (WCIDs), municipalities, and some private property owners. The maximum allocation to municipalities was based on the assumption that growth of the cities would not exceed 50 percent of their 1965 population. In many cases, this anticipated growth has already been exceeded. As a result, the cities are likely to use their water rights to serve property within their corporate limits rather than to serve the rural colonias.

The water supply corporations (WSCs) operating in the Valley were formed after the Stanley Decision. As a result, these entities were not allocated water and must rely on the acquisition of water rights as a means of expanding service. The availability of service to a colonia is therefore related to whether or not additional water rights can be obtained.

Meeting Future Water Demand

Consideration must also be given to providing for future growth needs. Population projections shown in Section III indicate that between now and the year 2010 there will be over 80,000 additional people moving into about 18,000 additional colonia housing units within the three counties.

By the year 2010, colonia residents will need an additional 8 million gallons of potable water per day, assuming an average consumption rate of 100 gallons per capita per day. Table III-4 presents estimates of the average daily demand and plant capacities for the major water filtration plants currently serving the colonias. These estimates were obtained from interviews with the staff of each individual plant. The Texas Department of Health defines plant capacity in terms of peak-day demand. Recognizing that some of these plants also serve noncolonia areas, it appears that, if a factor of 2.0 from average-day to peak-day demand is assumed, the majority of these plants are now, or will be in the near future, operating at or above their rated capacity. Further plant expansion may be limited by the availability of municipal water rights.

In addition, some water transmission line expansion will probably be required to transport the needed additional water supply to each colonia site. Because it is impossible to predict where new colonias may locate during the next 25 years, a basic assumption made throughout this study is that the projected growth in colonia population will take place near or within existing colonia locations. Therefore, it has been assumed that additional water transmission capacity will be in the form of extensions or expansion of the existing waterline systems. Colonias located in the same vicinity are grouped and can be served by a single transmission line extension. Long transmission line extensions to remote new colonia locations are not considered and would need to be dealt with as special cases.

In order to assure that each residential unit is supplied with good quality potable water at the house, future water supply expansion plans for these subdivisions must concern water distribution to each individual lot. Enforcement of local subdivision ordinances is needed to assure that each residential unit is connected to the proper distribution system providing good quality water to the residents of that unit, whether through a yard tap or plumbed into the house. Based on observations during this study, the effort associated with bringing water to the house from the yard can generally be accomplished by the resident. The critical factor is whether or not there is the capability to dispose of wastewater from the house, a subject addressed in the next section.

In planning and costing water distribution systems, it is essential that the systems include transporting the water to each individual property unit and metering its flow. Only in this way can it be assured that each housing unit in the colonias is receiving good quality water.

TABLE III-1 - COLONIA WATER SUPPLY SOURCES
(By County)

Water Supply Source	Number of Colonias Served			Total
	Hidalgo	Cameron	Willacy	
Water Supply Corporations	293	49	3	345
City Systems	9	-	-	9
Individual Wells	6	7	-	13
Other	3	2	1	6
None	4	1	-	5
Unknown	51	6	-	57
TOTALS	366	65	4	435

TABLE III-2 - MAJOR SUPPLIERS OF WATER TO THE COLONIAS

Water Supply Corporation	Colonias Served	Monthly Charge for 13,500 Gal.*	Total Connections**	Gal./Conn./Mo. Sold Last Year*
East Rio Hondo	12	$29.25	2,137	N/A
El Jardin	15	$16.50	1,590	13,253
Military Highway	33	$30.50	5,050	10,396
Sharyland	88	$25.88	5,500	12,181
La Joya	48	$26.35	2,775	8,030
City of Weslaco	9	$17.18	5,500	17,305
North Alamo	149	$21.20	8,918	14,500
TOTALS	354		31,470	

*Average monthly usage per residential connection based on 100 gallons per day per person and 4.5 persons per household.

**Includes residential and commercial connections for both colonias and others.

Source: Local Water Supply Corporation Superintendents, 1986

TABLE III-3 - TYPES OF COLONIA WATER PLUMBING

	Number of Residential Units
Indoor	12,265
Outdoor Only	3,346
Common Supply	138
No Apparent Supply	135
TOTAL	15,884

TABLE III-4 - WATER PLANTS SERVING COLONIAS OR SUPPLY CORPORATIONS SERVING COLONIAS

Water Plant	Customers	Plant Capacity (mgd)	Average Daily Demand (mgd)
Hidalgo County			
Weslaco	Military Highway WSC	8.0	4.0
Donna	N. Alamo WSC Colonias	1.3	2.5
Alamo	Retail Customers	3.0	1.5
Las Milpas (Military Highway WSC)	Retail Customers	0.70	0.70
La Joya WSC No. 1	Retail Customers	1.5	0.9
La Joya WSC No. 2	Retail Customers	1.5	N/A
Sharyland WSC No. 1	Retail Customers	2.0	1.5
Sharyland WSC No. 2	Retail Customers	2.0	1.5
Sharyland WSC No. 3	Retail Customers	2.0	1.5
N. Alamo WSC No. 1	Retail Customers	2.0	1.75
N. Alamo WSC No. 2	Retail Customers	2.5	2.0
N. Alamo WSC No. 3	Retail Customers	1.0	0.5
N. Alamo WSC No. 4	Retail Customers	1.0	0.5
N. Alamo WSC No. 5	Retail Customers	4.0	0.0*

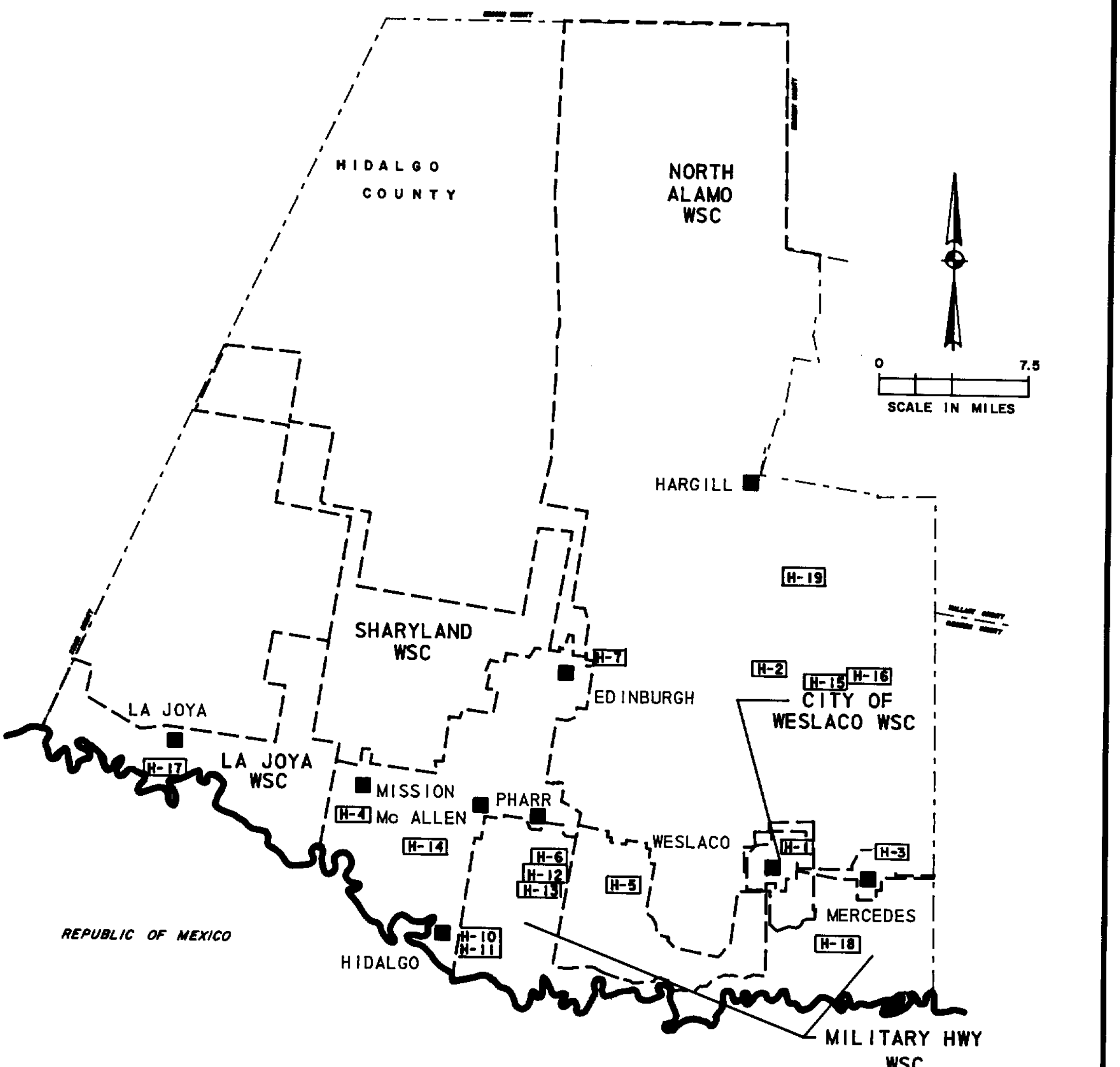
TABLE III-4 (Cont'd)

Water Plant	Customers	Plant Capacity (mgd)	Average Daily Demand (mgd)
Cameron County			
Brownsville No. 1	Military Highway WSC El Jardin WSC	15.0	8.0
Brownsville No. 2	Military Highway WSC El Jardin WSC	15.0	9.0
Los Fresnos	Olmito Military Highway WSC E. Rio Hondo WSC	1.0	0.45
Harlingen No. 1	Combes Primera Palm Valley Estates E. Rio Hondo WSC Military Highway WSC	7.0	4.0
Harlingen No. 2	Combes Primera Palm Valley Estates E. Rio Hondo WSC Military Highway WSC	6.0	4.0

*New plant not yet on line.

N/A - Not available.

Source: Local City Managers and Water Supply Corporation Superintendents, 1986



LEGEND

- – – – SERVICE BOUNDARIES
- H-1 TREATMENT PLANT DESIGNATIONS
- ■ CITIES OR TOWNS

FIGURE III-1
WATER SUPPLY CORPORATION BOUNDARIES AND TREATMENT PLANT LOCATIONS IN HIDALGO COUNTY

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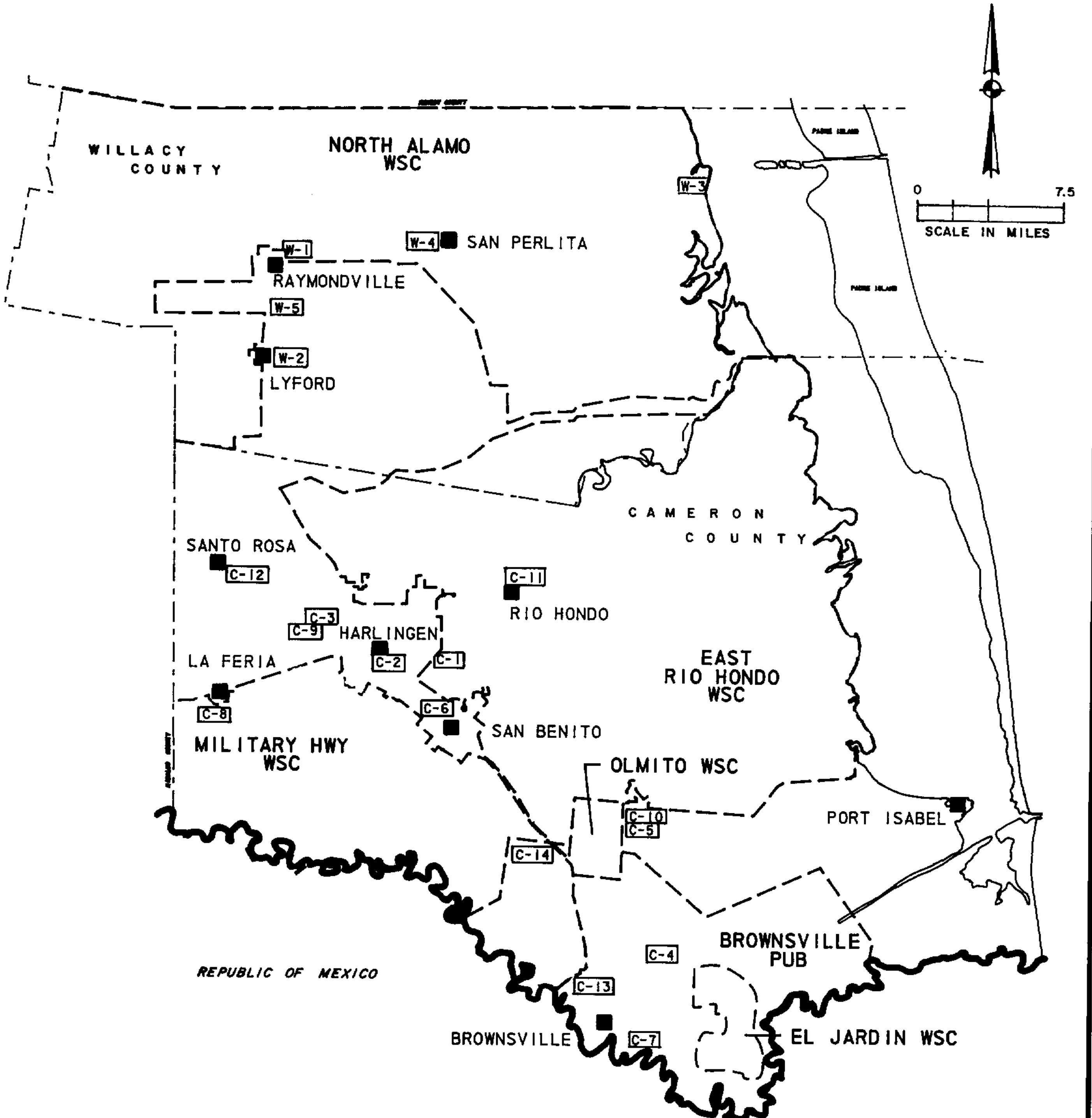

LEGEND

- - - - SERVICE BOUNDARIES

[C-1] TREATMENT PLANT DESIGNATIONS

■ CITIES OR TOWNS

FIGURE III-2

WATER SUPPLY CORPORATION BOUNDARIES AND TREATMENT PLANT LOCATIONS IN CAMERON AND WILLACY COUNTIES

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CONSULTING ENGINEERS

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Job No. 11-00150-001 | Date JANUARY 1987

EXISTING WASTEWATER SERVICE

A majority of the colonia residents in the three-county area receive wastewater treatment service through the use of private, onsite septic or latrine systems. The Hidalgo County Health Department estimated that 60 percent of the colonia residents in Hidalgo County have septic systems, 30 percent have latrines, and the remaining 10 percent are served by regional wastewater collection and treatment systems (Garcia, 1986). The Texas Department of Health (TDH) estimated that a similar wastewater service ratio also exists for Cameron and Willacy counties (Herrera, 1986). The colonias already receiving wastewater service through a regional treatment facility are not included in this study, since, as defined for purposes of this study, a colonia does not have the available adequate wastewater service.

Officials from both the Hidalgo and Cameron County Health Departments agree that many of the septic and latrine systems in the study area were improperly installed and are possibly creating environmental health problems (Garcia and Rodriguez, 1986). Information obtained from the TDH indicated that some septic systems within the colonias were installed on lots of 6,000 to 7,000 square feet (Herrera, 1986) and therefore not meeting the TDH requirement of at least a 15,000-square-foot lot for a septic/ absorption field system. In addition, septic systems and latrines are being installed in areas with unsuitable soils characterized as having seasonal high groundwater tables or low percolation rates (Figure II-4).

PRELIMINARY SCREENING OF WASTEWATER SERVICE ALTERNATIVES

There are numerous wastewater disposal options available to serve the needs of the colonias within the study area. These wastewater systems, however, fall into two general categories: offsite treatment and disposal category or onsite disposal category. Offsite disposal utilizes a collection system that conveys wastewater via gravity or pressure sewers to a centralized point for treatment. Alternatively, onsite disposal treats or stores the wastewater that an individual household generates within the boundary of the household property.

In order to streamline the wastewater system alternative analysis, these two categories are further divided into five wastewater treatment system groups:

- Regional Wastewater System
- Centralized Wastewater System
- Cluster Wastewater System
- Onsite Soil Treatment System
- Onsite Latrine System

Regional Wastewater System

A regional wastewater system is one that collects sewage flow from one large or several separate service areas (e.g., political subdivisions) and transmits the flow to a single facility for treatment and disposal. The term "regional" normally associates it with relatively large facilities. Many of the incorporated (and unincorporated) cities in the study area are currently served by centralized treatment facilities. For purposes of this study, these existing facilities were considered to be regional facilities, regardless of size. It is proposed that wastewater flows from the surrounding colonias be transmitted to one of these existing facilities for treatment. As such, the number of new treatment facilities required would be minimized.

Centralized Wastewater Treatment

The centralized wastewater treatment system is similar in concept to a regional system but generally with a smaller service area. For purposes of this study, centralized wastewater system is defined as any new treatment facility that serves one or more colonias with a total population of more than 200 at a single location.

Cluster Wastewater Treatment

The cluster wastewater treatment system is defined in this study as a system which serves 200 persons or less. Sewage is collected and transported to the facility, which is designed to accommodate smaller flows than the centralized facility. The cluster system usually utilizes some sort of soil treatment and disposal processes rather than the conventional treatment and discharge option.

Onsite Soil Treatment System

This system collects wastewater generated from an individual household and passes it through a septic tank, where it undergoes primary treatment. The effluent from the tank is disposed of into the soil, where a majority of the biological stabilization takes place.

Onsite Latrine System

The latrine system, implemented when in-house plumbing is not yet available or affordable, incorporates an outdoor shelter (superstructure) over an excavated trench that has been lined by some impervious material such as clay, plastic, or concrete. Once the trench or pit is filled, the humus-like material is removed for treatment and disposal, enabling the facility to be used again.

Criteria for Preliminary Screening

An important aspect of this reconnaissance-level study is to determine which of these five treatment groups is more suitable for a particular colonia. An extensive literature search has revealed that the selection is generally affected by four characteristics:

- Financial Resources
- Housing Density
- Population
- Location

In areas where financial resources are limited and housing densities are low, offsite sewerage systems are generally too expensive for the residents to afford and are unnecessary to properly dispose of the wastewater. A review of nearly 300 facility plans for rural communities in the United States in the mid-1970s showed that the total cost (not including treatment) of conventional gravity sewers averaged more than $30 per month for housing densities less than one unit per acre and more than $20 per month for housing densities less than two units per acre. Monthly charges much above $20 are considered excessive in rural areas, where median incomes are generally significantly lower than in urban areas. Because most conventional onsite disposal systems cost less than $20 per month, onsite septic systems have been generally used in these areas (Kreissl, 1985).

Densely populated areas usually rely upon offsite disposal systems for wastewater service. When an area's housing density increases beyond one or two units per acre, available space for an absorption field or its equivalent becomes limited, making the onsite septic system environmentally less feasible.

If an area contains a small population which is densely co centrated and its financial resources are limited, the cluster system may be a feasible alternative. This system is usually expensive than the traditional centralized systems. Since, i most cases, a soil absorption field or its equivalent is use final effluent disposal, implementation of this system negates the need for a discharge stream.

While the cluster system may be attractive from an economical point of view, its use is limited to areas where adequate land is available and soil conditions are suitable for soil treatment and disposal. According to the Lower Rio Grande Valley 208 Water Quality Program Study, this system should only be considered when an area generates a wastewater flow of less than 20,000 gallons per day (gpd), the quantity of flow generated by about 200 persons. When a cluster system is not technically feasible, a traditional centralized wastewater treatment system needs be considered.

Finally, residents in areas that cannot currently afford in-house plumbing or who do not currently have water available must rely upon the onsite latrine techniques. If built and managed properly, the onsite latrine system is able to protect groundwater and surface water from contamination.

CLASSIFICATION OF THE COLONIAS

Analyzing the technical and economic constraints of the ive wastewater treatment categories led to the development of he colonia classifications. Categorizing the 435 colonias into few classifications greatly simplifies the colonia wastewater ervice analysis. The five colonia classifications developed r this study are:

- **Classification 1**

  Colonias or close groupings of colonias that are within a one-mile-radius of an existing corporate boundary or regional treatment system service area.

- **Classification 2**

  Colonias or close groupings of colonias that contain more than 200 persons and have a relative housing unit density greater than one equivalent dwelling unit (EDU) per acre; location is greater than one mile from an existing corporate boundary or regional treatment system.

- **Classification 3**

  Colonias or close groupings of colonias that contain up to 200 persons and have a relative housing unit density greater than one EDU per acre; location is greater than one mile from an existing corporate boundary or regional treatment system.

- **Classification 4**

  Colonias that have a relative housing unit density less than or equal to one EDU per acre; location is greater than one mile from an existing corporate boundary or regional treatment system.

- **Classification 5**

  Colonias that contain housing units without in-house water or wastewater plumbing fixtures.

Classification 1 was created to take advantage of the use of existing regional treatment systems in the Lower Rio Grande Valley. Criteria developed for Classification 1 was based on the fact that colonias currently within one mile of an incorporated city boundary will most likely be within that city's corporate or extraterritorial jurisdiction (ETJ) boundary by the year 2010, the designated design year for this study. Also, the cost of transporting wastewater more than one mile from a colonia community to a treatment plant or an available collection line cannot be economically justified.

Those colonias placed in Classification 1 were designated with a letter that corresponds to the city that, because of its proximity, could likely service the colonia(s) through its wastewater system (see Tables IV-1 and IV-2).

The following distribution of the existing classifications was derived from results of the visual survey combined with estimates of population.

Distribution of 1986 Colonias

	Number of Colonias
Classification 1	137
Classification 2	49
Classification 3	139
Classification 4	110
Classification 5	*

Because it is presumed that by the year 2010 all colonia households will have in-house plumbing and water service, no individual colonias or colonia groupings were placed within classification 5 at the end of the design period.

*Virtually all of the colonias included some units with no apparent plumbing, indicating that to provide a solution other than onsite disposal some provision to install in-house plumbing will be necessary. A minimum of configuration of one in-house water tap, sink, and operational cistern toilet was anticipated for study purposes.

COLONIA GROUPING

With the intent of limiting the number of new treatment facilities that will be required and reducing collection system costs, colonia groupings were created. A "colonia grouping" consists of two or more colonias that could function as one large colonia unit. Since a colonia grouping will incorporate the use of a centralized treatment system, a grouping prerequisite is that it should have a housing unit density of over one unit per acre. Colonias within a grouping are no longer recognized as individual colonias for this analysis but as part of that individual grouping. A total of 257 colonias were placed into one of 66 such colonia groups. Table IV-3 presents an overview of the colonias that make up each grouping. Based on year 2010 growth projections, the 66 colonia groupings were placed within either Classification 1 or Classification 2 categories (Table IV-4). The remaining 178 individual colonias were placed within Classifications 1 through 4 (Table IV-5), depending on size.

DECISION MATRIX OVERVIEW

The decision matrix (Figure IV-1) has been partitioned to reflect the five colonia classifications. Decisions based on population, population density, and location lead to a range of alternative wastewater solutions developed specifically for each classification. The initial set of questions within each matrix classification, with the exception of Classification 4, deals with established colonia classification criteria. These questions determine the classification of a community and define the range of alternatives available for that classification. If the answer is no to all of the classification criteria questions for a specific colonia, the matrix is designed so that the community automatically falls into matrix Classification 4. The final round of questions, created specifically for matrix classifications 2, 3, and 4, considers certain site-specific community information to further narrow the alternatives available for a community. These questions evolved from established criteria developed for each alternative option in matrix classifications 2, 3, and 4. It should be stressed that this matrix is intended only to serve as a guide to the decision-making process involved in selecting a feasible alternative. It is not the intent of this reconnaissance-level study to provide final answers to any of these site-specific criteria.

The wastewater decision matrix can be used as a flexible planning tool that may help a community determine which wastewater collection and treatment systems are best suited to meet its current and future needs. A community wishing to develop a comprehensive wastewater service plan can initially refer to the matrix to develop a range of alternatives. If the characteristics of this community change over time, the community can refer back to the matrix to determine if its initial wastewater plan requires alteration. Alternatively, a community developing a long-range plan, as this study does, can refer to the matrix and determine an appropriate range of alternatives to serve a future population. If these long-range alternatives are currently impractical, the community can refer back to the matrix and develop a range of intermediary alternatives. These intermediary alternatives may be used until the growth in population warrants implementing one of the long-range alternatives.

Once a community develops a range of possible wastewater service solutions using the matrix, that community is not precluded from studying alternatives in different matrix classifications. In fact, it is suggested that the feasibility of alternatives in different matrix classifications be compared.

WASTEWATER SERVICE ALTERNATIVES

The use of the decision matrix permits a general definition of the type of wastewater solution applicable to the first four colonia classifications. These are as follows.

- Classification 1 - Expand existing regional system.
- Classification 2 - Establish centralized system.
- Classification 3 - Establish cluster-type system.
- Classification 4 - Maintain onsite system.

Classification 5, dealing with in-house plumbing, is considered potentially eliminated by incorporating plumbing as part of the solution in Classifications 1 through 4.

Within each colonia classification, specific colonias or colonia groups will find different wastewater collection and treatment options better suited than others to meet their individual needs and requirements. Some colonias in a given group may find a certain alternative of another classification more attractive. However, for reasons discussed earlier, the systems presented in the decision matrix (Figure IV-1) are considered best suited to the majority of the colonias in each classification. These wastewater systems are also presented in Tables IV-6 and IV-7.

The following paragraphs describe the alternative wastewater systems available to each colonia classification and the advantage and constraints associated with each system.

Alternatives for Classification 1 Colonias

The Classification 1 colonias have been defined as those located within one mile of an existing wastewater service area or corporate boundary. In order to minimize the number of small wastewater treatment plants, it is felt that these colonias can best be served through the expansion of an existing system. Each of the existing wastewater treatment facilities was assigned an identification city code and a map location designator code for use in this study. Table IV-1 summarizes the city codes established for each facility. Table IV-2 summarizes the permitted and operating flow characteristics along with the designator codes of each facility. The map location designator code was used to locate those treatment plants listed in Table IV-2 on

Figures III-1 and III-2. A review of colonia locations as shown in Appendix A revealed that 38 individual colonias and 99 colonias in groups meet the criteria for Classification 1. It should be noted, however, if treatment or collection system capacities are not available or costs associated with the extension of an existing trunk sewer are excessive, small-scale centralized treatment systems may be used initially, which can be abandoned at a later date as the option of using an existing regional facility becomes feasible or themselves further expanded into a regional system, as future demand dictates.

To collect wastewater within the colonias, five types of collection systems have been identified for the Classification 1 colonias. These are:

- Conventional Gravity Collection System
- Grinder Pump (GP) Systems
- Septic Tank Effluent Pumping System (STEP)
- Small Diameter Gravity (SDG) System
- Vacuum System

The choice from among these alternatives will depend on technical and economical considerations applicable to each individual colonia. These specific considerations and some of the major advantages of each system are briefly summarized in Table IV-7 and discussed in more detail in the following paragraphs.

<u>Conventional Gravity Collection System</u>

The conventional gravity system (Figure IV-2) has long been the standard in wastewater collection. It is relatively simple in design and reliable in operation. This system mainly relies upon gravity to transport sewage through a network of sewers and is generally designed to minimize the need for pumping facilities. The gravity collection system is the oldest and currently the most common wastewater transport system available.

Except for house laterals and force mains, a 6-inch-diameter pipe is usually considered a minimum for conventional systems. The sewer lines should be designed to provide a minimum velocity of 2.0 feet/second to maintain scouring. Access to gravity sewers is made by manholes which are usually required every 300 to 500 feet along the line or at changes in slope, direction, and junction points.

There exist several advantages to using a conventional gravity system. Of most importance is the fact that, unlike other alternative collection systems, the gravity system has been proven reliable in countless projects throughout the United States. Also, the minimization of mechanical equipment enables this system to have a low operating cost with a long life expectancy. Finally, as described in the appendix (Tables A-2 and A-3), densely populated communities containing more than two housing units per acre may find the conventional gravity collection system economically feasible as compared to the other four alternative collection systems previously listed.

Application of conventional collection systems in low-density rural areas is limited due to capital cost. The cost of conventional sewer service has escalated in recent years to the point where many small communities and private developers simply cannot afford the initial capital investment. It is not uncommon to see probable costs in excess of $10,000 per dwelling unit. In rural communities the cost of a conventional collection system may represent more than 80 percent of a total sewerage system capital cost. Because of costs associated with debt retirement, rates for conventional gravity sewers alone could be more than $30 per month for population densities less than four persons per acre and more than $20 per month for population densities less than eight persons per acre (Kreissl, 1985).

Capital costs associated with a conventional gravity system are not the only limitations. To maintain flow velocities required to prevent clogging of the pipe, gravity sewer lines have to be installed at a specified minimum slope. In communities with low housing densities located in areas of flat terrain, fairly deep cuts may be necessary to maintain the required gradient. In cases where extremely deep cuts are required, installation costs increase dramatically. In such cases, pump stations or lift stations are usually installed. The addition of these stations adds to the capital cost of a gravity collection system and imposes additional maintenance requirements. Finally, since excessive infiltration and inflow (I/I) are common problems associated with the conventional gravity collection systems, it may not be cost-effective to install such systems in areas with excessively high I/I potential.

Grinder Pump System

The grinder pump (GP) system (Figure IV-3) is a type of pressure sewerage collection system consisting of a combination grinder, pump, and small-diameter plastic pipe. The sewerage conveyed by the GP system may be discharged into a treatment facility or into a gravity collection system when sufficient flow has been accumulated by the GP system. A GP unit is installed at each individual house or, in many cases, more than one house (normally two) share a single unit.

The GP system is ordinarily implemented when conditions do not permit the use of an onsite septic system and when population densities are so low that conventional collection systems are financially impractical. Because the GP system uses small-diameter plastic pressure pipe, with cleanouts instead of manholes, its installation costs can be quite low compared to conventional gravity systems in low-density areas because of smaller pipe size, shallower pipe depth, and elimination of manholes.

One of the first relatively large installations of the GP pressure system is at Weatherby Lake, Missouri, a suburb of Kansas City. The system contains about 500 GP units and is approximately

12 years old (Godfrey, 1986). The most complete data on a GP system comes from the Apple Valley, Ohio system. This system incorporates the use of 43 GP units. Inspections of all units are performed quarterly. At the end of the first two years of operation, it was approximated that 80 percent of the 23 service calls were due to level switch problems (since redesigned by the manufacturer). Mean time between service calls data for these GP systems have been found to vary between two and five years (Kreissl, 1985).

According to TDH regulations, this type of pressure system may be considered when justified by unusual terrain or geological formation, low population density, or other circumstances where a pressure system would offer an advantage over a gravity system. TDH also requires that a responsible management structure be established, to the satisfaction of the appropriate reviewing authority, to be in charge of the operation and maintenance of the GP system.

Along with cost savings over the conventional system in low-density areas, the GP system has several other advantages. Because the GP system is a sealed system, there should be no opportunity for infiltration. Treatment plants can be designed to handle only the domestic sewage generated in the homes serviced, excluding the infiltration that occurs in gravity systems.

The disadvantages of using the GP system are basically related to repair and replacement of the GP unit, a problem that appears to be magnified since a GP unit is normally installed for every one or two residences. According to the Weatherby Lake system statistics, the mean life before replacement of a GP unit is around seven years. Homeowner problems with a GP unit are usually solved in less than eight hours, and replacing a broken unit averages 48 minutes (Godfrey, 1986).

Several other disadvantages of using the GP system also exist. Since GP wastewater contains finely shredded organic and inorganic matter, making preliminary and primary treatment processes less efficient and possibly contributing to sludge bulking problems, the total volume of secondary sludge generated at a treatment plant may be greater than if other collection systems were employed. This greater volume of secondary sludge that must be handled may offset potential savings in reduced hydraulic loadings and preliminary treatment requirements. Also, since GP systems require minimum scouring velocities to be reached daily, a low ratio of initial to final design population will likely require periodic flushing of the mains. Finally, GP systems may require some form of emergency overflow at each individual unit in areas where power outages are prevalent.

Septic Tank Effluent Pumping System

The Septic Tank Effluent Pumping (STEP) system (Figure IV-4) is also a pressure sewerage collection system that pumps septic tank effluent to a centralized point for treatment or collection.

When employing the STEP system, wastewater is pretreated in a septic tank. The septic tank effluent then flows to a holding tank, usually the second compartment of a double stage septic tank, which houses the pumping control sensors, and valves required for a STEP system. The effluent is then pumped into the small-diameter lines using a small centrifugal pump.

As in the case of the GP system, the STEP system is usually applied in areas with low population densities, high groundwater tables, or other soil characteristics that make an absorption bed infeasible. The STEP system is always used in conjunction with a septic tank. For the same reasons discussed in the GP system section, STEP system installation costs can be quite low compared to conventional gravity systems in low-density areas.

Harold Schmidt pioneered the STEP system nearly 20 years ago, while in charge of utilities for Port Charlotte, Florida. Since the installation of the STEP system in 1968, more than 700 Port Charlotte residents now employ the system (Godfrey, 1986). According to the town's maintenance manager, his office typically receives about five calls per week for service. Most of these calls are in reference to faulty float switches or levels. The mean time between service calls for Port Charlotte averages between six and eight years. Originally, the Florida community scheduled preventive maintenance calls every three years. These are now performed annually. Reduced service calls were attributed to the more intensive preventive maintenance program. In Port Charlotte the average life expectancy of a STEP system pump was seven years.

Because the STEP system and GP system are very similar, guidelines and advantages described for the GP system also may be applied to the STEP system. However, some differences between the two pressure systems do exist. The STEP system produces less sludge and a less concentrated waste, since a majority of the wastewater solids and associated biochemical oxygen demand (BOD) settle in the septic tank. A septic tank will typically remove up to 75 percent of the suspended solids, oils, and grease in raw sewage. It will also reduce the organic loading by about one-half (HUD, 1985). However, approximately every three years the accumulated solids in the septic tank must be removed for disposal. Also, unlike the GP system, STEP systems are not constrained by lower initial flows because daily minimum scouring velocities are not needed for septic tank effluent. Because of the inherent excess capacity of the septic tank, the STEP system can withstand a longer power outage than can a GP system. STEP systems may vary more than their GP counterparts due to the fact that the latter are generally sold as a complete package, while the former are sometimes engineered. In some cases this engineered approach has resulted in increased maintenance requirements due to design oversights or improper construction practices, however. Finally, STEP systems can experience sulfide corrosion problems in warmer climates because the pump is situated in a septic tank.

Review of recent EPA construction grant projects involving innovative/alternative (I/A) technologies reveals that about two-thirds of 146 small community wastewater collection systems funded under this program were either GP systems or STEP systems (Kreissl, 1985).

Small-Diameter Gravity System

Small-Diameter Gravity (SDG) systems (Figure IV-5) use individual septic tanks to pretreat the wastewater from homes before it is discharged to the collector sewer. The system transports the septic tank effluent mainly by gravity to a centralized point for treatment or collection. Since the septic tank effluent is relatively free from large solids and grease that can clog sewer lines, the sewers can be sized much smaller than in conventional systems. SDG lateral lines are typically 4 inches or smaller in diameter. The SDG system is similar to the STEP system, with the exception of not employing the use of a pump at each individual septic tank. There are two types of SDG sewers, those with relatively constant grade and those with variable grade. Since the latter system usually provides more cost advantage, this study only considers the use of the Variable Grade Sewer (VGS) system.

A VGS system operates on the principal of a sink trap. The drainage process within the system involves delays, surcharging, and transitions from full pipe flow to partial pipe flow (Simmons and Newman, 1985). The sewer line is laid at relatively constant depth regardless of ground slope. Overall, the outlet is lower than the inlet and, in fact, the outlet is lower than any house served by the sewer. However, it is possible that a house or group of houses may be located below the level of the sewer, making gravity flow through the sewer impossible. In such cases, a small pump following the septic tank could lift effluent up to the VGS line, a variation of the STEP system.

The use of SDG technology has been employed in Australia for almost 25 years. The first SDG system in the United States was developed in Mt. Andrew, Alabama in 1975. Currently there are over 25 major SDG systems operating successfully in this country. As of August 1982, approximately 25 percent of the small community alternative sewer projects funded under the EPA Construction Grants Program have utilized SDG systems (Kreissl, 1985). The Mt. Andrew system was developed as the pioneer VGS system. Consisting of 31 connections, the system has given good service and required little maintenance (Simmons and Newman, 1985). The only O&M problem experienced in this system was the periodic removal of accumulated solids from septic tanks. Some of the small tanks employed required cleanout in a little more than a year. The system used a modified two-compartment septic tank or interceptor tank which was designed to minimize surge conditions at peak flows. Although conventional septic tanks can be used with a VGS system, some form of liquid surge storage is recommended. Capped cleanouts should be provided so routine maintenance can be carried out. Check valves may need to be installed on some septic tank outlets to prevent backflow if the maximum hydraulic gradient can cause backflow.

The State of Texas and most local communities have not developed set criteria or guidelines for designing SDG systems. Therefore, before such a system can be designed and constructed, special approval must be obtained from the TDH, Texas Water Commission (TWC), and local regulatory agencies. The Farmers Home Administration, in cooperation with the Rural Housing Research Unit (RHRU) of USDA-ARS, Tuskegee Institute, developed its own set of design criteria for the Mt. Andrew system. According to the engineers who designed that system, a workable small-diameter variable-grade gravity sewer can be properly designed using many standard sewer design procedures as well as a good working knowledge of hydraulics. Detailed design standards for the SDG system can be found in the Agricultural Handbook No. 626, which is available from the U.S. Government Printing Office (Simmons and Newman, 1986).

The advantage of SDG sewers over conventional gravity sewers include lower capital cost due to reduced pipe costs, cleanouts in place of manholes, reduced lift station sizes due to peak flow attenuation by septic tanks, and potential reduction in treatment costs due to septic tank pretreatment (Kreissl, 1985). Construction costs are also further reduced because deep excavations can be avoided and less skilled labor can be used to install the pipe. SDG systems also usually have lower capital and operating costs than do STEP or GP systems since the wide use of pumps are eliminated.

A disadvantage of using an SDG system is related to the fact that the State of Texas has no set guidelines for designing and installing such a system. According to design criteria published by the TDH and TWC, sewer lines other than house laterals and force mains are not allowed to be less than 6 inches in diameter. In order for an SDG system to be implemented, a variance from this regulation must be obtained. Other disadvantages of using SDG systems include the continued need to maintain and pump septic tanks and the special design problems relative to odor and corrosion inherent with septic tank effluent (Kreissl, 1986).

Vacuum System

Vacuum sewers (Figure IV-6) utilize central vacuum stations to create a vacuum throughout the collection system. The system employs a vacuum valve at each house which periodically charges a slug of wastewater into the vacuum line. In some cases as many as eight houses can share the same vacuum assembly. The vacuum draws this wastewater through the lines to a central collection or treatment point. The sewer lines average 3 or 4 inches in diameter and are generally relatively shallow following natural terrain.

An interface valve separates atmospheric pressure in the home service line or toilets from the vacuum in the collection mains. When the interface valve opens, a volume of wastewater enters the main, followed by a volume of air. After a certain time interval, the valve closes. The packet of liquid, called a slug, is propelled into the main by the differential pressure of vacuum in the main and the higher atmospheric pressure air behind the slug. After a distance, the slug is broken down by shear and gravitational forces, allowing the higher pressure air behind the slug to slip past the liquid. With no differential pressure across it, the liquid then flows to the lowest local elevation and vacuum is restored to the interface valve for the subsequent operation. When the next upstream interface valve operates, identical actions occur, with that slug breaking down and air rushing across the second slug. That air then impacts the first slug and forces it further down the system. After a number of operations, the first slug arrives at the central vacuum station. When sufficient liquid volume accumulates in the collection tank at the central vacuum station, a sewage pump is actuated to deliver the accumulated sewage to a treatment plant (EPA, 1980a).

The vacuum sewer concept was first patented in the U.S. in 1888 by Adrian Le Marquand (Kreissl, 1986). Although several types of vacuum equipment and designs are available today, they all operate on the principles that Le Marquand developed. Currently, at least 20 vacuum systems are under construction or are already in operation in the U.S. A review of innovative/ alternative (I/A) small community projects in late 1982 revealed that nearly 5 percent were vacuum systems (Kreissl, 1986). One notable example of a smoothly operating vacuum sewer system is at Cedar Rocks, West Virginia. The system consists of 200 vacuum valves which serve 240 houses. According to the system's maintenance manager, after solving a few start-up problems no problems have been reported in the first 18 months of service. Although occasionally vacuum valves do stick open, repairing a stuck valve is not a major problem, requiring only about 45 minutes. The central vacuum station in Cedar Rocks requires about two hours of daily maintenance time (Godfrey, 1986).

The use of a vacuum system requires the development of a maintenance program. Most vacuum system manufacturers recommend an annual inspection of valves, valve pits, and wastewater sumps, in addition to inspection and cleaning of valve breathers, check valves, and solenoids. The time required for this onsite preventive maintenance for each valve was estimated to be one manhour per year. The mean time between service calls for typical onsite components was estimated to vary from 1.5 to 10 years (Kreissl, 1986). The central vacuum station is estimated to require 50 manhours of preventive maintenance time annually. Weekly preventive maintenance for the central station includes checking the standby generator fluids and battery, makeup oil for vacuum pumps, and the mechanical seals of the discharge pumps, as well as cleaning and testing of the alarm system. Annual preventive maintenance of the station includes inspection of discharge and vacuum pump check valves and exhaust lines, oil reservoir, and vacuum pump couplings, as well as lubrication of all motors.

It should be noted that TDH and TWC wastewater collection criteria does not specifically mention vacuum sewer systems, special approval from these agencies would be required before such systems can be designed and constructed.

The advantages of vacuum sewers over conventional sewers are similar to those previously stated for SDG, GP, and STEP systems, including reduced capital costs due to the use of small plastic pipe and reduced depth of installation. The unique advantages of vacuum systems are the substantial dissolved oxygen content of the wastewater, which would minimize odor problems, and the centralized power utilization at the vacuum station (Kreissl, 1986).

Disadvantages of the vacuum system compared to the other four collection systems described in this section include a higher energy requirement per unit volume of wastewater transported. The vacuum system incurs the cost of having a backup power supply. Also, the vacuum system has a greater potential for infiltration, limiting its use in areas with high groundwater tables. Finally, since vacuum sewers are sensitive to population density due to limiting line lengths, these systems are effective only when design populations are relatively concentrated (Kreissl, 1986).

Alternatives for Classification 2 Colonias

Where existing systems are not a practical treatment alternative and yet the colonia or colonia group has the size and density to justify a centralized treatment process, a new treatment plant is considered appropriate. This analysis indicates that 56 individual colonias and 158 colonias in groups fall into this classification.

To collect and convey wastewater from the service area to a centralized treatment plant would require a collection system network. The five types of collection systems identified for the Classification 1 colonias are also applicable to this classification of colonias. Please refer to the previous section (Alternatives for Classification 1 colonias) for these collection system options.

The centralized treatment system is defined for purposes of this study as a treatment facility servicing one or more colonias (i.e., a colonia group) and having a point source discharge. Two treatment options were evaluated: a conventional secondary treatment plant and an oxidation lagoon. The following paragraphs describe the two systems in some detail, providing the advantages and disadvantages of each.

Conventional Secondary Treatment Plants

The term secondary treatment is usually measured in terms of degree to which certain pollutants are removed. According to the TWC, conventional secondary treatment plants are expected to produce an effluent of 20 mg/l BOD_5 (five-day biochemical oxygen demand) and 20 mg/l TSS (total suspended solids). This level of treatment is defined by TWC as Effluent Set 1.

A variety of conventional secondary treatment plants are available today. The commonly used treatment processes would include activated sludge, contact stabilization, extended aeration, trickling filter, rotating biological contactor (RBC), and oxidation ditch. Typically, the plants which are applicable to this study would range in capacity from 10,000 gpd to 500,000 gpd. While large-scale wastewater treatment plants are custom designed for a particular application and constructed onsite, for small-scale plants such as these it is generally more economical to use pre-engineered plants which are available from a number of manufacturers. The exact treatment process selected for a particular application is usually made during the preliminary engineering stage based on site-specific information. Since this is a reconnaissance level study, no attempt was made to determine the advantages of a specific secondary treatment process on a site-specific basis. Rather, typical costs for a pre-engineered activated sludge plant was used in the study for purposes of determining system costs.

Conventional small-scale treatment systems are usually not affected by physical site constraints (except for extreme slopes and flood plains) and generally only require access to a receiving stream that can accept surface water discharge. These systems require relatively small amounts of land, although a buffer area should be provided to maintain some distance between the plant and residential areas.

In areas where interim treatment facilities are required, such as areas pending future connection to an existing regional treatment system, the use of small-scale secondary systems may be particularly appropriate. In most cases these small-scale plants can be assembled and disassembled and thus lend themselves well to such uses.

It is important that adequate operation and maintenance practices be implemented for these treatment plants. Although a full-time operating staff is generally not required, it is critically important to perform frequent inspections of the facility to monitor its performance. In addition, a routine maintenance schedule should be followed. If staffing by the operating entity is not feasible, these small-scale plants can be operated by private contractors under service contracts. It may also be possible to enter into a similar type of service contract with a nearby municipality that is willing to contract its staff services on a part-time basis.

The construction of wastewater treatment facilities is regulated by the TDH and the TWC. These agencies are responsible for setting discharge limitations and design guidelines. All treatment plants discharging effluent into surface water courses must apply for discharge permits from the TWC and the EPA. Also, even if no point source discharge is created, a "no discharge" permit is required in Texas.

The centralized conventional treatment plant has several distinct advantages. These systems are generally accepted as proven technologies, capable of providing consistent levels of treatment. Because they are able to consistently meet the 20 mg/l-20 mg/l guidelines set by the state, these systems are generally acceptable to the regulatory agencies except when more stringent standards are required. Conventional small-scale secondary systems provide an effective means of wastewater treatment when access to an existing regional system is not possible or costeffective.

The main disadvantages of the conventional small-scale secondary treatment system relate to cost. Mechanical treatment plants are much more expensive to construct and operate than onsite treatment alternatives. Operating costs include both energy and maintenance costs.

Oxidation Ponds

The oxidation lagoon is a simple, almost maintenance-free method of wastewater treatment. The lagoon system is usually designed with at least three separate cells connected together in a series, as shown in Figure IV-7. The first pond would consist of a facultative lagoon which is used for primary clarification and initial biological polishing of the raw wastewater. The remaining series of cells are stabilization ponds. These ponds continue the polishing process to produce an effluent quality meeting the TWC Effluent Set X requirement of 30 mg/l BOD_5 and 90 mg/l TSS. Due to the presence of algae cells in the effluent, this process normally cannot meet the 30 mg/l TSS limit for Effluent Set 0.

To allow sufficient time for the various natural treatment processes to take place, relatively long detention times are required. Detention times of 30 to 40 days are typical. These long detention times necessitate large storage volumes and associated large land areas.

Wastewater lagoons of this type are best suited to developments where sufficient land is available to allow the construction of the lagoon impoundments and maintain reasonable buffer distances between the lagoons and nearby residents. Lagoons may be inappropriate where stringent effluent quality standards apply. Since there is generally some carryover of algae cells in lagoon effluent, it may be difficult to achieve effluent quality required for some receiving streams in the Rio Grande Valley.

As with conventional small-scale secondary plants, oxidation lagoon systems must follow state criteria and guidelines. Discharge application procedures are similar for both centralized treatment systems. The TWC or the EPA may prohibit this type of treatment to be used if it is found that the receiving stream would be adversely impacted or that the effluent quality would not meet current discharge criteria.

The main advantages of oxidation lagoons are their low capital and operating cost and their simple design and operation. Very little mechanical equipment is required, and energy requirements are minimal. This treatment system is relatively insensitive to fluctuations in hydraulic and organic loadings and produces considerably less sludge than conventional treatment systems.

Instead of discharging the effluent produced by the two previously discussed centralized treatment alternatives into a receiving stream, there lies the option of applying the treated effluent to the land via irrigaton. Land application of effluent is not specifically recommended by the Lower Rio Grande Valley 208 Study as a general solution. Rather, the 208 study suggests that, where feasible, land application be considered during design of the individual systems. As a result, this study does not evaluate this effluent disposal option.

Alternatives for Classification 3 Colonias

Where the number of connections that can practically be served by a treatment system is too small to allow a centralized system to be practical, but at the same time the housing density is so high that lot size is too small for individual onsite systems, cluster systems should be considered. This study reveals that by the year 2010 there will be 54 individual colonias, none of which will be in groups, that fall into this classification.

The cluster systems are defined for purposes of this study as a treatment process serving at least several dwelling units within a single colonia but likely not of the scale to serve an entire colonia as described by the centralized treatment system.

To collect the wastewater from individual dwelling units to a cluster facility for treatment would require a network of collection systems. The five types of collection systems identified for Classification 1 and 2 colonias are also applicable to Classification 3 colonias. Please refer to the "Alternatives for Classification 1 Colonias" section for these collection system options.

Cluster systems typically incorporate the use of a community septic tank, although other tank variations do exist (refer to page IV-35 of this report). This community septic tank is a larger version of the tanks used in individual onsite septic systems. However, the design of these larger systems will be somewhat more involved than for one serving a single home.

Precast septic tanks are usually available from local suppliers in sizes up to 2,500 gallons (which can typically serve up to four or five dwelling units) (HUD, 1985). If larger treatment capacities are required, the septic tanks will usually have to be constructed in place using precast sections or poured-in-place concrete (Figure IV-8).

Cluster septic tanks are almost always used in conjunction with subsurface disposal systems. Because septic tank effluent quality does not meet secondary treatment requirements, the effluent cannot be discharged to surface water without further treatment.

Although cluster septic tanks normally are used to pretreat raw sewage, they can also be used to receive effluent from septic tank effluent pump (STEP) and small-diameter gravity (SDG) collection systems. When such systems discharge to a subsurface disposal system, the cluster septic tank provides a margin of safety by trapping some of the residual solids, oil, and grease that might have overflowed from the individual onsite septic tank.

Although state regulations do not specifically address the cluster system, the design of the system should follow the criteria set by the TDH for private onsite septic systems. Acceptable standards pertaining to the reinforcing and waterproofing of large septic tanks that need to be constructed onsite are available from the National Concrete Masonry Association (HUD, 1985).

The major assets of a cluster septic tank are its simple construction and its nominal operation and maintenance requirements. The lack of moving parts and mechanical equipment eliminates the need for intensive maintenance. Also, there are usually no electrical power requirements. Cluster septic tanks are relatively easy to install and much less expensive than conventional small-scale secondary plants or oxidation lagoon systems.

One of the largest disadvantages of the cluster septic system is that its use is limited to areas suitable to private onsite systems. A cluster septic system has the same limitations as onsite systems. If an area has a high groundwater table or a low percolation rate, the use of this system is limited. Another disadvantage is that large land areas must be set aside for subsurface disposal systems. As the decision matrix shows, at least 500 square feet of land per capita must be available for the subsurface disposal site. This is based on the assumption of a clay-loam soil and an absorption field loading rate of 0.2 gallon per day per square foot of land (EPA, 1980a). Finally, as with a centralized system, maintenance of these facilities does require personnel with formal training in the treatment process.

As previously mentioned, variations of community septic tanks do exist. The variation most encountered is the cluster aerobic tank. These tanks are miniature treatment plants designed to provide relatively the same type of treatment as a centralized activated sludge plant. This tank employs high concentrations of microorganisms under aerobic conditions resulting from mechanical aerators. The aeration process is followed by clarification within the same tank, whereby the biomass is separated from the treated wastewater.

The aerated tank unit does achieve higher BOD removals than septic tanks, but SS removals are similar. Field studies indicate that aerobic units can provide from 70 to 90 percent BOD_5 and SS reductions for household wastewater, yielding BOD_5 and SS concentrations in the range of 30 to 70 mg/l and 40 to 100 mg/l, respectively (EPA, 1980a).

The aerobic tank system is advantageous over the septic tank when space for an absorption field or its equivalent is limited. Because of the decreased organic load of the aerobic tank's effluent, the absorption field loading rate may be increased, reducing the land area required for the disposal system. Any variances to effluent disposal criteria set by the TDH will be considered on an individual basis by the TDH.

While the aerobic tank produces a higher quality effluent than does the septic tank, the TDH still requires that this effluent be discharged into a properly designed and constructed soil absorption system or its equivalent. According to the TDH, no discharges of aerobic tank effluent to the ground surface or into the waters of the State will be allowed (TDH, 1977). With the increased capital, maintenance, and management costs associated with this mechanical system along with the need of an effluent disposal system, the total cost of an aerobic tank system will equate, if not surpass, that of a septic system.

Five cluster system effluent disposal methods are available, including:

- Conventional Subsurface Disposal
- Evapotranspiration (ET) Bed Disposal
- Dosing Mound Disposal
- Intermittent Filter With Subsurface Disposal
- Intermittent Filter With Water Course Discharge

A brief overview of each of the cluster system effluent disposal systems is presented in the following paragraphs.

Conventional Subsurface Disposal (Absorption System)

A septic tank followed by a soil absorption bed (Figure IV-9) is the traditional system for the treatment and disposal of domestic wastewater from individual households or cluster septic tanks. Effluent discharged from the tank goes to either absorption trenches or seepage beds, the size of which is usually determined by soil characteristics.

This subsurface disposal alternative has the advantage of being a cost-effective alternative and, coincidentally, has the advantage of being the most widely used method of waste disposal for both onsite and cluster septic systems (EPA, 1980a). Almost one-third of the United States population depends on such systems.

The absorption system does have several limitations, usually related to soil and site conditions. Proper drainage requires a soil with relatively high permeability. When a soil system loses its capacity to absorb septic tank effluent, there is a potential for effluent surfacing, which often results in odor and possibly health hazards.

Evapotranspiration Bed Disposal

Evapotranspiration (ET) is a means of wastewater disposal that may be utilized in some localities where site conditions preclude soil absorption. Success of the process requires the combined rate of application of all moisture (rainfall and wastewater) to the soil be less than the rate of evaporation from the soil plus the rate of transpiration by plants.

The soil material must be fine textured enough to draw up the water from the saturated zone to the surface by capillary action but not so fine as to restrict the rate of flow to the surface (Figure IV-10). ET is also influenced by vegetation on the disposal field and can theoretically remove significant volumes of effluent in late spring, summer, and early fall. The surface area of the bed must be large enough for sufficient ET to occur to prevent the water level in the bed from rising to the surface (EPA, 1980a).

As mentioned above, the ET system has the advantage of being able to be employed in areas not suitable for absorption systems.

An ET system that has been properly designed and constructed is an efficient method for the disposal of pretreated wastewater and requires a minimum of maintenance. The EPA estimated in 1980 that 4,000 to 5,000 year-round ET systems were in operation in the United States.

The biggest disadvantage of an ET system is cost. An ET system, with its impermeable liner and special construction, can cost up to four times as much as an absorption system. If finances are limited, the ET alternative may be too expensive for some communities.

Application of the ET system to the Valley may be limited due to the significant rainfall the region experiences.

Dosing Mound Disposal

A mound system (Figure IV-11) is a method of treatment and disposal of domestic wastewater that can be used as an alternative to the conventional soil absorption system. In areas where problem soil conditions preclude the use of subsurface trenches, mounds can be installed to raise the absorption field above ground, provide treatment, and distribute the wastewater to the underlying soil over a wide area in a uniform manner.

The two main elements of the system are the dosing chamber and the mound. A pressure distribution network should be used for uniform application of clarified tank effluent to the mound. A subsurface chamber can be installed with a pump and high water alarm to dose the mound through a series of perforated pipes. Where sufficient head is available, a dosing siphon may be used (EPA, 1980a).

The design of a mound is based on the expected daily wastewater volume it will receive and the natural soil characteristics. As with the conventional subsurface disposal system, pollutants are removed by natural absorption and biological processes in the soil zone adjacent to the seepage bed. The mound must provide an adequate amount of unsaturated soil and spread septic tank effluent over a wide enough area so that distribution and purification can be effected before the water table is reached.

Dosing mound systems have proven to be successful alternatives for difficult soil conditions. The dosing mound system has the advantage of being able to overcome problems with slowly permeable soils and high water tables in rural areas. In slowly permeable soils, the mound serves to improve absorption of the effluent by utilizing the more permeable topsoil and eliminating construction in the wetter and more slowly permeable subsoil. In permeable soils with insufficient depth to groundwater, the fill material in the mound can provide the necessary treatment of the septic tank effluent before it reaches the groundwater (EPA, 1980a). The acceptable depth to a groundwater table from the base of the mound is site-specific. Sufficient depth must be available to channel the percolating wastewater away from the mound. If not, the soil beneath the mound and the mound fill material may become saturated, resulting in seepage of effluent on the ground surface.

The main disadvantages of the dosing mound system is that it is more expensive than a conventional absorption system. Also, it requires more land than the absorption system. Since pumping is required to distribute tank effluent throughout the mound, operation and maintenance and energy costs are higher than in an absorption field. Finally, it should be noted that the EPA has advised the states that funding for the mound system should be deferred until technical problems with the cluster dosing mound system are worked out (Water Pollution Control Federation, 1986). According to an EPA National Small Flows Clearing House representative, there is a problem of defining the hydraulic conductivity of the soils in and around the mounds. Procedures for defining the hydraulic gradients of the mounds are currently being developed (Dix, 1986).

Intermittent Sand Filter With Subsurface Disposal

Intermittent sand filters (Figure IV-12) are beds of granular materials 24 to 36 inches deep and underlain by graded gravel and collecting tile. Septic tank effluent is applied intermittently to the surface of the bed through distribution pipes or troughs. Uniform distribution is normally obtained by dosing so as to flood the entire surface of the bed. Filters may be designed to provide free access (open filters), or may be buried in the ground (buried filters).

The mechanisms of purification attained by intermittent sand filters are complex and not well understood even today. Filters provide physical straining and sedimentation of solid materials within the media grains. Chemical sorption also plays a role in the removal of some materials. However, successful treatment of septic tank effluent is dependent upon the biochemical transformations occurring within the filter. Without the assimilation of filtered and sorbed materials by biological growth within the filter, the process would fail to operate properly.

Intermittent sand filtration is well-adapted to treating septic tank effluent. The process is applicable to single-family homes and cluster systems. The intermittent sand filter is basically used where site conditions are not conducive to subsurface disposal of septic tank effluent. Because of the high-quality effluent produced, regulatory agencies often will allow subsurface disposal of sand filter effluent where groundwater protection concerns prevent disposal of septic tank effluent. Since the organic loading of the filter effluent is reduced, it may be possible to apply this effluent to absorption fields that have minor limitations without overloading them.

The advantage of deploying intermittent sand filters is that they represent an effective and reliable method of upgrading septic tank effluent to meet secondary, or better, treatment standards. While these filters remove suspended solids and reduce organic loading, they also transform organic forms of nitrogen to the nitrate form, provided the filter remains aerobic. Buried sand filters are essentially maintenance-free, although they may become clogged after several years' use and require resting or chemical treatment. To minimize clogging, lower loading rates are generally recommended for this type of filter. Open sand filters can be operated at much higher loading rates than buried filters, but they require frequent maintenance to sustain peak performance. The surface layer of sand must be periodically scraped clean as it becomes clogged with solids.

The major disadvantage of this type of system is cost. The major capital cost components in the construction of a sand filter include the concrete, sand, and gravel. Also, land cost associated with the filter and subsurface disposal system must be included. Labor requirements range from almost nothing for a buried sand filter to 300-500 hours per year for an open filter.

Intermittent Sand Filter With Discharge Into Water Course

In situations where subsurface disposal of intermittent sand filter effluent is impractical because of impermeable soils, shallow bedrock, or very steep slopes, it may be possible for this effluent to be discharged into surface waters. This method of cluster septic tank effluent disposal may prove to be more cost-effective than using conventional secondary treatment methods.

According to the EPA, intermittent filters produce high-quality effluent with respect to BOD_5 and suspended solids. Normally nitrogen is transformed almost completely to the nitrate form. The effluent quality characteristics of intermittent sand filters range between 9 mg/l BOD_5 and 13 mg/l (EPA, 1980b). As the effluent quality characteristics show, the intermittent sand filter can meet the TWC's Effluent Set 1 requirement (20 mg/l BOD_5 and 20 mg/l TSS).

Several disadvantages also exist for this cluster system effluent disposal alternative. As with conventional secondary plants and lagoons, the proper permits must be obtained if intermittent sand filter effluent is to be discharged. Finally, it is unknown at this time whether or not the TDH or TWC will approve such a system to discharge.

Alternatives for Classification 4 Colonias

Where housing density is sufficiently low, the available lot sizes may permit onsite septic systems or aerobic systems to provide a generally more cost-effective method of disposal than the various cluster systems. This study shows that 30 individual colonias fall into this classification.

With the exception of size, the onsite septic systems incorporate the same components and methods of treatment as do cluster systems. Both classes of systems share the same advantages and disadvantages. When implementing the use of an onsite septic system, TDH criteria must be followed. This criteria requires that a residential lot contain at least a 15,000-square-foot surface area before an onsite septic system can be installed (TDH, 1977). As described in the January 2, 1987 edition of the Texas Register, the minimum residential lot requirements for a septic system are proposed to change from 15,000 square feet to one-half acre (21,780 square feet). Refer back to the section on cluster systems (Classification 3) for discussion involving both the septic tank and aerobic tank.

There are four effluent disposal methods available for onsite septic systems, including:

- Conventional Surbsurface Disposal
- Evapotranspiration (ET) Bed Disposal
- Dosing Mound Disposal
- Intermittent Sand Filter With Subsurface Disposal

Please refer back to the section on cluster systems (Classification 3) for discussion concerning these disposal alternatives. Other than cost and size, these alternatives are the same as those presented for the cluster system.

Alternatives for Classification 5 Colonias

Until a household is able to afford in-house plumbing, there always lies the alternative of upgrading the existing latrines that are prevalent throughout the region. According to a TDH Region 8 official, a well-constructed latrine normally has less problems than a badly constructed septic system.

According to literature published by the World Bank, several measures can be executed to improve outdoor pit latrines from both an aesthetic and health standpoint. First, latrine pits can be lined with either plastic or clay, thus preventing pathogens and other organic pollutants from escaping into the environment. This practice is necessitated in areas having high groundwater tables. Lining a latrine pit will facilitate the need of desludging the pit on a more regular basis. A pit emptying program may need to be established so that the humus-like sludge material can be disposed of properly. Second, vent pipes can be installed in pit latrines to minimize odors and the nuisance of flies. The vent creates a circulation of air through the latrine that effectively exhausts odors emanating from the decaying organic material in the pit. Also, the nuisance of flies entering the latrine structure is minimized since they will be attracted to the vent pipe. If the vent pipe contains a flyscreen, the flies will not be able to fly down it and so enter the pit. Finally, as with any other waste disposal system, the installation and use of a latrine should be regulated. Latrine construction and desludging guidelines must be developed and defined. Also, an inspection and management program must be initiated to enforce these adopted guidelines. If this type of program is not established, any hope of improving the pit latrines in the Valley will rapidly vanish.

While the survey of colonias in the area indicates that about 3,346 residential units in various colonias currently have no inside plumbing, it is assumed that all will have inside plumbing by the end of the study period.

TABLE IV-1 - LETTER DESIGNATIONS FOR CITIES WITHIN THE STUDY AREA WITH WASTEWATER TREATMENT PLANTS

Letter	Corresponding City
A	Mission
B	McAllen
C	Edinburg
D	Pharr
E	Alamo
F	Donna
G	Weslaco
H	Mercedes
I	Elsa
J	Edcouch
K	Santa Rosa
L	Combes
M	Harlingen
N	San Benito
O	Brownsville
P	Los Fresnos
Q	San Juan
R	La Feria
S	La Joya
T	La Villa
U	Rio Hondo
V	San Perlina
W	Hidalgo
X	Progresso
Y	Raymondville
Z	Lyfford

TABLE IV-2 - EXISTING WASTEWATER TREATMENT SERVICES

Map Location Designator	Plant Owner	City Code	Current Flows (mgd) Average-Day	Current Flows (mgd) Peak-Day	Treatment Permit Capacity (mgd) Average-Day	Treatment Permit Capacity (mgd) Peak-Day	Future Expansion Plans
H-1	Weslaco	G	1.5	2.1	3.5	4.0	Yes
H-2	Elsa	I	0.5	0.7	0.5	0.98	Yes
H-3	Donna	F	1.0	N/A	N/A	1.56	Yes
H-4	Mission	A	1.9	2.1	N/A	3.5	Yes
H-5	Alamo	E	1.2	N/A	0.9	N/A	Yes
H-6	San Juan	Q	0.5	1.0	0.67	1.40	Yes
H-7	Edinburg	C	2.7	3.9	4.5	10.24	No
H-8	Mercedes	H	1.0	1.4	1.5	2.5	Yes
H-9	McAllen No. 3	B	N/A	N/A	N/A	4.0	*
H-10	Hidalgo No. 1	B	0.25	0.25	0.14	0.35	**
H-11	Hidalgo No. 2	B	N/A	N/A	0.4	0.5	*
H-12	Pharr No. 2	D	N/A	N/A	N/A	1.5	*
H-13	Pharr No. 1 and Las Milpas	D	1.8	2.5	2.0	4.0	***
H-14	McAllen No. 2	B	6.0	7.9	10.0	17.0	No
H-15	Edcouch	J	0.24	0.35	0.24	0.48	****
H-16	La Villa	T	0.1	N/A	0.2	0.35	No
H-17	La Joya	S	N/A	N/A	0.31	0.72	Yes
H-18	Military Highway WSC (Progreso)	X	N/A	N/A	0.2	0.4	Yes
H-19	Phoenix Foods	None	N/A	N/A	N/A	N/A	No
C-1	Harlingen No. 2	M	2.7	5.4	3.5	8.75	No
C-2	Harlingen No. 1	M	1.9	3.3	3.1	7.75	Yes
C-3	Harlingen No. 3	M	N/A	N/A	3.25	N/A	Yes
C-4	Brownsville No. 2	O	3.2	5.8	2.8	10.0	No
C-5	Los Fresnos	P	0.2	0.4	0.6	N/A	Yes
C-6	San Benito	N	1.5	2.16	N/A	3.0	Yes
C-7	Brownsville No. 1	O	6.3	11.0	5.8	7.8	No
C-8	La Feria	R	0.28	0.35	0.4	1.0	Yes
C-9	Palm Valley Estates UD	None	0.14	0.2	0.28	0.45	Yes

TABLE IV-2 (Cont'd)

Map Location Designator	Plant Owner	City Code	Current Flows (mgd) Average-Day	Current Flows (mgd) Peak-Day	Treatment Permit Capacity (mgd) Average-Day	Treatment Permit Capacity (mgd) Peak-Day	Future Expansion Plans
C-10	Cameron Housing Authority (Las Palmas)	None	0.003	0.01	0.03	0.07	Yes
C-11	Rio Hondo	U	0.08	N/A	0.15	0.30	No
C-12	Santa Rosa	K	0.05	0.13	0.20	0.50	Yes
C-13	Valley MUD No. 1 (VICC)	O	0.11	0.14	0.13	N/A	No
C-14	Valley MUD No. 2	O	0.18	0.28	0.15	0.50	No
W-1	Raymondville and Willacy County Housing Authority	Y	0.78	1.2	1.0	1.25	Yes
W-2	Lyford	Z	N/A	N/A	0.27	N/A	No
W-3	Port Mansfield PUD	None	0.3	0.5	0.22	0.57	No
W-4	San Perlita	V	0.06	0.09	0.10	0.20	No

Notes

*Under construction.
**Will be abandoned when Plant No. 2 is complete.
***Will be utilized 20 percent when Plant No. 2 is complete.
****New plant in design stage.

N/A - Not available.

Source: Local City Managers and Wastewater Superintendents, 1986

TABLE IV-3
COLONIA GROUPINGS

	REGIONAL /CENTRAL SERVICE GROUP NO.	MAP NO.	COLONIA NAME
HIDALGO COUNTY			
	101	5	R.O.W. (Roger Road)
		6	Tierra Buena #1 & 2
		329	Austin Gardens
		3050	Unknown
	102	40	Tagle, Roberta
		41	Crouse
	103	595	Country Terrace
		596	Thrasher Terrace
		599	Beamsley
	104	32	Ranchitos #2
		575	Ranchitos #1
		676	Garza Terrace
		677	Tract W. of Garza Terr
		680	Colonia Estrella
	105	580	Las Brisas Del Sur
		584	Beto Acres
	106	90	Sandy Ridge
		798	Doolittle Acres
	107	15	MonteMayor(SantaCruzGds#3)
		16	El Seco Sub
		92	Bar II
		301	Merrill
		320	Bar V
	108	103	Schunior Sub(NuevaSeca)
		105	Colonia Garza #2
	109	74	Closner Sub
		87	Terry
		221	Country View Est #2
		309	Thompson Rd
	110	81	Lopezville
		83	Villa Del Mundo
		328	North Lopezville
		609	Villa Del Sol
		610	Sevilla Park #1
		612	El Charro Sub #1 (West)
		615	Mesquite Acres
		616	Arco Iris #2
		620	Aldamas & No. 2
		622	Las Palmas
	111	623	Eldora Gardens Sub
		634	R.S.W. #1
	112	631	Nadia
		636	Bar VI (Barra Privies)
	113	625	Small Sub #2
		626	Las Brisas
		657	Small Sub #1

TABLE IV-3 (Cont.)
COLONIA GROUPINGS

REGIONAL /CENTRAL SERVICE GROUP NO.	MAP NO.	COLONIA NAME
114	111	Jackson's New World/Griesel
	116	Palma & Palmas #2
115	232	L.J. Sub #1
	345	Alberta Acres
	371	Colonia Del Valle
116	347	Colonia Gonzales
	351	La Paloma
117	350	East of Eden Sub
	654	Val Bar Estates
118	118	Las Brisas Est
	119	San Carlos Community
	120	Villarreal, D.T. Sub
	121	San Carlos Acres
	122	Rankin
	182	Sosa
	201	Ruthven
120	398	Walston Farms Sub
	999	Highland Farms
122	130	Delta West Sub
	139	Cinco Hermanas
	140	Imperial
123	132	Mary Ann's Sub
	133	Brenda Gay Sub
124	161	Green Valley Dev
	163	Evergreen
	167	El Trunifo
125	165	El Mesquite Sub Phase 1
	166	L & P Sub
126	242	Alvarez
	405	La Blanca Heights(N.11thPl.)
127	366	Noreste
	367	Barbosa Lopez 1, 2, 3
	414	Unknown
	415	Victoria Acres
	416	Delta Court Sub
	418	Barbosa-Lopez 1, 2, & 3
	420	Mile 9 Rd Sub
128	421	Flora
	430	Martin Sub #1
129	459	Rosedale Heights
	460	Mid-Way Village(Mid Valley)
	461	La Palma #1
130	439	Avila IB
	442	Tierra Bella
	443	Tierra Prieta
	556	Balli Sub #2
	3003	Scissors

TABLE IV-3 (Cont.)
COLONIA GROUPINGS

REGIONAL /CENTRAL SERVICE GROUP NO.	MAP NO.	COLONIA NAME
132	246	El Leon
	445	Colonia Tijerina
	478	Mile Doce West Sub
	489	Olivarez #4
	495	Mesquite Sub Unit #1
	501	La Paloma I & II
	3051	Mila Doce Sub
133	479	Sunrise Sub Unit 2
	493	Puesta Del Sol
	773	Sunrise Hill Sub
135	476	Chapa #4
	496	Chapa #2 and others
	867	Mid Valley Est
136	510	Los Reyes Acres
	514	Wes Mar Sub
137	515	Chapa #5
	3004	UnKnown
138	522	Cuellar A.C. 1, 2, 3
	525	Los Castillos/Agua Dulce
	535	Llano Grande #1
	688	Angela
139	919	Colonia Las Palos
	920	Progreso
140	516	Tideland
	519	Capisallo Park
	520	Olympic Sub
141	113	Freedom Est
	174	Laborsita
	175	Hacienda De Los Vega
143	8	Floresta
	9	Tierra Maria #II
201	968	Flores
	969	Colonia Rodrigue/Sullivan City
	970	Fisher
	974	La Aurora
	977	San Miguel
	978	Las Cuevas #2
202	960	Havana Sub
	981	Havana(Community)/Havana Lomas
203	699	King Ranch #1 & #2
	702	El Rio
204	700	Nuevo Penitas
	701	Penitas
205	708	Perezville
	713	Mata
	717	Tierra Maria/Valle Sac Bella
	721	Plainview

TABLE IV-3 (Cont.)
COLONIA GROUPINGS

REGIONAL /CENTRAL SERVICE GROUP NO.	MAP NO.	COLONIA NAME
207	719	Los Trevino 1, 2, 3, 4
	730	Acevedo #1 (Esquivel Jr)
	731	Acevedo #2 (Esquivel)
208	774	Acevedo #4
	5020	Unknown
	5021	Unknown
209	754	Lakeside
	756	Quarto Vientos
	760	La Camellia
	767	Carlos
	770	Hilda #1
210	740	La Homa Rd
	748	Ramirez Est.
	751	Henojosa, Ariel #1
	987	Basham #15
211	338	Goodwin Heights #1
	339	Palmerina
	340	Kountry Hill Est
212	197	Regal Est
	203	Palm Drive North
	245	Basham #11
	251	Basham #1
	254	Basham #2
	255	Basham #10
	256	Basham #6
	259	Randolph/Barnett #1
	260	Cavazos, Alex
	261	Villa Capri
	262	Leal, Carlos II
	263	Rodriguez Est #2
	269	Coyne
	275	Hinojosa Ariel #2
	277	N. Country Est #2
	278	Randolph/Barnett #2
	746	Johnson, Paul
	747	La Homa Rd. North
	749	Acevedo, Daniel Sub
	994	Basham #7
	6021	Basham MB
213	821	Grovewood
	822	Perlas De Naranja
214	333	Bazan, Enrique
	334	Celso
	335	Basham #13
	336	La Paloma Sites
	337	Munoz Estates
	343	Basham #12

TABLE IV-3 (Cont.)
COLONIA GROUPINGS

REGIONAL /CENTRAL SERVICE GROUP NO.	MAP NO.	COLONIA NAME
	986	Unknown
215	188	Chucas Est #1
	192	Wahon
	198	Hinojosa, Ariel #3
	200	Rocky
	205	Chula Vista Acres
	235	Basham #5
	236	Basham #4
	248	La Homa Grove Est
	267	Basham #8/Country Est W.
	342	Acevedo #3
216	280	Linda Vista Est(Popular)
	284	Diamond (L)
	288	N. Country Est #1
	289	Tangerine Est
	290	Monica Acres
217	283	Dude Hill #1
	287	Vereda Tropical
	5002	Unknown
	5003	Unknown
218	294	North Cross Est
	300	Rabbit Patch 1 & 2
	5011	Unknown
221	191	El Paraiso (Rudy Vela)
	193	Los Ebanos
222	194	Tierra Estates Sub
	195	Bryan Acres
	214	Cantu, Jose
	227	Val Verde North
	228	Los Ninos
	229	Citrus Shadows
	308	Jardin Terrace
	323	Stewart Place Sub #1
	3052	Stewart Place Sub #2
	5006	Unknown
	5007	Unknown
	5008	Unknown
	5009	Unknown
	5010	Unknown
	6015	M & S
223	190	Leal, Ramon
	202	Cantu (Diaz)
227	988	Regency Acres
	5004	Unknown
	5005	Unknown

TABLE IV-3 (Cont.)
COLONIA GROUPINGS

	REGIONAL /CENTRAL SERVICE GROUP NO.	MAP NO.	COLONIA NAME
CAMERON COUNTY			
	301	1305	S Cluster of houses along rd.
		1308	Q Unknown Sub
		1311	R Unknown Sub
	302	1095	Villa Cavazos
		1115	Montalvo
		1117	El Calaboz
		1118	(El) Ranchito
		1119	Encantada
		1297	Escamilla's
	303	1110	Polo Arizmendi/Padilla
		1112	La Paloma
	401	1026	La Coma Del Norte
		1027	Cisneros (Limon)
		1295	25
	403	1264	Illinois Heights
		1334	Unnamed B
	404	1022	21 (See El Jardin)
		1272	Los Cuates
		1273	Coronado
		1274	Pleasant Meadows
		1340	Unnamed C
		7006	Unknown
	405	1241	Valle Hermosa
		1281	Valle Escondido
		7005	Unknown

TABLE IV-4 COLONIA GROUPINGS BY CLASSIFICATION

CLASS 1

	REGIONAL /CENTRAL SERVICE GROUP NO.	GROUP AREA (ac.)	2010 GROUP POP.	2010 GROUP DENSITY (cap/ac)
HIDALGO CO.				
A:	208	110	754	6.9
	209	246	2172	8.8
	210	126	724	5.7
B:	103	139	905	6.5
C:	102	24	161	6.7
	108	124	654	5.3
	109	231	1780	7.7
	110	652	5029	7.7
D:	104	243	3138	12.9
	105	91	996	10.9
E:	117	87	674	7.7
F:	120	93	1157	12.4
	126	58	422	7.3
	127	318	2223	7.0
	128	62	795	12.8
	129	205	1881	9.2
	130	368	2172	5.9
G:	137	41	352	8.6
	138	349	3631	10.4
H:	140	163	1056	6.5
I:	123	71	412	5.8
	124	68	473	7.0
	125	44	362	8.2
Q:	111	74	533	7.2
	112	92	915	9.9
	113	310	1629	5.3
X:	139	265	3953	14.9
CAMERON CO.				
K:	301	72.0	418	5.8
O:	403	52.0	251	4.8
	404	227.0	1311	5.8

CLASS 2

	REGIONAL /CENTRAL SERVICE GROUP NO.	GROUP AREA (ac.)	2010 GROUP POP.	2010 GROUP DENSITY (cap/ac)
HIDALGO CO.				
	101	110	905	8.2
	106	53	362	6.8
	107	250	1428	5.7
	114	40	261	6.5
	115	138	865	6.3
	116	55	292	5.3
	118	396	2545	6.4
	122	149	744	5.0
	132	235	1368	5.8
	133	155	1810	11.7
	135	186	1086	5.8
	136	96	905	9.4
	141	118	835	7.1
	143	51	241	4.7
	201	335	4476	13.4
	202	93	503	5.4
	203	81	704	8.7
	204	225	2565	11.4
	205	152	1710	11.2
	207	118	1760	14.9
	211	89	634	7.1
	212	800	4033	5.0
	213	40	231	5.8
	214	149	795	5.3
	215	315	1499	4.8
	216	159	1026	6.5
	217	72	352	4.9
	218	80	443	5.5
	221	26	261	10.1
	222	542	2866	5.3
	223	55	261	4.8
	227	42	261	6.2
CAMERON CO.				
	302	290.0	3257	11.2
	303	145.0	994	6.9
	401	163.0	1270	7.8
	405	67.0	501	7.5

TABLE IV-5 INDIVIDUAL COLONIAS BY CLASSIFICATION

CLASS 1

	MAP NO.	COLONIA NAME
HIDALGO CO.		
A:	796	Polonski Sub
B:	61	Ranchette Est
	310	Klement, W.J.
	604	Villa Del Carmen
C:	11	Lull
	43	W. McColl
	75	Colonia Rodriquez #1 & #2
	158	Yokum Hall
D:	578	Villas Del Valle
	681	El Sol
E:	362	Laguna Park
	368	Tierra Bone
	386	Carroll Rd Acres
	436	El Gato
	3007	Unknown
F:	444	La Donna
	462	Mile 7 Sub
	840	Tierra Del Sol
G:	419	Sun Country Est
	422	Expressway Heights
	532	Villa Verde #1, #3
	996	Anaqua
H:	549	Eastland Park
J:	552	Mile 15 North Sub
K:	928	Colonia Capitalle
	933	Colonia Jesus Maria
	3000	La Riena
CAMERON CO.		
M:	1301	26
N:	1073	Rice Tracts
	1151	Leal Sub
O:	1244	Cameron Park 1
	1255	Stuart Sub
	1266	King Sub
	1284	Villa Pancho
	1336	Unnamed D
	1339	Soldivar
	7004	Unknown
P:	1035	Los Cuates

CLASS 2

MAP NO.	COLONIA NAME
HIDALGO CO.	
2	Hoehn Drive
14	Americana Sub
97	Evergreen
154	Tierra Del Valle 1 & 2
155	Muniz
160	Tower Sub
186	Casa De Los Vecinos
199	Nuevo Alton
271	Friendly Acres
361	Roosevelt Rd Sub(Chapa#3)
369	Bar VII Sub(DelValle)/Mabi.#2
380	Clark's Sub
499	La Mesa
503	Harmony Hill and others
517	Heidelberg
561	Hargill, City of
587	Southfork Est
662	Regency Acres
706	Chihuahua
711	Country Grove
725	South Minnesota Rd 1,2,3
742	Abrea (Ojo de Agua)/ChapaJosephina
988	Madero/Wheel City
906	Granjeno (Loop Area)
915	Faysville, Town of
930	Relampago
965	Valle Vista
975	Cuevitas (Town)
980	Los Ebanos Community
3006	Unknown
3061	Unknown
CAMERON CO.	
1042	Orason Acres/ChulaVista/Shoemaker
1049	La Tina Ranch
1074	Lago Sub
1099	Olmito
1108	Los Indios
1109	Carricitos-Landrum
1154	Los Yescas
1158	Lozano
1161	Glenwood Acres Sub
1163	Santa Maria
1164	Bluetown
1166	El Venadito
1226	San Pedro/Carmen/Barrera Gd.
1230	Villa Nueva
1242	Alabama/Arkansas (La Casa)
1263	Barrio Sub
1282	Saldivar
1299	Palmer
1300	Lasana
1304	Iglesia Antigua
1306	T 2 Unknown Sub along rd
7001	Unknown
7007	Unknown
WILLACY CO.	
2001	Santa Monica
2007	LaSara

CLASS 3

MAP NO.	COLONIA NAME
HIDALGO CO.	
7	River Bend - (Jinks)
10	Adan Lee
26	Garza, Lazaro
128	Hormel
134	Lopez-Gutierrez
138	Tropicana Sub
152	South Port Sub
172	Austin Stonebaker/CRJS Sub
176	Guerra, Daniel
177	Longoria Sub with Pride
181	Diamond #2
189	Palmeras
207	Twin Acres
219	Acosta 107
250	Stables, The
268	Mott
272	Good Valley
273	Bernal
312	TWA
325	Citrus City
326	Western Estate
358	Minnesota Rd
359	Leal, Ramiro
469	Ramosville
477	Tropical Farms Sub
709	Catalina Estates
772	Colonia Lucero Del Norte
911	Redgate
936	Los Pampas
937	Los Pampas #2
940	El Monte
941	Lookingbill, George
952	La Palma
959	Delta Lake Colonia
961	Linn Siding
979	Unknown
991	Bogert
993	Orange Hill
3005	Unknown
5001	Unknown
6000	Unknown
6016	Palm Sub
6018	Monger Line
6019	Dimas
6022	Sales
6025	Edinburg East Sub
6028	Big John
CAMERON CO.	
1302	Laguna Escondido Heights
1310	X Unknown Sub
1313	W Cluster of houses along rd.
7000	Unknown
7002	Unknown
WILLACY CO.	
2019	Willamar
2034	Sebastian

CLASS 4

MAP NO.	COLONIA NAME
HIDALGO CO.	
1	Seminary Est
3	Roeseyer Gardens
4	Tierra De Luz
12	South Seminary
96	Meadow Lands
146	Sunnybrook Sub
178	Krista Estates
179	Bougainvillea
180	La Homa Ranch(ComptonGrove)
185	Alta Vista Sub
187	Valley Rancheros
215	Lopez Bibiano
217	Acosta
218	Mitchell, Albert
253	Black V.A.
304	Amberland Sub
306	Guardian Angel Est
354	Los Tinacos
490	Country Village Sub 1 & 2
492	Puerta Del Sol Sub
494	Tijerina Est#
498	Campacuas Sub
518	Old Rebel Field Sub
560	La Coma Heights
614	El Castilleja
667	Cole
868	Lorenzana
985	El Flaco
6027	Isaacs
CAMERON CO.	
1341	Del Mar Heights

TABLE IV-6 - WASTEWATER TREATMENT SYSTEM ALTERNATIVES

Classification 1

- Existing Regional Treatment Plant

Classification 2

- Centralized Oxidation Pond (BOD_5 = 30 mg/l, TSS = 90 mg/l)
- Centralized Package Treatment Plant (BOD_5 = 20 mg/l, TSS = 20 mg/l)

Classification 3

- Cluster Septic System With Conventional Drainfield
- Cluster Septic System With Evapotranspiration (ET) Beds
- Cluster Septic System With Dosing Mounds
- Cluster Septic System With Intermittent Sand Filter and Subsurface Disposal
- Cluster Septic System With Intermittent Sand Filter and Watercourse Discharge

Classification 4

- Onsite Septic System With Conventional Drainfield
- Onsite Septic System With Evapotranspiration (ET) Beds
- Onsite Septic System With Dosing Mounds
- Onsite Septic System With Intermittent Sand Filter and Absorption Field

Classification 5

- Improved Latrine System

TABLE IV-7 - OVERVIEW OF SIGNIFICANT COLLECTION SYSTEM CHARACTERISTICS

Collection System	Method of Conveyance	Septic Tank Requirement	(MTBSC) Average Time Between Service Calls (years)	Infiltration Probability
Conventional Collection System	Gravity	No	N/A	High
GP System	Pressure	No	2-5	Low
STEP System	Pressure	Yes	6-8	Low
SDG System	Gravity	Yes	N/A	Moderate
Vacuum System	Pressure	No	1.5-10	High

Notes

N/A - Not applicable.
GP - Grinder pump.
STEP - Septic tank effluent pump.
SDG - Small-diameter gravity sewer.

Sources: Kreissl, 1985
Godfrey, 1986

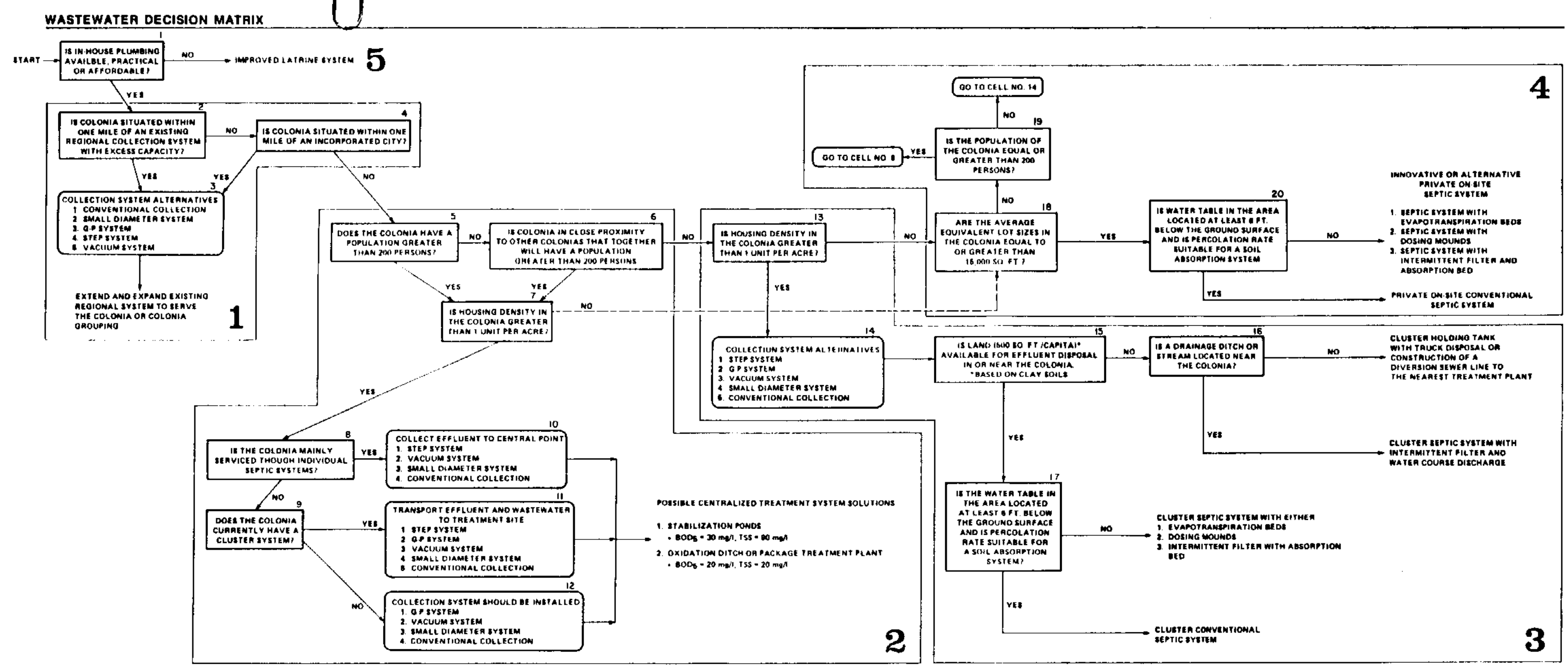


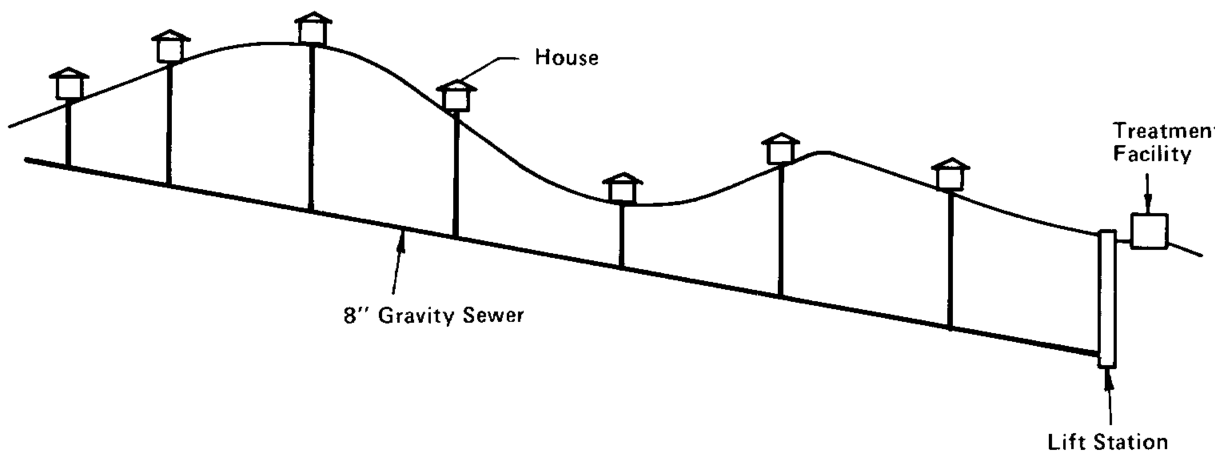
FIGURE IV-1

WASTEWATER DECISION MATRIX

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
TEXAS AUSTIN DALLAS HOUSTON PORT ARTHUR
COLORADO DENVER

Job No 11-00150-001	Date NOVEMBER 1986

TYPICAL LAYOUT



SOURCE: DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, 1985.

FIGURE IV-2

CONVENTIONAL GRAVITY SYSTEM

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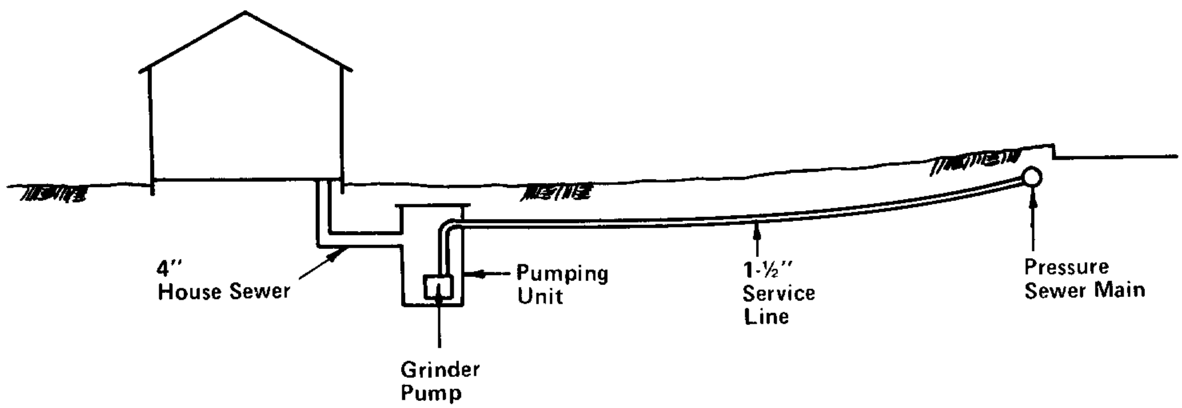
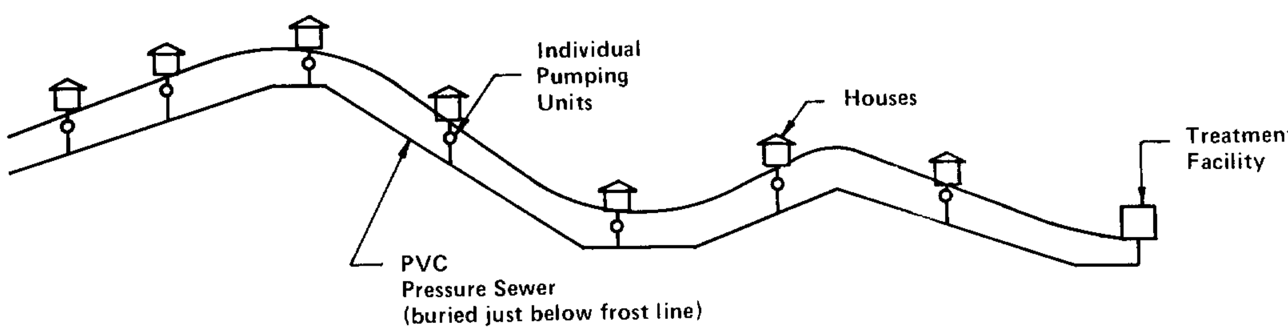
G.P. SYSTEM TYPICAL LAYOUT



PRESSURE SEWER TYPICAL LAYOUT



SOURCE: DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, 1985.

FIGURE IV-3

GRINDER PUMP SYSTEM AND
TYPICAL PRESSURE SEWER LAYOUT

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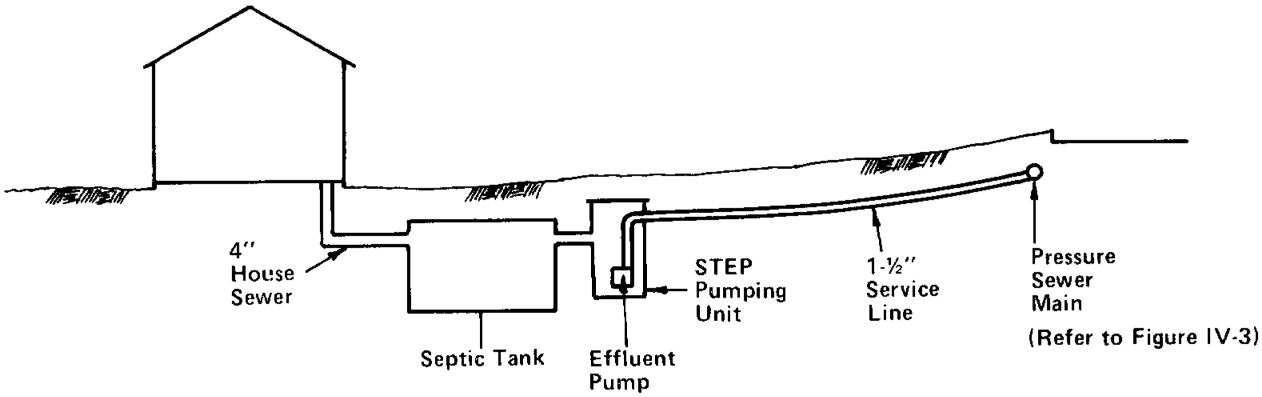
STEP SYSTEM TYPICAL LAYOUT



POSSIBLE STEP SYSTEM CONFIGURATIONS

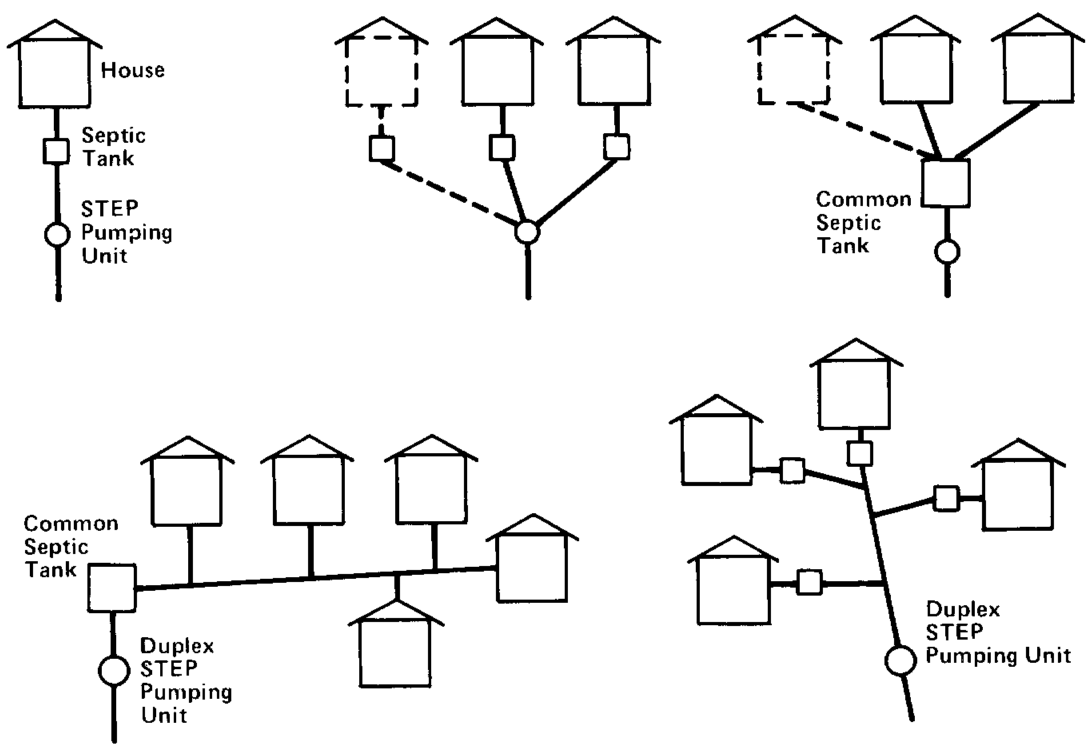


FIGURE IV-4

SEPTIC TANK EFFLUENT PUMPING (STEP) SYSTEM

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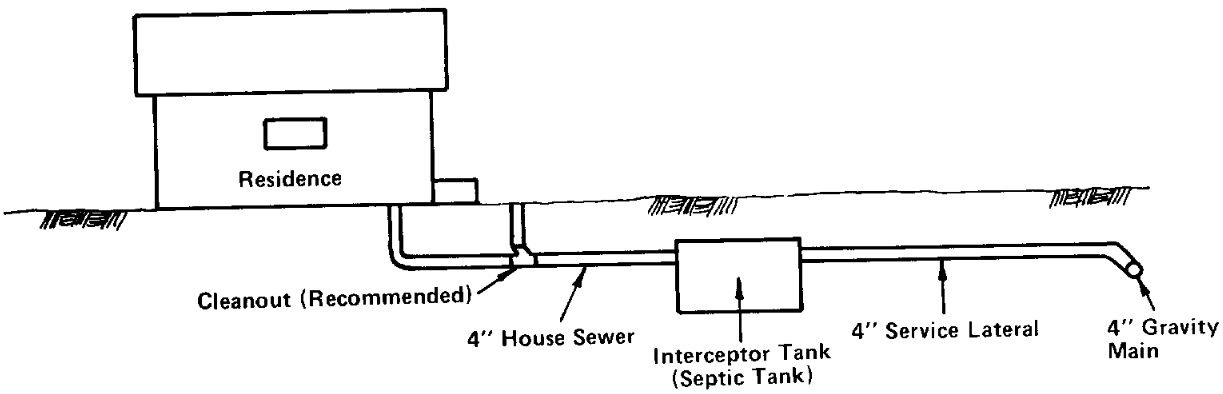
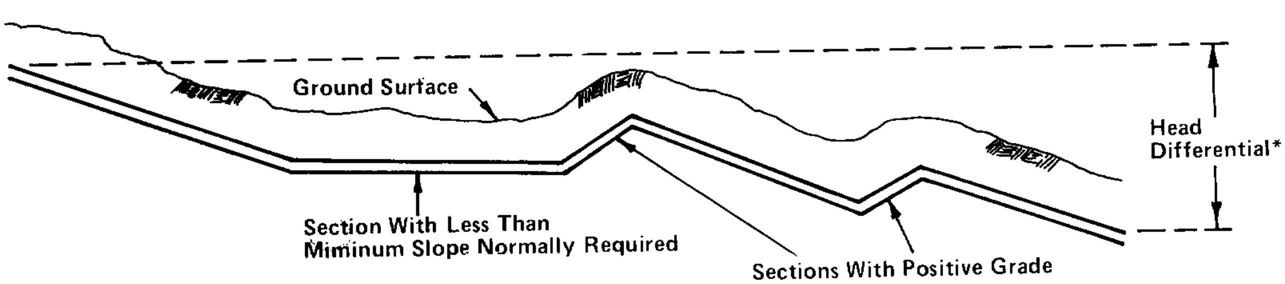
SOURCE: DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, 1985.

TYPICAL SDG SEWER LAYOUT



PROFILE OF VARIABLE GRADE SDG SEWER



*Difference in Elevation

SOURCE: DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, 1985.

FIGURE IV-5

SMALL DIAMETER GRAVITY (SDG) SYSTEM

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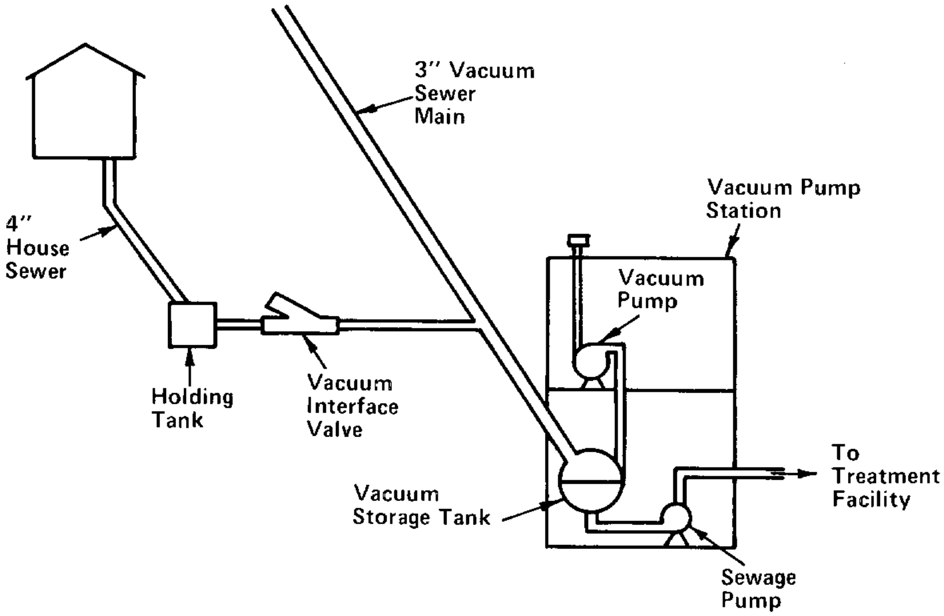
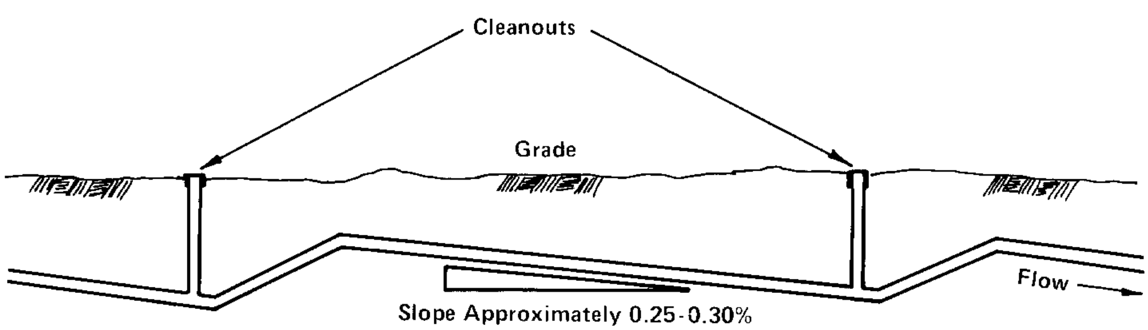
TYPICAL COMPONENTS



TYPICAL "SAW TOOTH" VACUUM SEWER INSTALLATION



SOURCE: DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, 1985.

FIGURE IV-6

VACUUM SYSTEM

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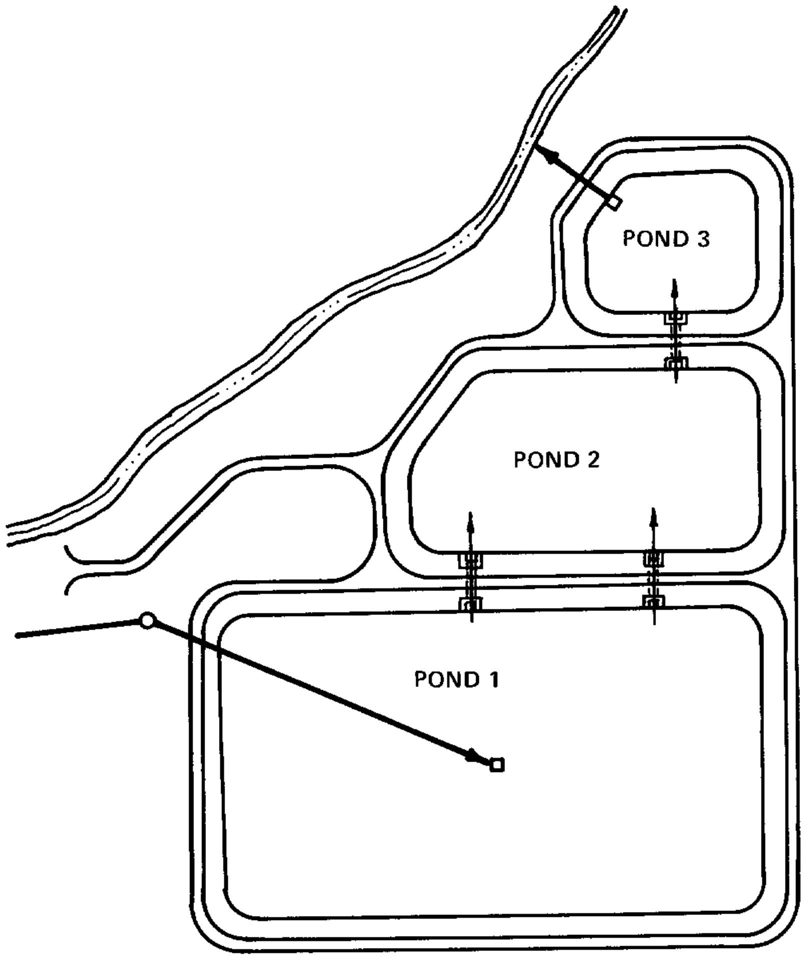

SOURCE: DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, 1985.

FIGURE IV–7

OXIDATION LAGOON SYSTEM

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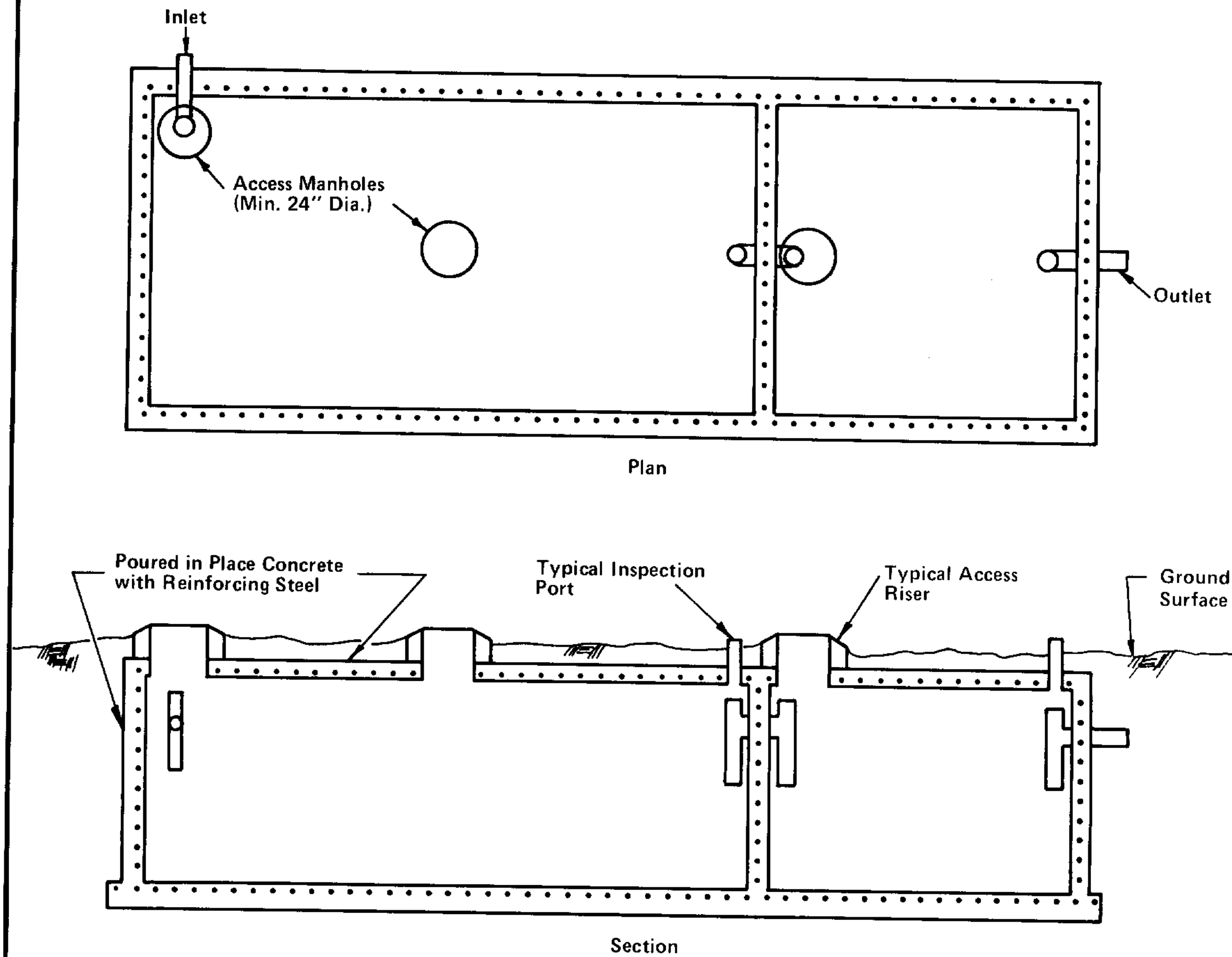

SOURCE: DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, 1985.

FIGURE IV-8

THE CLUSTER SEPTIC TANK

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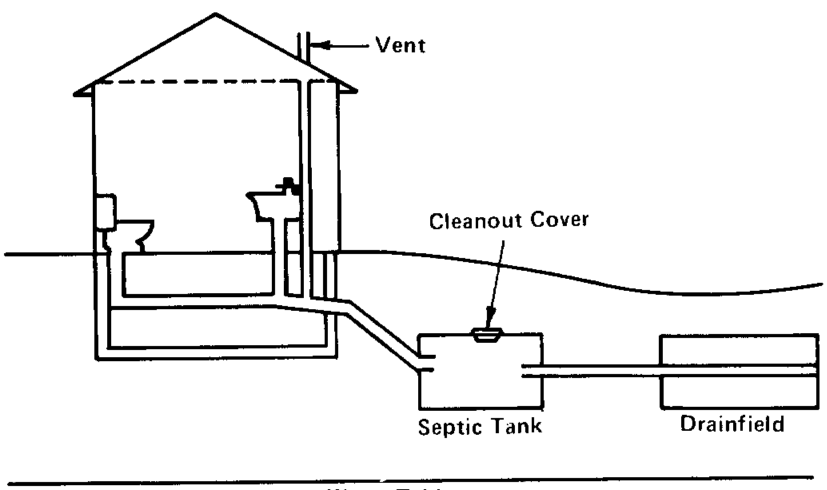
TYPICAL LAYOUT



SOURCE: DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, 1985.

FIGURE IV-9

CONVENTIONAL SUBSURFACE DISPOSAL

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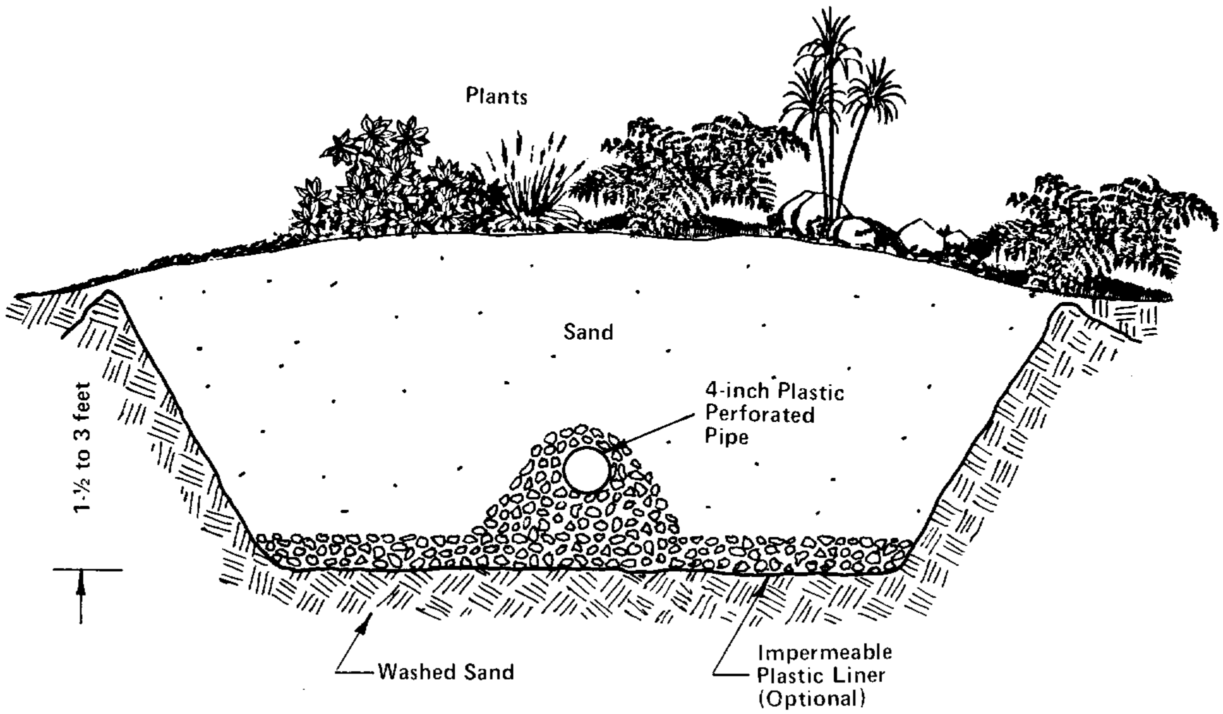
COLORADO DENVER

	Job No. 11-00150-001	Date NOVEMBER 1986



SOURCE: U.S. ENVIRONMENTAL PROTECTION AGENCY, 1980b

FIGURE IV–10

EVAPOTRANSPIRATION SYSTEM

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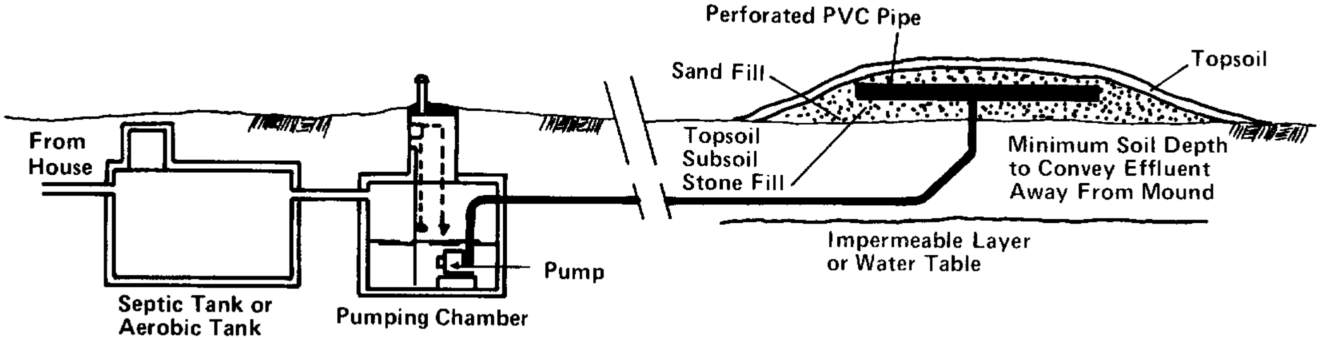
COLORADO DENVER

	Job No. 11-00150 001	Date NOVEMBER 1986

TYPICAL LAYOUT



SOURCE: DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, 1985.

FIGUGE IV-11

DOSING MOUND

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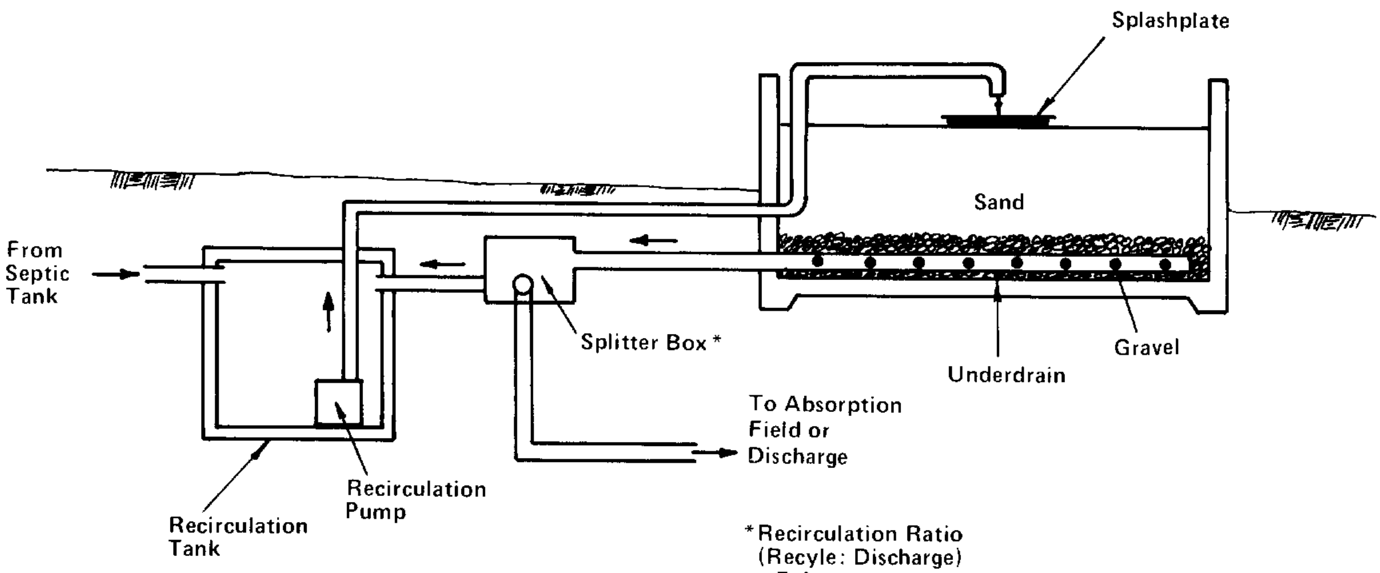
COLORADO DENVER

	Job No. 11-00150 001	Date NOVEMBER 1986

TYPICAL LAYOUT



*Recirculation Ratio
(Recyle: Discharge)
= 5:1

SOURCE: DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, 1985.

FIGURE IV-12

INTERMITTENT SAND FILTER

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Job No. 11-00150-001 | Date NOVEMBER 1986

This section of the report addresses the cost to provide water and wastewater service to each of the colonias considering future growth through the year 2010. Unit costs used to develop probable water supply system costs are based on data obtained from recent construction bids at various locations throughout the State adjusted to reflect price levels in the Lower Rio Grande Valley. These costs do not include costs of developing or obtaining additional raw water supply. Unit costs used in developing probable sewer system costs were developed from a variety of sources, including "Innovative and Alternative Technology Assessment Manual" (EPA, 1980a); "A Reference Handbook on Small-Scale Wastewater Technology" (HUD, 1985); "Rural Wastewater Disposal, Southern Cameron County, Texas (Draft Report)" (LRGVDC, 1986); "Operations and Maintenance Requirements for Small-Flow Treatment Systems" (Ward, 1986); "Onsite Wastewater Treatment" (ASAE, 1984); and "Alternative Sewers in the United States" (Kriessl, 1985).

As previously discussed in Section IV, a range of wastewater service alternatives were investigated in this study. The wastewater decision matrix presented in Figure IV-1 identifies 5 potential collection systems and 13 potential wastewater treatment options available to address each of five classifications of colonias defined by this study. This section of the report addresses the capital and monthly operation and maintenance costs for each individual component of the wastewater system. This section also presents a range of costs for the various alternative wastewater collection and treatment systems that may be applicable to the individual colonia. The actual implementation cost will vary depending on the characteristics unique to each colonia, the identification of which is beyond the scope of this reconnaissance-level study.

The tables on wastewater cost presented in this section of the report are summarized from Tables A-2 through A-7 in Appendix A. The tables in the Appendix address the cost for each colonia (or colonia group) individually.

In order to develop the probable costs associated with the various alternative solutions, a series of cost equations was developed which are applicable to each colonia, colonia class, or colonia grouping. Several generalized assumptions made in preparing the cost equations need to be recognized. Perhaps the most important of these assumptions is that future colonia development will occur at the same general location as existing colonia development in the region. Widely dispersed variations in the location of future colonia development patterns could have a significant effect on cost results presented herein.

On the other hand, the costing methodology used is quite flexible in its application and can be adapted to a wide variety of conditions and assumptions. Because equations are used to develop costs for each colonia or colonia grouping included in the study, the results can be used for both macro analysis of the region as a whole and also for micro analysis of individual colonias. The entire costing procedure is in the form of a series of computerized models, allowing easy testing of the sensitivity of various adjustments or alternative assumptions. Additional or corrected base data regarding specific colonias, colonia groupings, or plant locations can also easily be introduced.

WATER SYSTEM COSTS

In costing necessary water system improvements, three problem areas are addressed:

- Bringing water to colonias not currently served.
- Providing service to individual colonia residences which currently have no onsite service.
- Providing service to the new population projected to move into the colonias between now and 2010.

The costs of providing for each of the three categories of improvements are summarized as follows:

	Total Cost	Cost per Residence Served
Water to Colonias Not Now Served*	$ 171,600	$1,666
Water to Individual Residences Not Now Served*	59,600	350
Water to Serve Future Colonia Growth**	45,434,700	2,457
TOTAL	$45,665,900	

*Based on 1986 data.
**Based on 2010 data.

Colonias Not Now Served

The costs of bringing service to colonias not now served (or served from an unacceptable supply source) consists of the cost of extending transmission lines to the colonia boundary and extending a distribution system throughout the colonia. An examination of the five specific colonias identified by this study as lacking any water service indicates each has an existing water supply line within approximately 1,500 feet of the colonia site. Costs of extending distribution systems throughout the colonia are based on calculations of linear waterline requirements using an estimated water demand for 1987. These demands were calculated using the population density, number of housing units, and a per capita consumption of 100 gallons per day. The current population in these five colonias is estimated at 486 persons. No additional water plant expansion is anticipated to serve the additional demand under this category. Costs associated with individual residences' metering and connection to local suppliers' lines are based on average WSC costs in the area and include membership fees. Unit costs used in this part of the analysis are as follows:

Transmission Lines (12-inch)	$12 per foot
Distribution Lines (2-inch)	$4 per foot
Meter/Connection Charge	$200 per unit
Membership Fee	$150 per unit

The total resulting cost to provide water service to the five colonias is shown in Table V-1.

Discussions with local officials and residents in the area indicate that other colonias may be served by unsatisfactory water supply sources. While the scope of this reconnaissance study did not identify the specific colonias involved, a similar analysis could be applied to these cases.

Individual Residences Not Now Served

For those colonias found in this study that apparently have water piped to the colonia but not to all residential units in the colonia, the cost of bringing the water on to each occupied property has been calculated. As with those in the last category, these cost estimates include costs of meters, connection fees, and the average initial membership or buy-in fee for joining a WSC. Although many residences may not be connected to the water system within the colonia, they obtain their water from some source, many by sharing a tap with a neighbor. As a result, adding additional units to the system will be partially compensated by a reduction in water usage at the currently metered taps. For this reason, no additional water plant capacity is anticipated in approximating the cost to serve this category of the colonia population. The costs for the current residents of each colonia involved are summarized in Table V-2.

Water for Future Colonia Growth

The third category of water supply costs represents the costs associated with providing for colonia growth between now and 2010. These costs are shown by colonia or colonia group in Table V-3. Three categories of costs are considered.

Transmission Line Extension

In developing the probable future costs for extending or replacing transmission lines to accommodate colonia growth through 2010, those colonias located in close proximity to one another were treated as a single entity of grouped colonias. These colonia groups were identified and defined in the previous section in Table IV-3. Transmission line extensions or replacements were considered necessary only if the colonia or colonia group were to grow by at least 50 housing units. Transmission line costs are calculated on a per-housing-unit basis using the unit costs shown on the previous page and applying 100 housing units for each 12-inch line ($1.20 per foot, per housing unit). The costs of transmission line extensions are shown in Table V-3.

Water Plant Capacity

An estimated 16 million gallons per day of additional water treatment capacity will be required to serve the projected growth in demand in the colonias through the year 2010. It is anticipated that this expansion will occur within the WSCs or WCIDs because of the limitations on water rights within the municipalities. No attempt was made to locate additional plant facilities. Costs were allocated on the basis of $2.00 per gallon of water demand.

In-Colonia Distribution Line Extensions

In developing the probable future costs for extension of distribution lines within each colonia, distribution line extensions were considered necessary if the colonia or colonia group grows by at least 25 housing units. The unit costs shown on page V-4 were applied to line lengths computed from distribution requirement curve relating line requirements to housing units and density. Average water demand of 100 gallons per day per person have been used throughout. These costs are also shown in Table V-3.

Connection and New Service Costs

Costs required to provide service to the property of each new residential unit built in the colonias between now and 2010 is the third category of cost shown in Table V-3. These costs were derived by applying the unit costs shown on page V-4 to each new colonia unit.

WASTEWATER SYSTEM COSTS

Wastewater system costs were determined separately for each of the 5 collection system alternatives and 13 treatment alternatives described in the decision matrix. A combination of collection and treatment options were then combined to obtain a range of costs for various wastewater systems, as shown in Tables A-2 through A-7 of Appendix A.

Table V-4 presents a summary of the range of costs associated with providing wastewater service to the colonias in the three-county region for the years 1986 and 2010. This table is also presented graphically in Figure V-1. It is estimated that the probable capital cost of providing every colonia with complete wastewater services will range between about $93 million and $152 million. This range of cost is dependent on whether or not technical or regulatory conditions will require a more expensive system or permit implementation of one of the less costly alternatives to meet the same adequate level of service. The total monthly cost per housing unit in the region ranges from $20 to over $280, depending on the options chosen. These total monthly costs include both the estimated monthly O&M costs and the amortized capital costs based on a 20-year life at an 8 percent interest rate.

It should be noted that because the costs presented in the cost tables of this report were generated using computer modeling techniques, the numbers generated from the model may reflect a precision greater than can be reasonably forecasted. However, output from the model clearly indicates a realistic cost range.

The maximum costs in Tables V-4 and V-5 represent the most costly combination of wastewater collection and treatment alternatives considered for that specific colonia classification. Accordingly, the minimum costs represent the least costly combination of collection and treatment alternatives considered for each classification. As stated above, these maximum and minimum costs will be dictated by whether or not technical and regulatory conditions will permit implementation of lower or higher cost alternatives to meet the same adequate level of service.

It should be pointed out that Table V-4 indicates that the maximum monthly cost per residential unit for the cluster systems (Class 3) are higher than they are for other classes. The reason for this is that the Class 3 maximum cost actually reflects the costs for a conventional secondary wastewater treatment system. Even though such a system was not the option shown in the decision matrix for Class 3, the costs for this system were included to demonstrate that, at a certain population size and density, use of a conventional secondary treatment system becomes very expensive.

Table V-5 is a summation of Tables A-2 through A-7 in Appendix A. In this table, maximum and minimum wastewater collection and treatment capital costs are presented for each colonia or colonia grouping within each classification category. As in the case of Table V-4, the maximum costs reflect the case that technical and regulatory conditions will require implementing the more costly collection and treatment systems. Conversely, the minimum costs reflect a situation when favorable site conditions permit the use of less costly alternatives.

Cost for Collection Systems

The costs for each of the five collection systems considered for the Class 1, Class 2, and Class 3 colonias were computed and shown in Tables A-2 and A-3 of the appendix. The Class 4 and Class 5 colonias, consisting of individual onsite treatment systems, logically have no collection system costs associated with them.

The collection system unit costs, summarized in Table V-6, include the construction costs for sewer, lift stations, and appurtenances.

The length of the sewer line required for each colonia was estimated using the projected population, population density, and the curve shown in Figure V-1. The curve illustrates the relationship between population density and average length of sewer required per capita. The figure was developed for generic comparison purposes using a hypothetic community model and information contained in several reports published by LRDVGC.

Each of the five collection systems evaluated had unique structure components that were considered in developing system costs.

The small-diameter gravity system (SDG) was assumed to require an interceptor tank between it and the dwelling unit as a means of removing large solids that could clog the sewer pipe. The sedimentation tank can be envisioned as a small septic tank with a single chamber. Although not as expensive as a septic tank, the interceptor tank does have a capital cost associated with it, as well as operation and maintenance costs for cleaning.

The vacuum and pump-supported systems (grinder and STEP) have a vacuum valve assembly or pump cost associated with them. The STEP system, however, would also incur the cost of constructing a septic tank.

In many cases, it is possible for more than one dwelling unit to share the cost of a single valve or pumping unit. While the size and hence the cost of the multiplex unit is increased, the cost per dwelling unit is decreased. The collection system costs levied in Tables A-2 and A-3 of Appendix A take into consideration the cost saving resulting from the use of the multiplex units. The operation and maintenance costs for these systems reflect the increased dependence on mechanical systems. In the case of the STEP and SDG systems, the maintenance of the septic tank is also included. In both Tables A-2 and A-3 of the appendix, the monthly costs presented assume a 20-year life with an 8 percent annual interest rate and the capital costs include engineering, contingencies, legal, and administrative costs.

Cost for Wastewater Treatment

Each of the treatment alternatives for the four major classifications of colonias was derived independently. The cost for latrine systems (Class 5) was not addressed since the objective of this study is to improve on those current systems. The cost of treatment was equated closely to colonia population in all cases.

Those colonias identified as being serviced by expansion of existing regional facilities (Class 1) would require the cost of expansion of the existing treatment plants and trunk sewer. For cost estimating purposes, the trunk sewer expansion costs were calculated for a force main system to bring wastewater from these colonias to the existing treatment plant. The costs for regional systems presented in Tables A-3 and A-4 of Appendix A reflect the cost for expansion of the plant and the cost to transmit the sewage from each colonia identified.

The centralized treatment system (Class 2) was assumed to comprise either a conventional secondary treatment plant or construction of an oxidation pond. Cost of construction of a new secondary plant was based on population (hence plant capacity) and ranged from $2.50 to $7.50 per gallon, depending on size of facility.

The cost of the oxidation pond assumed a pond size based on an organic loading rate of 30 pounds of BOD_5 per acre per day. This equates to 176 persons per acre per day. Since the oxidation ponds require substantial areas of land, land costs of $2,000 per acre were included in formation of the capital costs.

The cost for the cluster system treatment systems (Class 3) include the cost for a large septic tank and construction of a land disposal system. Since the system will be shared by several units, the capital and O&M costs for the cluster system were approximated to be 80 percent of the cost for the individual septic systems (Class 4). Added to this cost would be the cost for acquisition of the drainage field, which was approximated at $2,000 per acre.

The onsite septic system (Class 4) cost is composed of the capital cost for the tank and its maintenance. Since the drain field would be located on the owner's property, no cost is associated with land acquisition. The management costs associated with these individual systems were included as part of the O&M costs.

TABLE V-1

COSTS OF PROVIDING WATER TO COLONIAS NOT CURRENTLY SERVED

MAP NO.	COLONIA NAME	1986 HSNG UNITS	1986 POP.	1986 COLONIA DENSITY (cap/ac)	TRANSMISSION LINE EXTENSION COST ($)	IN-COLONIA DISTRIBUTION LINES CAPITAL COST ($)	INDIVIDUAL RESIDENCE CONNECTION COST ($)	TOTAL COST ($)	UNIT COST ($)
172	Austin Stonebaker/CRJS Sub	10	45	2.3	18,000	7,294	3,500	28,794	2,879
283	Dude Hill #1	5	23	2.3	18,000	3,647	1,750	23,397	4,679
981	Havana(Community)/Havana Lomas	10	45	0.7	18,000	12,840	3,500	34,340	3,434
3050	Unknown	16	72	20.7	18,000	3,882	5,600	27,482	1,718
1284	Villa Pancho	62	279	14.6	18,000	17,850	21,700	57,550	928
	Total:	103	464		90,000	45,512	36,050	171,562	1,666

TABLE V-2

COSTS OF PROVIDING WATER TO INDIVIDUAL COLONIA RESIDENCES NOT CURRENTLY SERVED

MAP NO.	COLONIA NAME	1986 HSNG UNITS IN NEED OF WATER	1986 POPULATION IN NEED OF WATER	1986 COLONIA DENSITY (cap/ac.)	INDIVIDUAL RESIDENCE CONNECTION COST ($)
418	Barbosa-Lopez 1, 2, & 3	2	9	0.2	700
32	Ranchitos #2	2	10	0.5	753
416	Delta Court Sub	3	14	0.4	1,050
587	Southfork Est	3	14	0.7	1,050
493	Puesta Del Sol*	3	14	0.3	1,050
5020	Unknown	4	17	7.2	1,313
578	Villas Del Valle	6	28	0.6	2,188
774	Acevedo #4	9	39	2.6	3,063
742	Abram (Ojo de Agua)/ChapaJosep	10	46	0.6	3,605
580	Las Brisas Del Sur	13	58	1.6	4,480
3	Ramseyer Gardens	14	65	0.7	5,040
366	Noreste	15	68	2.3	5,250
3000	La Riena	40	180	11.7	14,000
121	San Carlos Acres	2	9	1.0	718
130	Delta West Sub	4	19	0.4	1,470
975	Cuevitas (Town)	4	19	0.3	1,470
706	Chihuahua	9	41	3.3	3,150
15	MonteMayor(SantaCruzGds#3)	23	101	10.1	7,875
7007	Unknown	4	18	2.3	1,400
	Total:	170	767		59,623

TABLE V-3

COST FOR PROVIDING WATER TO THE COLONIAS THROUGH THE YEAR 2010

	MAP NO.	COLONIA NAME	1986 HSNG UNITS	2010 HSNG UNITS	1986 POP.	2010 POP.	2010 DENSITY (cap/ac)	POP. IN NEED OF WATER BY 2010	HSNG UNITS IN NEED OF WATER BY 2010	TRANSMISSION LINE EXTENSION COST ($)	IN-COLONIA DISTRIBUTION LINES CAPITAL COST ($)	INDIVIDUAL RESIDENCE CONNECTION COST ($)	PLANT COST ($)	TOTAL COST ($)	UNIT COST ($)
Individual Colonias:	1	Seminory Est	1	2	5	10	1.0	6	1	0	0	432	2,223	2,655	2,150
	2	Hoehn Drive	25	56	113	251	6.3	139	31	0	6,758	10,806	55,575	73,139	2,369
	3	Ramseyer Gardens	18	40	81	181	1.8	100	22	0	0	7,781	40,014	47,795	2,150
	4	Tierra De Luz	8	18	36	80	4.5	44	10	0	0	3,458	17,784	21,242	2,150
	7	River Bend - (Jinks)	8	18	36	80	5.4	44	10	0	0	3,458	17,784	21,242	2,150
	10	Adan Lee	3	7	14	30	39.0	17	4	0	0	1,297	6,669	7,966	2,150
	12	South Seminary	2	4	9	20	2.0	11	2	0	0	865	4,446	5,311	2,150
	14	Americana Sub	43	96	194	432	14.4	239	53	9,559	7,704	18,587	95,589	131,439	2,475
	26	Garza, Lazaro	15	34	68	151	15.1	83	19	0	0	6,484	33,345	39,829	2,150
	96	Meadow Lands	16	36	72	161	4.0	89	20	0	0	6,916	35,568	42,484	2,150
	97	Evergreen	21	47	95	211	39.2	117	26	0	2,320	9,077	46,683	58,080	2,239
	128	Harmel*	6	13	27	60	12.7	33	7	0	0	2,594	13,338	15,932	2,150
	136	Lopez-Gutierrez	6	13	27	60	6.0	33	7	0	0	2,594	13,338	15,932	2,150
	138	Tropicana Sub	7	16	32	70	7.0	39	9	0	0	3,026	15,561	18,587	2,150
	146	Sunnybrook Sub	11	25	50	111	3.7	61	14	0	0	4,755	24,453	29,208	2,150
	152	South Port Sub	12	27	54	121	6.4	67	15	0	0	5,187	26,676	31,863	2,150
	154	Tierra Del Valle 1 & 2	20	45	90	201	5.7	111	25	0	0	8,645	44,460	53,105	2,150
	155	Muniz*	28	63	126	282	6.1	156	35	0	7,674	12,103	62,244	82,021	2,372
	160	Tower Sub	20	45	90	201	36.1	111	25	0	0	8,645	44,460	53,105	2,150
	172	Austin Stonebaker/CRJS Sub	10	22	45	101	5.0	56	12	0	0	4,323	22,230	26,553	2,150
	176	Sumero, Daniel	8	18	36	80	21.5	44	10	0	0	3,458	17,784	21,242	2,150
	177	Longoria Sub with Pride	15	34	68	151	7.5	83	19	0	0	6,484	33,345	39,829	2,150
	178	Krista Estates	5	11	23	50	4.1	28	6	0	0	2,161	11,115	13,276	2,150
	179	Bougainvillea	1	2	5	10	0.5	6	1	0	0	432	2,223	2,655	2,150
	180	La Homa Ranch(ComptonGrove)	8	18	36	80	2.7	44	10	0	0	3,458	17,784	21,242	2,150
	181	Diamond #2	7	16	32	70	7.0	39	9	0	0	3,026	15,561	18,587	2,150
	185	Alta Vista Sub	16	36	72	161	3.9	89	20	0	0	6,916	35,568	42,484	2,150
	186	Casa De Los Vecinos	32	72	144	322	13.4	178	40	0	5,943	13,832	71,136	90,911	2,300
	187	Valley Rancheros	8	18	36	80	4.5	44	10	0	0	3,458	17,784	21,242	2,150
	189	Palmeras	14	31	63	141	14.1	78	17	0	0	6,052	31,122	37,174	2,150
	199	Nuevo Altun	155	346	698	1559	15.6	861	191	34,457	26,713	66,999	344,565	472,733	2,470
	207	Twin Acres	9	20	41	91	5.1	50	11	0	0	3,890	20,007	23,897	2,150
	215	Lopez Bibiano	3	7	14	30	1.0	17	4	0	0	1,297	6,669	7,966	2,150
	217	Acosta	10	22	45	101	3.1	56	12	0	0	4,323	22,230	26,553	2,150
	218	Mitchell, Albert	4	9	18	40	1.7	22	5	0	0	1,729	8,892	10,621	2,150
	219	Acosta 107	8	18	36	80	7.0	44	10	0	0	3,458	17,784	21,242	2,150
	250	Stables, The*	6	13	27	60	6.0	33	7	0	0	2,594	13,338	15,932	2,150
	253	Black V.A.	5	11	23	50	2.4	28	6	0	0	2,161	11,115	13,276	2,150
	260	Matt	10	22	45	101	9.5	56	12	0	0	4,323	22,230	26,553	2,150
	271	Friendly Acres	25	56	113	251	8.7	139	31	0	5,765	10,806	55,575	72,146	2,337

TABLE V-3 (Con't.)
COST FOR PROVIDING WATER TO THE COLONIAS THROUGH THE YEAR 2010

MAP NO.	COLONIA NAME	1986 HSNG UNITS	2010 HSNG UNITS	1986 POP.	2010 POP.	2010 DENSITY (cap/ac)	POP. IN NEED OF WATER BY 2010	HSNG UNITS IN NEED OF WATER BY 2010	TRANSMISSION LINE EXTENSION COST ($)	IN-COLONIA DISTRIBUTION LINES CAPITAL COST ($)	INDIVIDUAL RESIDENCE CONNECTION COST ($)	PLANT COST ($)	TOTAL COST ($)	UNIT COST ($)
272	Good Valley	8	18	36	80	6.0	44	10	0	0	3,458	17,784	21,242	2,150
273	Bernal	10	22	45	101	6.5	56	12	0	0	4,323	22,230	26,553	2,150
304	Amberland Sub	4	9	18	40	1.3	22	5	0	0	1,729	8,892	10,621	2,150
306	Guardian Angel Est	6	13	27	60	2.2	33	7	0	0	2,594	13,338	15,932	2,150
312	TWA	6	13	27	60	6.0	33	7	0	0	2,594	13,338	15,932	2,150
325	Citrus City	15	34	68	151	5.0	83	19	0	0	6,484	33,345	39,829	2,150
326	Western Estate	11	25	50	111	11.1	61	14	0	0	4,755	24,453	29,208	2,150
354	Los Tinocos	4	9	18	40	3.4	22	5	0	0	1,729	8,892	10,621	2,150
358	Minnesota Rd	7	16	32	70	4.7	38	9	0	0	3,150	15,200	18,350	2,039
359	Leal, Ramiro	8	18	36	80	10.0	44	10	0	0	3,500	17,600	21,100	2,110
361	Roosevselt Rd Sub(Chapa#3)	52	116	234	523	26.1	289	64	11,560	6,933	22,477	115,596	156,565	2,438
369	Bar VII Sub(DelValle)/Bobbs#2	49	110	221	493	21.7	272	61	10,893	7,161	21,180	108,927	148,161	2,448
380	Clark's Sub	30	67	135	302	9.8	167	37	0	6,515	12,968	66,690	86,173	2,326
436	El Gato	8	18	36	80	7.0	44	10	0	0	3,458	17,784	21,242	2,150
459	Ramosville	1	2	5	10	17.6	6	1	0	0	432	2,223	2,655	2,150
477	Tropical Farms Sub	15	34	68	151	6.2	83	19	0	0	6,484	33,345	39,829	2,150
490	Country Village Sub 1 & 2	15	34	68	151	3.6	83	19	0	0	6,484	33,345	39,829	2,150
492	Puerta Del Sol Sub	6	13	27	60	1.7	33	7	0	0	2,594	13,338	15,932	2,150
494	Tijerina Est*	6	13	27	60	3.6	33	7	0	0	2,594	13,338	15,932	2,150
498	Campacuas Sub	6	13	27	60	4.4	33	7	0	0	2,594	13,338	15,932	2,150
499	La Mesa	44	98	198	443	5.8	245	54	9,781	12,421	19,019	97,812	139,034	2,559
500	Harmony Hill and others	25	56	113	251	6.5	139	31	0	6,641	10,806	55,575	73,022	2,365
517	Heidelberg	132	295	594	1328	19.6	734	163	29,344	20,313	57,057	293,436	400,149	2,455
518	Old Rebel Field Sub	20	45	90	201	4.5	111	25	0	0	8,645	44,460	53,105	2,150
560	La Coma Heights	2	4	9	20	0.0	11	2	0	0	865	4,446	5,311	2,150
561	Hargill, City of	250	559	1125	2514	39.2	1389	309	55,575	27,268	108,063	555,750	746,655	2,418
587	Southfork Est	30	67	135	302	15.1	167	37	0	5,255	12,968	66,690	84,913	2,292
614	El Castillejo	16	36	72	161	2.1	89	20	0	0	6,916	35,568	42,484	2,150
662	Regency Acres	85	190	383	855	42.7	472	105	18,896	8,880	36,741	188,955	253,471	2,415
667	Cole	6	13	27	60	3.0	33	7	0	0	2,594	13,338	15,932	2,150
706	Chihuahua	30	67	135	302	24.4	167	37	0	4,138	12,968	66,690	83,796	2,262
709	Catalina Estates	5	11	23	50	12.6	28	6	0	0	2,161	11,115	13,276	2,150
711	Country Grove	20	45	90	201	29.8	111	25	0	0	8,645	44,460	53,105	2,150
725	South Minnesota Rd 1,2,3	40	89	180	402	32.6	222	49	0	4,782	17,290	88,920	110,992	2,247
742	Abram (Ojo de Agua)/ChapaJosep	206	460	927	2072	25.9	1145	254	45,794	27,596	69,044	457,938	620,371	2,438
772	Colonia Lucero Del Norte	5	11	23	50	4.8	28	6	0	0	2,161	11,115	13,276	2,150
868	Lorenzana	15	34	68	151	3.8	83	19	0	0	6,484	33,345	39,829	2,150
888	Madero/Wheel City	160	358	720	1609	11.5	889	198	35,568	32,076	69,160	355,680	492,484	2,492
906	Granjeno (Loop Area)	100	224	450	1006	16.1	556	124	22,230	21,421	43,225	222,300	309,176	2,503
911	Redgate	11	25	50	111	40.3	51	14	0	0	4,755	24,453	29,208	2,150
915	Faysville, Town of	200	447	900	2012	20.1	1112	247	44,460	30,372	86,450	444,600	605,882	2,453

TABLE V-3 (Con't.)
COST FOR PROVIDING WATER TO THE COLONIAS THROUGH THE YEAR 2010

MAP NO.	COLONIA NAME	1986 HSNG UNITS	2010 HSNG UNITS	1986 POP.	2010 POP.	2010 DENSITY (cap/ac)	POP. IN NEED OF WATER BY 2010	HSNG UNITS IN NEED OF WATER BY 2010	TRANSMISSION LINE EXTENSION COST ($)	IN-COLONIA DISTRIBUTION LINES CAPITAL COST ($)	INDIVIDUAL RESIDENCE CONNECTION COST ($)	PLANT COST ($)	TOTAL COST ($)	UNIT COST ($)
928	Colonia Capitallo	30	67	135	302	34.7	167	37	0	3,477	12,968	66,690	83,134	2,244
930	Relampago	30	67	135	302	19.5	167	37	0	4,623	12,968	66,690	84,281	2,275
933	0	341	762	1535	857	26.3	473.8	105.3	18,951	11,335	36,849	189,511	256,646	2,438
936	Los Pampas	3	7	14	30	ERR	17	4	0	0	1,297	6,669	7,966	2,150
937	Los Pampas #2	3	7	14	30	18.9	17	4	0	0	1,297	6,669	7,966	2,150
940	El Monte*	13	29	59	131	7.8	72	16	0	0	5,619	28,899	34,518	2,150
941	Lookingbill, George*	12	27	54	121	8.3	67	15	0	0	5,187	26,676	31,863	2,150
952	La Palma	19	42	86	191	7.7	106	23	0	0	8,213	42,237	50,450	2,150
959	Delta Lake Colonia	9	20	41	91	19.4	50	11	0	0	3,890	20,007	23,897	2,150
961	Linn Siding	8	18	36	80	26.9	44	10	0	0	3,458	17,784	21,242	2,150
965	Valle Vista	20	45	90	201	48.7	111	25	0	0	8,645	44,460	53,105	2,150
975	Cuevitas (Town)	42	94	189	422	6.0	233	52	9,337	11,593	18,155	93,366	132,450	2,554
979	Unknown	2	4	9	20	37.4	11	2	0	0	865	4,446	5,311	2,150
980	Los Ebanos Community	225	503	1013	2263	18.1	1250	278	50,018	36,003	97,256	500,175	683,452	2,460
985	El Flaco	12	27	54	121	2.0	67	15	0	0	5,187	26,676	31,863	2,150
991	Bogert	3	7	14	30	39.0	17	4	0	0	1,297	6,669	7,966	2,150
993	Orange Hill	4	9	18	40	13.4	22	5	0	0	1,729	8,892	10,621	2,150
1042	Orason Acres/ChulaVista/Shoema	30	56	135	251	27.1	116	26	0	2,722	8,988	46,224	57,934	2,256
1049	La Tina Ranch	50	93	225	418	27.2	193	43	0	4,534	14,980	77,040	96,554	2,256
1074	Lago Sub	81	150	365	677	27.2	312	69	12,480	7,342	24,268	124,805	168,895	2,436
1108	Los Indios	80	148	360	668	27.2	308	68	12,326	7,251	23,968	123,264	166,810	2,436
1109	Carricitos-Landrum	45	84	203	376	27.2	173	39	0	4,081	13,492	69,336	86,899	2,256
1154	Las Yescas	40	74	180	334	19.7	154	34	0	4,259	11,984	61,632	77,875	2,274
1158	Lozano	120	223	540	1002	27.8	462	103	18,490	10,749	35,952	184,896	250,087	2,435
1161	Glenwood Acres Sub	25	46	113	209	27.1	96	21	0	0	7,490	38,520	46,010	2,150
1163	Santa Maria	239	444	1076	1996	78.3	921	205	36,825	12,813	71,604	368,251	489,494	2,393
1164	Bluetown	91	169	410	760	78.2	351	78	14,021	4,883	27,264	140,213	186,381	2,393
1166	El Venadito	46	85	207	384	27.2	177	39	0	4,172	13,782	70,877	88,830	2,256
1226	San Pedro/Carmen/Barrera Gd.	80	148	360	668	27.2	308	68	12,326	7,251	23,968	123,264	166,810	2,436
1242	Alabama/Arkansas (La Coma)	50	93	225	418	14.5	193	43	0	6,192	14,980	77,040	98,212	2,295
1263	Barrio Sub	40	74	180	334	77.9	154	34	0	2,150	11,984	61,632	75,766	2,213
1282	Saldivar	25	46	113	209	27.1	96	21	0	0	7,490	38,520	46,010	2,150
1299	Palmer	30	56	135	251	27.1	116	26	0	2,722	8,938	46,224	57,934	2,256
1302	Laguna Escondido Heights	11	20	50	92	16.2	42	9	0	0	3,296	16,949	20,244	2,150
1304	Iglesia Antigua	32	59	144	267	27.1	123	27	0	2,903	9,587	49,306	61,796	2,256
1306	T 2 Unknown Sub along rd	69	128	311	576	32.0	266	59	10,632	5,767	20,672	106,315	143,386	2,428
1310	X Unknown Sub	12	22	54	100	20.0	46	10	0	0	3,595	18,490	22,085	2,150
1313	W Cluster of houses along rd.	22	41	99	184	15.3	85	19	0	0	6,591	33,898	40,489	2,150
1341	Del Mar Heights	47	87	212	393	1.6	181	40	0	17,610	14,081	72,418	104,109	2,588
2001	Santa Monica	20	27	90	119	32.4	29	7	0	0	2,289	11,772	14,061	2,150
2007	LaSara	137	182	617	818	32.6	202	45	0	4,333	15,680	80,638	100,651	2,247

TABLE V-3 (Con't.)
COST FOR PROVIDING WATER TO THE COLONIAS THROUGH THE YEAR 2010

MAP NO.	COLONIA NAME	1986 HSNG UNITS	2010 HSNG UNITS	1986 POP.	2010 POP.	2010 DENSITY (cap/ac)	POP. IN NEED OF WATER BY 2010	HSNG UNITS IN NEED OF WATER BY 2010	TRANSMISSION LINE EXTENSION COST ($)	IN-COLONIA DISTRIBUTION LINES CAPITAL COST ($)	INDIVIDUAL RESIDENCE CONNECTION COST ($)	PLANT COST ($)	TOTAL COST ($)	UNIT COST ($)
2019	Willamar	4	5	18	24	31.2	6	1	0	0	458	2,354	2,812	2,150
2034	Sebastian	425	564	1913	2538	20.4	625	139	25,016	16,965	48,641	250,155	340,777	2,452
3000	La Riena	50	112	225	503	32.6	278	62	11,115	5,975	21,613	111,150	149,853	2,427
3005	Unknown	6	13	27	60	4.9	33	7	0	0	2,594	13,339	15,932	2,150
3006	Unknown	25	56	113	251	19.5	139	31	0	3,854	10,806	55,575	70,235	2,275
3007	Unknown	20	45	90	201	13.0	111	25	0	0	8,645	44,460	53,105	2,150
3061	Unknown	20	45	90	201	21.7	111	25	0	0	8,645	44,460	53,105	2,150
5001	Unknown	3	7	14	30	46.8	17	4	0	0	1,297	6,669	7,966	2,150
6000	Unknown	4	9	18	40	39.5	22	5	0	0	1,729	8,892	10,621	2,150
6016	Palm Sub	4	9	18	40	4.8	22	5	0	0	1,729	8,892	10,621	2,150
6018	Monger Line	9	20	41	91	30.2	50	11	0	0	3,890	20,007	23,897	2,150
6019	Dimas	5	11	23	50	12.6	28	6	0	0	2,161	11,115	13,276	2,150
6022	Salas	6	13	27	60	12.7	33	7	0	0	2,594	13,338	15,932	2,150
6025	Edinburg East Sub	5	11	23	50	5.0	28	6	0	0	2,161	11,115	13,276	2,150
6027	Isaacs	3	7	14	30	0.9	17	4	0	0	1,297	6,669	7,966	2,150
6028	Big John	10	22	45	101	6.7	56	12	0	0	4,323	22,230	26,553	2,150
7000	Unknown	7	13	32	58	26.8	27	6	0	0	2,097	10,786	12,883	2,150
7001	Unknown	35	65	158	292	27.1	135	30	0	3,175	10,486	53,928	67,589	2,256
7002	Unknown	20	37	90	167	27.1	77	17	0	0	5,992	30,816	36,808	2,150
7007	Unknown	26	48	117	217	27.1	100	22	0	0	7,790	40,061	47,850	2,150
796	Polanski Sub	30	67	135	302	30.2	167	37	0	3,725	12,968	66,690	83,383	2,251
310	Klement, W.J.	7	16	32	70	26.9	39	9	0	0	3,026	15,561	18,587	2,150
11	Lull	222	496	999	2233	27.9	1234	274	49,351	28,655	95,960	493,506	667,472	2,435
43	N. McColl	7	16	32	70	14.9	39	9	0	0	3,026	15,561	18,587	2,150
61	Ranchette Est	7	16	32	70	7.0	39	9	0	0	3,026	15,561	18,587	2,150
75	Colonia Rodriquez #1 & #2	30	67	135	302	129.7	167	37	0	1,806	12,968	66,690	81,464	2,199
158	Yokum Hall	27	60	122	272	21.7	150	33	0	3,950	11,671	60,021	75,641	2,268
362	Laguna Park	7	16	32	70	4.6	39	9	0	0	3,026	15,561	18,587	2,150
368	Tierra Bone	20	45	90	201	43.3	111	25	0	0	8,645	44,460	53,105	2,150
386	Carroll Rd Acres	8	18	36	80	4.9	44	10	0	0	3,458	17,784	21,242	2,150
578	Villas Del Valle	125	279	563	1257	27.2	695	154	27,788	16,341	54,031	277,875	376,035	2,436
604	Villa Del Carmen	6	13	27	60	5.0	33	7	0	0	2,594	13,338	15,932	2,150
681	El Sol	25	56	113	251	8.2	139	31	0	5,942	10,806	55,575	72,324	2,342
444	La Donna**	30	67	135	302	4.9	167	37	0	9,190	12,968	66,690	88,848	2,398
462	Mile 7 Sub	20	45	90	201	26.0	111	25	0	0	8,645	44,460	53,105	2,150
840	Tierra Del Sol	6	13	27	60	27.5	33	7	0	0	2,594	13,338	15,932	2,150
419	Sun Country Est	85	190	383	855	27.2	472	105	18,896	11,114	36,741	188,955	255,706	2,436
422	Expressway Heights	120	268	540	1207	19.6	667	148	26,676	18,467	51,870	266,760	363,773	2,455
532	Villa Verde #1, #3	117	261	527	1177	22.0	650	144	26,009	17,008	50,573	260,091	353,681	2,448
996	Anaqua	6	13	27	60	12.9	33	7	0	0	2,594	13,338	15,932	2,150
549	Eastland Park	10	22	45	101	2.5	56	12	0	0	4,323	22,230	26,553	2,150

TABLE V-3 (Con't.)
COST FOR PROVIDING WATER TO THE COLONIAS THROUGH THE YEAR 2010

	MAP NO.	COLONIA NAME	1986 HSNG UNITS	2010 HSNG UNITS	1986 POP.	2010 POP.	2010 DENSITY (cap/ac)	POP. IN NEED OF WATER BY 2010	HSNG UNITS IN NEED OF WATER BY 2010	TRANSMISSION LINE EXTENSION COST ($)	IN-COLONIA DISTRIBUTION LINES CAPITAL COST ($)	INDIVIDUAL RESIDENCE CONNECTION COST ($)	PLANT COST ($)	TOTAL COST ($)	UNIT COST ($)
	552	Mile 15 North Sub	10	22	45	101	18.0	56	12	0	0	4,323	22,230	26,553	2,150
	1300	Losana	30	56	135	251	77.7	116	26	0	1,615	8,988	46,224	56,827	2,213
	1301	26	60	111	270	501	27.2	231	51	9,245	5,440	17,976	92,448	125,108	2,436
	1073	Rice Tracts	26	48	117	217	3.3	100	22	0	0	7,790	40,061	47,850	2,150
	1151	Leal Sub	25	46	113	209	13.9	96	21	0	0	7,490	38,520	46,010	2,150
	1035	Los Cuates	18	33	81	150	27.1	69	15	0	0	5,393	27,734	33,127	2,150
	1099	Olmito	274	509	1233	2288	27.2	1055	235	42,218	24,823	82,090	422,179	571,310	2,436
	1230	Villa Nueva	83	154	374	693	27.2	320	71	12,789	7,523	24,867	127,886	173,065	2,436
	1244	Cameron Park 1	500	928	2250	4176	49.0	1926	428	77,040	33,835	149,800	770,400	1,031,075	2,409
	1255	Stuart Sub	200	371	900	1670	49.0	770	171	30,816	13,537	59,920	308,160	412,433	2,409
	1266	King Sub	130	241	585	1086	78.2	501	111	20,030	6,973	38,948	200,304	266,255	2,393
	1284	Villa Pancho	62	115	279	518	27.2	239	53	9,553	5,621	18,575	95,530	129,279	2,436
	1336	Unnamed D	25	46	113	209	77.6	96	21	0	0	7,490	38,520	46,010	2,150
	1339	Saldivar	30	56	135	251	77.7	116	26	0	1,615	8,988	46,224	56,827	2,213
	7004	Unknown	12	22	54	100	27.0	46	10	0	0	3,595	18,490	22,085	2,150
Colonia Groups:	101		90	201	405	905	8.2	500	111	20,007	21,298	38,903	200,070	280,278	2,522
	102		16	36	72	161	6.7	89	20	0	0	6,916	35,568	42,484	2,150
	103		90	201	405	905	6.5	500	111	20,007	23,921	38,903	200,070	282,900	2,545
	104		312	697	1404	3138	12.9	1734	385	69,358	59,038	134,862	693,576	956,833	2,483
	105		99	221	446	996	10.9	550	122	22,008	20,339	42,793	220,077	305,216	2,496
	106		36	80	162	362	6.8	200	44	0	9,344	15,561	80,028	104,933	2,360
	107		142	317	639	1428	5.7	789	175	31,567	40,276	61,380	315,666	448,889	2,560
	108		65	145	293	654	5.3	361	80	14,449	19,186	28,096	144,495	206,226	2,569
	109		177	396	797	1790	7.7	984	219	39,347	43,272	76,508	393,471	552,599	2,528
	110		500	1118	2250	5029	7.7	2779	618	111,150	122,188	216,125	1,111,500	1,560,963	2,528
	111		53	118	239	533	7.2	295	65	11,782	13,399	22,909	117,819	165,909	2,535
	112		91	203	410	915	9.9	506	112	20,229	19,599	39,335	202,293	281,456	2,504
	113		162	362	729	1629	5.3	900	200	36,013	47,890	70,025	360,126	514,053	2,569
	114		26	58	117	261	6.5	144	32	0	6,897	11,239	57,798	75,934	2,365
	115		86	192	387	865	6.3	478	106	19,118	23,296	37,174	191,178	270,765	2,549
	116		29	65	131	292	5.3	161	36	0	8,535	12,535	64,467	85,537	2,388
	117		67	150	302	674	7.7	372	83	14,894	16,339	28,961	148,941	209,135	2,527
	118		253	565	1139	2545	6.4	1406	312	56,242	67,692	109,359	562,419	795,712	2,547
	120		115	257	518	1157	12.4	639	142	25,565	22,171	49,709	255,645	353,089	2,486
	122		74	165	333	744	5.0	411	91	16,450	22,435	31,987	164,502	235,374	2,575
	123		41	92	185	412	5.8	228	51	9,114	11,534	17,722	91,143	129,514	2,558
	124		47	105	212	473	7.0	261	58	10,448	12,094	20,316	104,481	147,338	2,538
	125		36	80	162	362	8.2	200	44	0	8,519	15,561	80,028	104,108	2,342
	126		42	94	189	422	7.3	233	52	9,337	10,560	18,155	93,366	131,417	2,534
	127		221	494	995	2223	7.0	1228	273	49,128	56,712	95,527	491,283	692,650	2,538
	128		79	177	356	795	12.8	439	98	17,562	15,005	34,148	175,617	242,332	2,484

TABLE V-3 (Con't.)
COST FOR PROVIDING WATER TO THE COLONIAS THROUGH THE YEAR 2010

MAP NO.	COLONIA NAME	1986 HSNG UNITS	2010 HSNG UNITS	1986 POP.	2010 POP.	2010 DENSITY (cap/ac)	POP. IN NEED OF WATER BY 2010	HSNG UNITS IN NEED OF WATER BY 2010	TRANSMISSION LINE EXTENSION COST ($)	IN-COLONIA DISTRIBUTION LINES CAPITAL COST ($)	INDIVIDUAL RESIDENCE CONNECTION COST ($)	PLANT COST ($)	TOTAL COST ($)	UNIT COST ($)
129		187	418	842	1881	9.2	1039	231	41,570	41,927	80,831	415,701	580,029	2,512
130		216	483	972	2172	5.9	1200	267	48,017	60,276	93,366	480,168	681,826	2,556
132		136	304	612	1368	5.8	756	168	30,233	38,218	58,786	302,328	429,565	2,558
133		180	402	810	1810	11.7	1000	222	40,014	35,800	77,805	400,140	553,759	2,491
135		108	241	486	1086	5.8	600	133	24,008	30,300	46,683	240,084	341,075	2,557
136		90	201	405	905	9.4	500	111	20,007	19,907	38,903	200,070	278,886	2,509
137		35	78	158	352	8.6	195	43	0	8,110	15,129	77,805	101,044	2,338
138		361	807	1625	3631	10.4	2006	446	80,250	76,044	156,042	802,503	1,114,840	2,501
139		393	878	1769	3953	14.9	2184	485	87,364	69,231	169,874	873,639	1,200,108	2,473
140		105	235	473	1056	6.5	584	130	23,342	27,979	45,386	233,415	330,121	2,546
141		83	186	374	835	7.1	461	103	18,451	21,172	35,877	184,509	260,009	2,537
143		24	54	108	241	4.7	133	30	0	7,474	10,374	53,352	71,200	2,402
201		445	995	2003	4476	13.4	2473	550	98,924	82,795	192,351	989,235	1,363,305	2,481
202		50	112	225	503	5.4	278	62	11,115	14,574	21,613	111,150	158,451	2,566
203		70	156	315	704	8.7	389	86	15,561	16,121	30,258	155,610	217,550	2,516
204		255	570	1148	2565	11.4	1417	315	56,687	51,334	110,224	566,865	785,110	2,493
205		170	380	765	1710	11.2	945	210	37,791	34,449	73,483	377,910	523,632	2,494
207		175	391	788	1760	14.9	973	216	38,903	30,828	75,644	389,025	534,399	2,473
208		75	168	338	754	6.9	417	93	16,673	19,429	32,419	166,725	235,246	2,540
209		216	483	972	2172	8.8	1200	267	48,017	49,355	93,366	480,168	670,906	2,515
210		72	161	324	724	5.7	400	89	16,006	20,361	31,122	160,056	227,545	2,559
211		63	141	284	634	7.1	350	78	14,005	16,020	27,232	140,049	197,305	2,536
212		401	896	1805	4033	5.0	2229	495	89,142	121,019	173,332	891,423	1,274,917	2,574
213		23	51	104	231	5.8	128	28	0	6,484	9,942	51,129	67,555	2,378
214		79	177	356	795	5.3	439	98	17,562	23,186	34,148	175,617	250,513	2,568
215		149	333	671	1499	4.8	828	184	33,123	46,280	64,405	331,227	475,035	2,582
216		102	228	459	1026	6.5	567	126	22,675	27,235	44,089	226,746	320,745	2,546
217		35	78	158	352	4.9	195	43	0	10,725	15,129	77,805	103,659	2,398
218		44	98	198	443	5.5	245	54	9,781	12,681	19,019	97,812	139,293	2,563
221		26	58	117	261	10.1	144	32	0	5,570	11,239	57,798	74,606	2,323
222		285	637	1283	2866	5.3	1584	352	63,355	83,992	123,191	633,555	904,093	2,569
223		26	58	117	261	4.8	144	32	0	8,078	11,239	57,798	77,115	2,402
227		26	58	117	261	6.2	144	32	0	7,066	11,239	57,798	76,103	2,370
301		12	93	54	418	5.8	364	81	14,544	18,418	28,280	145,440	206,682	2,558
302		10	724	45	3257	11.2	3212	714	128,491	117,213	249,844	1,284,912	1,780,460	2,494
303		100	221	450	994	6.9	544	121	21,756	25,358	42,302	217,555	306,971	2,540
401		12	282	54	1270	7.8	1216	270	48,620	53,191	94,539	486,202	682,551	2,527
403		10	56	45	251	4.8	206	46	0	11,416	15,988	82,224	109,628	2,400
404		15	291	68	1311	5.8	1244	276	49,751	63,129	96,737	497,506	707,122	2,558
405		25	111	113	501	7.5	389	86	15,545	17,351	30,226	155,448	218,570	2,531
	Total:	15421	34229	69395	151457		83213	18492	2,815,114	2,862,197	6,472,363	33,285,040	45,434,714	2,457

TABLE V-4 - SUMMARY OF THE COSTS ASSOCIATED WITH PROVIDING THE COLONIAS WITH WASTEWATER SERVICE

YEAR 1986

County/ Treatment Class	Colonia Population	Colonia Dwelling Units	Total Capital Costs		Amortized Monthly Capital Costs per Unit*		Average Total Monthly Cost per Unit**	
			Maximum ($000)	Minimum ($000)	Maximum ($)	Minimum ($)	Maximum ($)	Minimum ($)
Hidalgo County								
Class 1	22,212	4,936	30,322	18,946	52	33	73	40
Class 2	13,451	2,989	15,752	10,424	45	30	66	40
Class 3	10,103	2,245	18,142	8,719	69	33	114	42
Class 4	6,039	1,342	7,894	2,684	50	17	60	20
Total Hidalgo County	51,805	11,512	72,110	40,773	53	30	78	38
Cameron County								
Class 1	5,963	1,325	9,339	5,313	60	34	81	43
Class 2	8,469	1,882	12,688	5,035	57	23	82	41
Class 3	2,349	522	5,074	2,313	83	38	121	48
Class 4	257	57	335	114	50	17	60	20
Total Cameron County	17,038	3,786	27,436	12,775	62	29	87	42
Willacy County								
Class 1	0	0	0	0	0	0	0	0
Class 2	2,529	562	2,826	2,089	43	32	71	40
Class 3	108	24	217	102	77	36	140	42
Class 4	0	0	0	0	0	0	0	0
Total Willacy County	2,637	586	3,043	2,191	44	32	74	40
Region								
Class 1	28,175	6,261	39,661	24,259	54	33	75	41
Class 2	24,449	5,433	31,266	17,548	49	27	72	40
Class 3	12,560	2,791	23,433	11,134	71	34	116	43
Class 4	6,296	1,399	8,229	2,798	50	17	60	20
Total Region	71,480	15,884	102,589	55,739	55	30	80	39

TABLE V-4 (Cont'd)

YEAR 2010

County/ Treatment Class	Colonia Population	Colonia Dwelling Units	Total Capital Costs Maximum ($000)	Total Capital Costs Minimum ($000)	Amortized Monthly Capital Costs per Unit* Maximum ($)	Amortized Monthly Capital Costs per Unit* Minimum ($)	Average Total Monthly Cost per Unit** Maximum ($)	Average Total Monthly Cost per Unit** Minimum ($)
Hidalgo County								
Class 1	49,644	11,032	48,772	35,019	37	27	55	34
Class 2	59,993	13,332	60,793	34,506	38	22	55	34
Class 3	3,761	836	6,224	2,472	62	25	120	45
Class 4	2,384	530	3,078	1,026	50	17	60	20
Total Hidalgo County	115,782	25,730	118,867	73,023	39	24	57	34
Cameron County								
Class 1	11,066	2,459	10,440	6,279	35	21	56	28
Class 2	19,560	4,347	18,846	11,008	36	21	56	29
Class 3	601	134	605	363	38	23	97	37
Class 4	393	87	522	174	50	17	60	20
Total Cameron County	31,620	7,027	30,413	17,824	36	21	57	29
Willacy County								
Class 1	0	0	0	0	0	0	0	0
Class 2	3,356	746	2,878	2,143	32	24	61	31
Class 3	143	32	221	95	58	25	125	31
Class 4	0	0	0	0	0	0	0	0
Total Willacy County	3,499	778	3,099	2,238	33	24	64	31
Region								
Class 1	60,710	13,491	59,212	41,298	37	26	55	33
Class 2	82,909	18,425	82,517	47,657	37	22	44	26
Class 3	4,505	1,002	7,050	2,930	59	24	117	44
Class 4	2,777	617	3,600	1,200	50	17	60	20
Total Region	150,901	33,535	152,379	93,085	38	23	51	29

*Amortized over 20 years at 8 percent per annum.
**Includes amortized capital costs plus monthly O&M costs for respective systems.

TABLE V-5
SUMMARY OF MAXIMUM AND MINIMUM
ALTERNATIVE WASTEWATER SYSTEM COSTS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
HIDALGO COUNTY CLASS 1 INDIVIDUAL COLONIAS									
11	Lull		C	2233	27.9	1,823,000	1,231,000	46	25
578	Villas Del Valle		D	1257	27.2	1,117,000	740,000	51	26
422	Expressway Heights		G	1207	19.6	1,092,000	785,000	52	29
532	Villa Verde #1, #3		G	1177	22.0	1,064,000	744,000	52	28
419	Sun Country Est		G	855	27.2	808,000	525,000	56	27
3000	La Riena		X	503	32.6	521,000	314,000	64	29
796	Polonski Sub		A	302	30.2	353,600	205,000	74	31
75	Colonia Rodriquez #1 & #2		C	302	129.7	337,000	152,800	73	24
444	La Donna**		F	302	4.9	438,000	277,500	83	44
933	Colonia Jesus Maria		X	302	34.7	345,000	198,000	74	30
928	Colonia Capitallo		X	302	34.7	345,000	198,000	74	30
158	Yokum Hall		C	272	21.7	321,000	203,200	77	34
681	El Sol		D	251	8.2	331,000	219,000	82	43
462	Mile 7 Sub		F	201	26.0	253,000	150,000	85	33
3007			F	201	13.0	258,000	169,000	86	39
368	Tierra Bone		E	201	43.3	250,000	134,000	85	30
552	Mile 15 North Sub		J	101	18.0	150,000	89,000	109	40
549	Eastland Park		H	101	2.5	220,800	111,000	129	52
386	Carroll Rd Acres		E	80	4.9	149,000	86,000	125	50
436	El Gato		E	80	7.0	139,000	83,000	121	50
362	Laguna Park		E	70	4.6	137,000	77,000	133	52
43	N. McColl		C	70	14.9	115,000	67,000	124	43
310	Klement, W.J.		B	70	26.9	241,100	61,000	147	39
61	Ranchette Est		B	70	7.0	125,000	73,000	127	51
996	Anaqua		G	60	12.8	103,000	59,000	132	46
840	Tierra Del Sol		F	60	27.5	102,000	53,000	131	40
604	Villa Del Carmen		B	60	5.0	119,000	67,000	139	52
	Subtotal		27	10691		$11,257,500	$7,071,500	$94 (AVERAGE)	$38 (AVERAGE)
HIDALGO COUNTY CLASS 2 INDIVIDUAL COLONIAS									
561	Hargill, City of		2	2514	39.2	1,997,000	1,235,000	44	22
980	Los Ebanos Community		2	2263	18.1	1,876,000	1,406,000	46	28
742	Abram (Ojo de Agua)/ChapaJosephina		2	2072	25.9	1,713,000	1,178,000	46	26
915	Faysville, Town of		2	2012	20.1	1,688,000	1,244,000	46	28
888	Madero/Wheel City		2	1609	11.5	1,447,000	1,107,000	50	33
199	Nuevo Alton		2	1559	15.6	1,371,000	1,024,000	49	30
517	Heidelberg		2	1328	19.6	1,184,000	856,000	51	29
906	Granjeno (Loop Area)		2	1006	10.1	999,000	737,000	55	36
662	Regency Acres		2	855	42.7	798,000	464,000	55	24
361	Roosevselt Rd Sub(Chapa#3)		2	523	26.1	540,000	344,000	64	29
369	Bar VII Sub(DelValle)/Babbs#2		2	493	21.7	518,000	344,000	65	31
499	La Mesa		2	443	5.8	576,000	386,000	73	42
14	Americana Sub		2	432	14.4	472,000	327,000	68	35

TABLE V-5 (Cont.)
SUMMARY OF MAXIMUM AND MINIMUM
ALTERNATIVE WASTEWATER SYSTEM COSTS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
975	Cuevitas (Town)		2	422	6.0	547,000	368,000	73	42
725	South Minnesota Rd 1,2,3		2	402	32.7	434,000	258,000	68	29
186	Casa De Los Vecinos		2	322	13.4	374,000	254,000	74	37
587	Southfork Est		2	302	15.1	353,000	236,000	75	36
930	Relampago		2	302	19.5	350,000	228,000	75	34
706	Chihuahua		2	302	24.3	348,000	216,000	74	32
380	Clark's Sub		2	302	9.8	370,000	250,000	76	40
155	Muniz*		2	282	6.1	389,000	254,000	81	43
271	Friendly Acres		2	251	8.7	327,000	217,000	81	43
3006			2	251	19.5	303,000	194,000	80	35
2	Hoehn Drive		2	251	6.3	352,000	229,000	84	44
500	Harmony Hill and others		2	251	6.5	349,000	227,000	84	44
97	Evergreen		2	211	38.2	260,000	143,000	83	31
160	Tower Sub		2	201	36.1	251,000	139,000	85	31
154	Tierra Del Valle 1 & 2		2	201	5.7	300,000	191,000	91	45
965	Valle Vista		2	201	48.7	249,000	131,000	84	30
711	Country Grove		2	201	29.8	252,000	146,000	85	33
3061			2	201	21.7	254,000	157,000	85	35
	Subtotal		31	21966		$21,241,000	$14,490,000	$69 (AVERAGE)	$34 (AVERAGE)

HIDALGO COUNTY CLASS 3 INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
952	La Palma		3	191	7.7	268,000	131,000	89	45
477	Tropical Farms Sub		3	151	6.2	234,000	109,000	99	46
325	Citrus City		3	151	5.0	246,000	113,000	102	46
26	Garza, Lazaro		3	151	15.1	205,000	92,000	94	38
177	Longoria Sub with Pride		3	151	7.5	223,000	104,000	97	45
189	Palmeras		3	141	14.1	195,000	86,000	97	39
940	El Monte*		3	131	7.8	198,000	89,000	101	45
941	Lookingbill, George*		3	121	8.3	184,000	81,000	103	44
152	South Port Sub		3	121	6.4	194,000	86,000	106	46
326	Western Estate		3	111	11.1	165,000	71,000	106	41
911	Redgate		3	111	40.3	158,000	51,000	104	31
273	Bernal		3	101	15.5	151,000	61,000	109	38
268	Matt		3	101	9.5	157,000	66,000	110	43
172	Austin Stonebaker/CRJS Sub		3	101	5.0	178,000	75,000	117	46
6028	Big John		3	101	6.7	167,000	71,000	113	46
959	Delta Lake Colonia		3	91	19.4	137,000	52,000	112	36
207	Twin Acres		3	91	5.1	162,000	67,000	120	46
6018	Monger Line		3	91	30.2	136,000	45,000	111	33
176	Gumero, Daniel		3	80	21.5	126,000	46,000	117	35
961	Linn Siding		3	80	26.9	125,000	42,000	117	33
272	Good Valley		3	80	6.0	143,000	59,000	123	46
7	River Bend - (Jinks)		3	80	5.4	146,000	60,000	124	46
219	Acosta 107		3	80	7.0	139,000	57,000	121	46
359	Leal, Remira		3	80	10.0	131,000	53,000	119	42

TABLE V-5 (Cont.)
SUMMARY OF MAXIMUM AND MINIMUM
ALTERNATIVE WASTEWATER SYSTEM COSTS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
358	Minnesota Rd		3	70	4.7	135,000	55,000	132	47
138	Tropicana Sub		3	70	7.0	125,000	49,000	127	45
181	Diamond #2		3	70	7.0	125,000	49,000	127	45
6022	Salas		3	60	12.7	103,000	37,000	132	40
128	Harmel*		3	60	12.7	103,000	37,000	132	40
312	TWA		3	60	6.0	115,000	43,000	137	46
136	Lopez-Gutierrez		3	60	6.0	115,000	43,000	137	46
3005			3	60	4.9	120,000	45,000	140	46
250	Stables, The*		3	60	6.0	115,000	43,000	137	46
6025	Edinburg East Sub		3	50	5.0	103,000	38,000	149	46
772	Colonia Lucero Del Norte		3	50	4.8	104,000	38,000	150	46
709	Catalina Estates		3	50	12.6	90,000	32,000	142	40
6019	Dimas		3	50	12.6	90,000	32,000	142	40
993	Orange Hill		3	40	13.4	76,000	25,000	155	39
6000			3	40	39.5	75,000	19,000	153	31
6016	Palm Sub		3	40	4.8	87,000	30,000	162	46
991	Bogert		3	30	39.0	60,000	14,000	174	31
937	Los Pampas #2		3	30	18.9	61,000	18,000	174	36
10	Adan Lee		3	30	39.0	60,000	14,000	174	31
5001			3	30	46.8	60,000	13,000	173	30
936	Los Pampas		3	30	26.4	61,000	16,000	174	34
979			3	20	37.4	45,000	9,000	206	33
469	Ramosville		3	10	17.6	28,000	6,000	281	36
	Subtotal		47	3761		$6,224,000	$2,472,000	$132 (AVERAGE)	$41 (AVERAGE)

CAMERON COUNTY CLASS 1 INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
1244	Cameron Park 1		0	4,176	49.0	3,089,000	1,822,000	43	20
1255	Stuart Sub		0	1,670	49.0	1,396,000	807,000	47	22
1266	King Sub		0	1,086	78.2	960,000	493,000	52	22
1284	Villa Pancho		0	518	27.2	535,000	337,000	63	29
1301	26		M	501	27.2	529,100	327,000	64	30
1339	Saldivar		0	251	77.7	293,000	143,000	78	27
1073	Rice Tracts		N	217	3.3	382,100	214,000	98	47
1336	Unnamed D		0	209	77.6	254,000	124,000	82	28
1151	Leal Sub		N	209	13.9	264,000	173,000	84	38
1035	Los Cuates		P	150	27.1	202,000	116,000	93	35
7004	Unknown		0	100	27.0	147,000	82,000	109	37
	Subtotal		11	9087		$8,051,200	$4,638,000	$74 (AVERAGE)	$30 (AVERAGE)

CAMERON COUNTY CLASS 2 INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
1099	Olmito		2	2,288	27.2	1,864,000	1,269,000	45	25

TABLE V-5 (Cont.)
SUMMARY OF MAXIMUM AND MINIMUM
ALTERNATIVE WASTEWATER SYSTEM COSTS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
1163	Santa Maria		2	1,996	78.3	1,607,000	834,000	45	20
1158	Lozano		2	1,002	27.8	923,000	600,000	53	27
1164	Bluetown		2	760	78.2	715,000	364,000	57	23
1230	Villa Nueva		2	693	27.2	680,000	436,000	58	28
1074	Lago Sub		2	677	27.2	666,000	427,000	59	28
1108	Los Indios		2	668	27.2	660,000	422,000	59	28
1226	San Pedro/Carmen/Barrera Gd.		2	668	27.2	660,000	422,000	59	28
1306	T 2 Unknown Sub along rd		2	576	32.0	582,000	355,000	62	28
1242	Alabama/Arkansas (La Coma)		2	418	14.5	459,000	317,000	69	35
1049	La Tina Ranch		2	418	27.2	450,000	280,000	68	30
1166	El Venadito		2	384	27.2	421,000	260,000	69	31
1109	Carricitos-Landrum		2	376	27.2	414,000	255,000	70	30
1263	Barrio Sub		2	334	77.9	368,000	183,000	71	26
1154	Las Yescas		2	334	19.7	379,000	250,000	72	34
7001	Unknown		2	292	27.1	338,000	205,000	75	31
1304	Iglesia Antigua		2	267	27.1	315,000	190,000	78	32
1299	Palmer		2	251	27.1	299,000	179,000	79	32
1300	Lasana		2	251	77.7	293,000	143,000	78	27
1042	Orason Acres/ChulaVista/Shoemaker		2	251	27.1	299,000	179,000	79	32
7007	Unknown		2	217	27.1	268,000	159,000	83	33
1282	Saldivar		2	209	27.1	259,000	154,000	83	33
1161	Glenwood Acres Sub		2	209	27.1	259,000	154,000	83	33
	Subtotal		23	13539		$13,178,000	$8,037,000	$68 (AVERAGE)	$29 (AVERAGE)

CAMERON COUNTY CLASS 3 INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
1313	W Cluster of houses along rd.		3	184	15.3	239,000	118,000	89	38
7002	Unknown		3	167	27.1	218,000	93,000	90	34
1310	X Unknown Sub		3	100	20.0	148,000	61,000	109	36
1302	Laguna Escondido Heights		3	92	16.2	140,000	58,000	112	38
7000	Unknown		3	58	26.8	99,000	33,000	133	34
	Subtotal		5	601		$605,000	$363,000	$107 (AVERAGE)	$36 (AVERAGE)

WILLACY COUNTY CLASS 2 INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
2034	Sebastian		2	2,538	14.6	2,095,000	1,616,000	45	30
2007	LaSara		2	818	23.3	783,000	527,000	57	29
	Subtotal		2	3356		$2,878,000	$2,143,000	$51 (AVERAGE)	$29 (AVERAGE)

WILLACY COUNTY CLASS 3 INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
2001	Santa Monica		3	119	23.1	169,000	79,000	102	35

TABLE V-5 (Cont.)
SUMMARY OF MAXIMUM AND MINIMUM
ALTERNATIVE WASTEWATER SYSTEM COSTS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
2019	Willamar		3	24	22.7	52,000	16,000	192	35
	Subtotal		2	143		$221,000	$95,000	$147 (AVERAGE)	$35 (AVERAGE)

HIDALGO COUNTY CLASS 1 GROUPED COLONIAS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
40	Tagle, Roberta								
41	Crouse	102	C	161	6.7	241,000	152,000	96	46
595	Country Terrace								
596	Thrasher Terrace								
599	Beamsley	103	B	905	6.5	1,046,000	725,000	60	39
32	Ranchitos #2								
575	Ranchitos #1								
676	Garza Terrace								
677	Tract W. of Garza Terr								
680	Colonia Estrella	104	D	3138	12.9	2,538,000	2,006,000	46	30
580	Las Brisas Del Sur								
584	Beto Acres	105	D	996	10.9	971,000	720,000	55	35
103	Schunior Sub(NuevaSeca)								
105	Colonia Garza #2	108	C	654	5.3	825,000	558,000	67	41
74	Closner Sub								
87	Terry								
221	Country View Est #2								
309	Thompson Rd	109	C	1780	7.7	1,743,000	1,305,000	50	37
81	Lopezville								
83	Villa Del Mundo								
328	North Lopezville								
609	Villa Del Sol								
610	Sevilla Park #1								
612	El Charro Sub #1 (West)								
615	Mesquite Acres								
616	Arco Iris #2*								
620	Aldamas & No. 2								
622	Las Palmas	110	C	5029	7.7	4,400,000	3,432,000	47	35
623	Eldora Gardens Sub								
634	R.S.W. #1	111	Q	533	7.2	632,000	440,000	67	41
631	Nadia								
636	Bar VI (Barra Privies)	112	Q	915	9.9	924,000	678,000	56	36
625	Small Sub #2								
626	Las Brisas								
657	Small Sub #1	113	Q	1629	5.3	1,835,000	1,292,000	55	38
350	East of Eden Sub								
654	Val Bar Estates	117	E	674	7.7	754,000	536,000	62	40
398	Walston Farms Sub								

TABLE V-5 (Cont.)
SUMMARY OF MAXIMUM AND MINIMUM
ALTERNATIVE WASTEWATER SYSTEM COSTS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
999	Highland Farms	120	F	1157	12.4	1,075,000	808,000	53	33
132	Mary Ann's Sub								
133	Brenda Gay Sub	123	I	412	5.8	542,000	362,000	74	42
161	Green Valley Dev								
163	Evergreen								
167	El Trunifo	124	I	473	7.0	577,000	397,000	69	41
165	El Mesquite Sub Phase 1								
166	L & P Sub	125	I	362	8.2	445,000	303,000	73	41
242	Alvarez								
405	La Blanca Heights(N.11thPl.)	126	F	422	7.3	519,000	356,000	71	42
366	Noreste								
367	Barbosa Lopez 1, 2, 3								
414									
415	Victoria Acres								
416	Delta Court Sub								
418	Barbosa-Lopez 1, 2, & 3								
420	Mile 9 Rd Sub	127	F	2223	7.0	2,188,000	1,635,000	49	37
421	Flora								
430	Martin Sub #1	128	F	795	12.8	783,000	573,000	58	34
459	Rosedale Heights								
460	Mid-Way Village(Mid Valley)								
461	La Palma #1	129	F	1881	9.2	1,749,000	1,329,000	48	35
439	Avila IB								
442	Tierra Bella								
443	Tierra Prieta								
556	Balli Sub #2								
3003		130	F	2172	5.9	2,276,000	1,657,000	51	37
515	Chapa #5								
3004		137	G	352	8.6	431,000	294,000	73	41
522	Cuellar A.C. 1, 2, 3								
525	Los Castillos/Agua Dulce								
535	Llano Grande #1								
688	Angela	138	G	3631	10.4	3,022,000	2,387,000	46	32
919	Colonia Las Palos								
920	Progreso	139	X	3953	14.9	3,088,000	2,424,000	45	28
516	Tideland								
519	Capisallo Park								
520	Olympic Sub	140	H	1056	6.5	1,169,000	835,000	58	39
774	Acevedo #4								
5020									
5021		208	A	754	6.9	860,000	608,000	62	40
754	Lakeside								
756	Quarto Vientos ***								
760	La Camellia								
767	Carlos								
770	Hilda #1	209	A	2172	8.8	2,004,000	1,529,000	47	35
740	La Homa Rd								

TABLE V-5 (Cont.)
SUMMARY OF MAXIMUM AND MINIMUM
ALTERNATIVE WASTEWATER SYSTEM COSTS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
748	Ramirez Est.								
751	Henojosa, Ariel #1								
987	Basham #15	210	A	724	5.7	877,000	606,000	64	40
	Subtotal		65	38952		$37,514,000	$27,947,000	$59 (AVERAGE)	$38 (AVERAGE)

HIDALGO COUNTY CLASS 2 GROUPED COLONIAS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
5	R.O.W. (Roger Road)								
6	Tierra Buena #1 & 2								
329	Austin Gardens								
3050		101	2	905	8.2	956,000	460,000	57	38
90	Sandy Ridge								
798	Doolittle Acres	106	2	362	6.8	465,000	194,000	75	42
15	MonteMayor(SantaCruzGds#3)								
16	El Seco Sub*								
92	Bar II*								
301	Merrill								
320	Bar V	107	2	1428	5.7	1,587,000	804,000	56	38
111	Jackson's New World/Griesel								
116	Palma & Palmas #2	114	2	261	6.5	360,000	142,000	83	44
232	L.J. Sub #1								
345	Alberta Acres								
371	Colonia Del Valle	115	2	865	6.3	994,000	474,000	61	39
347	Colonia Gonzales								
351	La Paloma	116	2	292	5.3	416,000	167,000	83	44
118	Las Brisas Est								
119	San Carlos Community								
120	Villarreal, D.T. Sub								
121	San Carlos Acres								
122	Rankin								
182	Sosa								
201	Ruthven	118	2	2545	6.4	2,542,000	1,384,000	49	37
130	Delta West Sub								
139	Cinco Hermanos								
140	Imperial*	122	2	744	5.0	938,000	428,000	66	41
246	El Leon								
445	Colonia Tijerina								
478	Mile Doce West Sub								
489	Olivarez #4								
495	Mesquite Sub Unit #1								
501	La Paloma I & II*								
3051	Mila Doce Sub	132	2	1368	5.8	1,518,000	766,000	56	38
479	Sunrise Sub Unit 2								
493	Puesta Del Sol*								
773	Sunrise Hill Sub	133	2	1810	7.0	1,823,000	961,000	51	37
476	Chapa #4								

TABLE V-5 (Cont.)
SUMMARY OF MAXIMUM AND MINIMUM
ALTERNATIVE WASTEWATER SYSTEM COSTS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
496	Chapa #2 and others								
367	Mid Valley Est	135	2	1086	5.8	1,239,000	607,000	59	39
510	Los Reyes Acres**								
514	Wes Mar Sub	136	2	905	9.4	926,000	443,000	57	37
113	Freedom Est**								
174	Laborsita								
175	Hacienda De Los Vega	141	2	835	7.1	929,000	442,000	60	39
8	Floresta								
9	Tierra Maria #II	143	2	241	4.7	367,000	140,000	89	45
968	Flores								
969	Colonia Rodrigue/Sullivan City								
970	Fisher								
974	La Aurora								
977	San Miguel								
978	Las Cuevas #2	201	2	4476	13.4	3,468,000	2,008,000	41	29
960	Havana Sub								
981	Havana(Community)/Havana Lomas	202	2	503	5.4	655,000	287,000	71	42
699	King Ranch #1 & #2								
702	El Rio	203	2	704	8.7	763,000	352,000	60	38
700	Nuevo Penitas								
701	Penitas	204	2	2565	11.4	2,172,000	1,197,000	45	32
708	Perezville								
713	Mata								
717	Tierra Maria/Valle Sac Bella								
721	Plainview	205	2	1710	11.2	1,532,000	800,000	49	33
719	Los Trevino 1, 2, 3, 4								
730	Acevedo #1 (Esquivel Jr)								
731	Acevedo #2 (Esquivel)	207	2	1760	13.4	1,532,000	789,000	48	31
338	Goodwin Heights #1								
339	Palmerina								
340	Kountry Hill Est	211	2	634	7.1	733,000	335,000	64	40
197	Regal Est								
203	Palm Drive North								
245	Basham #11								
251	Basham #1								
254	Basham #2								
255	Basham #10								
256	Basham #6								
259	Randolph/Barnett #1								
260	Cavazos, Alex								
261	Villa Capri								
262	Leal, Carlos II								
263	Rodriguez Est #2								
269	Coyne								
275	Hinojosa Ariel #2								
277	N. Country Est #2								
278	Randolph/Barnett #2								

TABLE V-5 (Cont.)
SUMMARY OF MAXIMUM AND MINIMUM
ALTERNATIVE WASTEWATER SYSTEM COSTS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
746	Johnson, Paul								
747	La Homa Rd. North								
749	Acevedo, Daniel Sub								
994	Basham #7								
6021	Basham NB	212	2	4033	5.0	4,221,000	2,317,000	49	36
821	Grovewood								
822	Perlas De Naranja	213	2	231	5.8	335,000	130,000	87	45
333	Bazan, Enrique								
334	Celso								
335	Basham #13								
336	La Paloma Sites								
337	Munoz Estates								
343	Basham #12								
986		214	2	795	5.3	972,000	453,000	64	40
188	Chucas Est #1								
192	Wahan								
198	Hinojosa, Ariel #3								
200	Rocky								
205	Chula Vista Acres								
235	Basham #5								
236	Basham #4								
248	La Homa Grove Est**								
267	Basham #8/Country Est W.								
342	Acevedo #3	215	2	1499	4.8	1,764,000	867,000	58	39
280	Linda Vista Est(Popular)								
284	Diamond (L)								
288	N. Country Est #1								
289	Tangerine Est								
290	Monica Acres	216	2	1026	6.5	1,141,000	557,000	58	39
283	Dude Hill #1								
287	Vereda Tropical								
5002									
5003		217	2	352	4.9	498,000	203,000	79	43
294	North Cross Est								
300	Rabbit Patch 1 & 2								
5011		218	2	443	5.5	583,000	251,000	73	42
191	El Paraiso (Rudy Vela)								
193	Los Ebanos	221	2	261	10.1	329,000	126,000	90	41
194	Tierra Estates Sub								
195	Bryan Acres								
214	Cantu, Jose								
227	Val Verde North								
228	Los Ninos								
229	Citrus Shadows								
308	Jardin Terrace								
323	Stewart Place Sub #1								
3052	Stewart Place Sub #2								

TABLE V-5 (Cont.)
SUMMARY OF MAXIMUM AND MINIMUM
ALTERNATIVE WASTEWATER SYSTEM COSTS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
5006									
5007									
5008									
5009									
5010									
6015	M & S	222	2	2866	5.3	3,038,000	1,637,000	50	37
190	Leal, Ramon								
202	Cantu (Diaz)	223	2	261	4.8	392,000	151,000	87	45
988	Regency Acres								
5004									
5005		227	2	261	6.2	364,000	144,000	83	44
	Subtotal		144	38027		$39,552,000	$20,016,000	$64 (AVERAGE)	$39 (AVERAGE)

CAMERON COUNTY CLASS 1 GROUPED COLONIAS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
1264	Illinois Heights								
1334	Unnamed B	403	0	251	4.8	376,000	236,000	88	45
1273	Coronado								
1274	Pleasant Meadows								
7006	Unknown								
1272	Los Cuates								
1022	21 (See El Jardin)								
1340	Unnamed C	404	0	1311	5.8	1,466,000	1,043,000	56	38
1311	R Unknown Sub								
1305	S Cluster of houses along rd.								
1308	Q Unknown Sub	301	K	418	5.8	547,000	362,000	74	42
	Subtotal		6	1979		$2,389,000	$1,641,000	$73 (AVERAGE)	$42 (AVERAGE)

CAMERON COUNTY CLASS 2 GROUPED COLONIAS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
1117	El Calaboz								
1119	Encantado								
1115	Montalvo								
1297	Escamilla's								
1095	Villa Cavazos								
1118	(El) Ranchito	302	2	3257	11.2	2,690,000	1,525,000	43	32
1112	La Paloma								
1110	Polo Arizmendi/Padilla	303	2	994	6.9	1,090,000	531,000	58	39
1027	Cisneros (Limon)								
1295	25								
1026	La Coma Del Norte	401	2	1270	7.8	1,295,000	654,000	54	38
1241	Valle Hermosa								
1281	Valle Escondido								

TABLE V-5 (Cont.)
SUMMARY OF MAXIMUM AND MINIMUM
ALTERNATIVE WASTEWATER SYSTEM COSTS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
7005	Unknown	405	2	501	7.5	593,000	261,000	67	41
	Subtotal		14	6,022		$5,668,000	$2,971,000	$56 (AVERAGE)	$37 (AVERAGE)
	HIDALGO COUNTY CLASS 4 COLONIAS								
518	Old Rebel Field Sub		4	201	4.5	264,000	88,000	56	20
3	Ramseyer Gardens		4	181	1.8	240,000	80,000	56	20
614	El Castilleja		4	161	2.1	210,000	70,000	56	20
185	Alta Vista Sub		4	161	3.9	210,000	70,000	56	20
96	Meadow Lands		4	161	4.0	210,000	70,000	56	20
490	Country Village Sub 1 & 2		4	151	3.6	198,000	66,000	56	20
868	Lorenzana		4	151	3.8	198,000	66,000	56	20
985	El Flaco		4	121	2.0	156,000	52,000	56	20
146	Sunnybrook Sub		4	111	3.7	144,000	48,000	56	20
217	Acosta		4	101	3.1	132,000	44,000	56	20
4	Tierra De Luz		4	80	4.5	102,000	34,000	56	20
180	La Homa Ranch(ComptonGrove)		4	80	2.7	102,000	34,000	56	20
187	Valley Rancheros		4	80	4.5	102,000	34,000	56	20
494	Tijerina Est*		4	60	3.6	78,000	26,000	56	20
306	Guardian Angel Est		4	60	2.2	78,000	26,000	56	20
667	Cole		4	60	3.0	78,000	26,000	56	20
498	Campacuas Sub		4	60	4.4	78,000	26,000	56	20
492	Puerta Del Sol Sub		4	60	1.7	78,000	26,000	56	20
253	Black V.A.		4	50	2.4	66,000	22,000	56	20
178	Krista Estates		4	50	4.1	66,000	22,000	56	20
304	Amberland Sub		4	40	1.3	48,000	16,000	56	20
354	Los Tinacos		4	40	3.4	48,000	16,000	56	20
218	Mitchell, Albert		4	40	1.7	48,000	16,000	56	20
215	Lopez Bibiano		4	30	1.0	36,000	12,000	56	20
6027	Isaacs		4	30	0.9	36,000	12,000	56	20
12	South Seminary		4	20	2.0	24,000	8,000	56	20
560	La Coma Heights		4	20	0.0	24,000	8,000	56	20
1	Seminary Est		4	10	1.0	12,000	4,000	56	20
179	Bougainvillea		4	10	0.5	12,000	4,000	56	20
	Subtotal		29	2384		$3,078,000	$1,026,000	$56 (AVERAGE)	$20 (AVERAGE)
	CAMERON COUNTY CLASS 4 COLONIAS								
1341	Del Mar Heights		4	393	1.6	522,000	174,000	56	20
	Subtotal		1	393		$522,000	$174,000	$56 (AVERAGE)	$20 (AVERAGE)

TABLE V-5 (Cont.)
SUMMARY OF MAXIMUM AND MINIMUM
ALTERNATIVE WASTEWATER SYSTEM COSTS

MAP NO.	COLONIA NAME	2010 GROUP NO.	2010 CLASS	2010 POP.	2010 COLONIAS DENSITY (cap/ac)	MAXIMUM SYSTEM CAPITAL COST	MINIMUM SYSTEM CAPITAL COST	MAXIMUM TOTAL SYSTEM COST $/MO/UNIT	MINIMUM TOTAL SYSTEM COST $/MO/UNIT
	HIDALGO COUNTY								
	Class 1		92	49,644		48,771,500	35,018,500		
	Class 2		175	59,993		60,793,000	34,506,000		
	Class 3		47	3,761		6,224,000	2,472,000		
	Class 4		29	2,384		3,078,000	1,026,000		
	Subtotal		343	115,781		$118,866,500	$73,022,500		
	CAMERON COUNTY								
	Class 1		17	11,066		10,440,200	6,279,000		
	Class 2		37	19,560		18,846,000	11,008,000		
	Class 3		5	601		605,000	363,000		
	Class 4		1	393		522,000	174,000		
	Subtotal		60	31,621		$30,413,200	$17,824,000		
	WILLACY COUNTY								
	Class 1		0	0		0	0		
	Class 2		2	3,356		2,878,000	2,143,000		
	Class 3		2	143		221,000	95,000		
	Class 4		0	0		0	0		
	Subtotal		4	3,499		$3,099,000	$2,238,000		
	THREE COUNTY								
	Class 1		109	60,710		59,211,700	41,297,500		
	Class 2		214	82,909		82,517,000	47,657,000		
	Class 3		54	4,505		7,050,000	2,930,000		
	Class 4		30	2,777		3,600,000	1,200,000		
	THREE-COUNTY GRAND TOTAL		407	150,901		$152,378,700	$93,034,500		

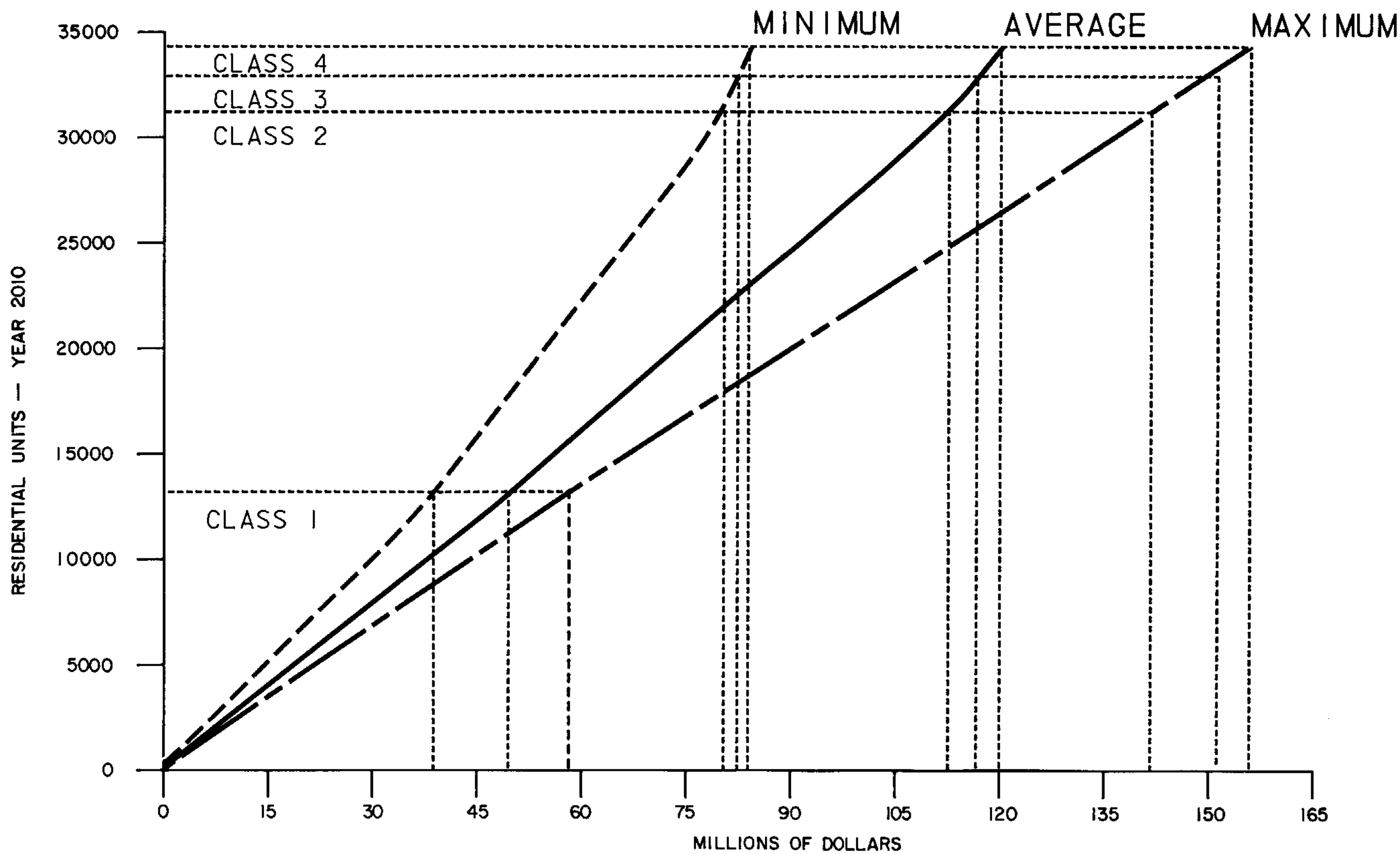
TABLE V-6 - WASTEWATER COLLECTION SYSTEM COMPONENT COST ESTIMATES

System	Pumping Unit Costs ($/Unit)	Collection Line Costs ($/Foot)	Individual Septic Tank Cost ($/Unit)	Average O&M Cost ($/EDU*/Year)
Gravity	0	23	0	35
GP	1,500	4	0	85
STEP	1,100	4	500	70
SDG	0	18	500	45
Vacuum	800	10	0	95

*Equivalent dwelling unit (4.5 persons).

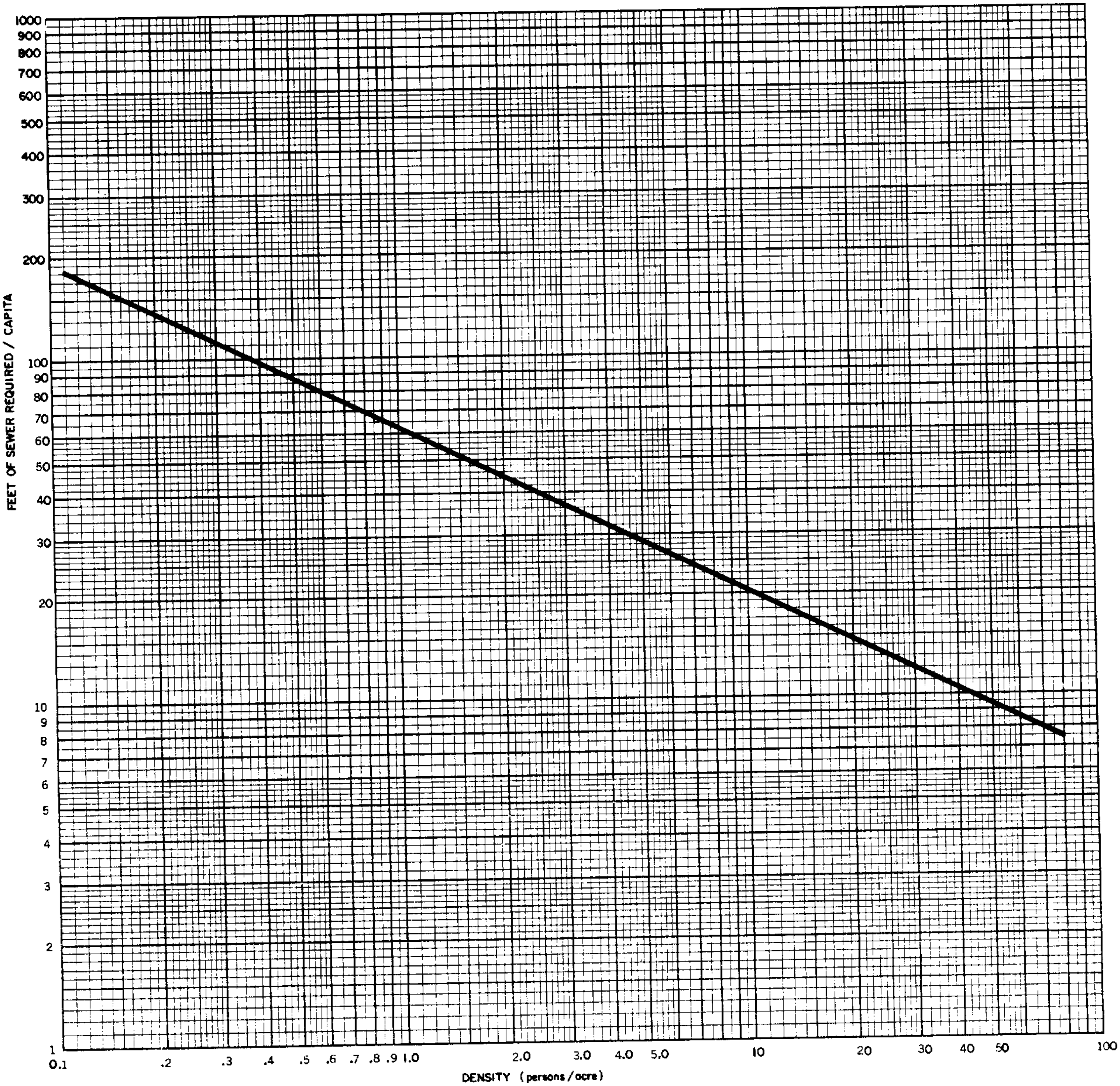
Sources: Turner Collie & Braden Inc., 1986
LRGVDC, 1986
L. L. Rodriguez and Associates, Inc., 1986
HUD, 1985
EPA, 1980
Kreissl, 1985
Otis, 1985
Simmons & Newman, 1985

FIGURE V-1 - SUMMARY OF WASTEWATER CAPITAL COSTS BY COLONIA CLASSIFICATION



Turner Collie & Braden Inc.
CONSULTING ENGINEERS

FIGURE V-2 **RELATIONSHIP OF POPULATION DENSITY TO COLLECTION LINE LENGTH**



NOTE:
Based on assumption that one (1) equivalent dwelling unit = 4.5 persons

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
TEXAS AUSTIN/DALLAS/HOUSTON/PORT ARTHUR
COLORADO DENVER

FUNDING OVERVIEW

Perhaps the most difficult and controversial part of a water supply or wastewater disposal program is the determination of how the implementation of the program should be financed and how it should be managed. In the case of the colonias of the Lower Rio Grande Valley, the poverty level of many of the residents, their rural location, and the many other capital demands in the area make these particularly difficult questions. However, without workable answers to these questions, any capital development program obviously remains only a plan.

Water and wastewater development programs historically have been largely funded with general tax revenues and general obligation debt, most often at the federal level. Most major water impoundments constructed throughout the country during this century have been financed with federal funding, often as flood control and conservation projects. Since 1972, the Federal Water Pollution Control Act (later known as the Clean Water Act) has provided billions of dollars of federal money in the form of grants for the construction of wastewater treatment plants in an effort to improve water quality and control pollution.

On the other hand, transmission and collection lines and annual operating and maintenance expenses of both water and wastewater systems traditionally have been the financial responsibility of state and local governments or of the utilities themselves.

Most of these costs, in turn, are passed on to the utility user in some form of user charge.

In analyzing the options available for financing proposed improvements to the water and wastewater systems serving the colonias in the Lower Rio Grande Valley, several considerations must be taken into account. Some systems require relatively high initial costs with lesser recurring costs. Other systems may be relatively inexpensive to build but require higher, and often widely fluctuating, recurring costs. Some costs may qualify for various grant programs, while others do not. Ability to pay (or lack thereof) may significantly limit user charges as a potential revenue source. Existing municipal and utility service areas, facilities, and financial commitments also bear on the choice of financing and management structures and on which procedures appear most reasonable for future development. It is the purpose of this section of the report to examine some of the financing and management options available to implement needed water and sewage improvements for the colonias of the Lower Rio Grande Valley.

POTENTIAL PROGRAMS FOR FINANCING COLONIA UTILITY DEVELOPMENT

There are some federal programs that have been used or potentially could be used to assist in financing water or wastewater system development to serve the colonias of the Lower Rio Grande Valley. The following is a brief description of these programs that currently appear to have the greatest potential.

Clean Water Act Construction Grants For Wastewater Treatment Works

Historically, the most important program assisting in the financing of wastewater treatment facilities has been the federal grant program administered by the Environmental Protection Agency. The program is available to municipalities, counties, and other political subdivisions of the State, such as districts and river authorities. The program currently provides grants for up to 75 percent of the eligible project costs if the project involves "innovative or alternative technology processes," otherwise participation is up to 55 percent. Generally the funding is limited only to system capacity required to meet current needs as contrasted to providing for future growth potential expected to be placed on the system. There are a number of other restraints and qualifications regarding eligibility of funding under this program, particularly regarding funding for wastewater collection systems. The EPA also requires that any municipality receiving a grant under this program employ fees that charge each user a proportionate share of the costs of operating and maintaining the system and any other system operating within the grantee's jurisdiction. If the system is a regional system serving others outside the grantee's jurisdiction, those served must also meet the EPA's user charge requirements.

This program has been the major financial participant in new wastewater treatment plant development throughout the country since its inception in 1972. Most of the treatment plant capacity now located throughout the Lower Rio Grande Valley has been financed through this program. However, in recent years lack of available funding has essentially limited the program's participation in assisting in the completion of projects that are currently under development.

The Clean Water Act grant program has been scheduled to be phased out and replaced by a revolving loan program administered by the individual states. While Congress recently passed an amendment to the Clean Water Act authorizing an appropriation of $18 billion to extend the program through at least 1990, President Reagan vetoed that act in November 1986. The act would have allotted approximately $110 million per year to Texas. A similar bill is being considered by Congress early in 1987.

Farmers Home Administration's Program for Rural Communities

The Farmers Home Administration (FmHA) has grant and loan programs specifically designed to assist in financing water and wastewater systems for rural communities. Facilities financed by FmHA must be designed to serve primarily rural residents. The financing is not available to any "area" or any city or town with a population in excess of 10,000. The grants and loans are available to political subdivisions of the State (except cities or towns in excess of 10,000) and also to nonprofit organizations which are "utility-type" organizations serving rural communities.

It is this latter ability that has made these programs very useful to the nonprofit water supply corporations that currently provide water service to the colonias of the Lower Rio Grande Valley. In fact, FmHA is the primary, if not the sole, financing agency or institution used by most of these water suppliers.

In order to be eligible for financial assistance from FmHA's rural water and waste disposal program, the applicant must be unable to finance the program from its own resources or to find reasonable financing through commercial credit institutions. Grant funds cannot be used to pay interest on loans or to pay operations and maintenance expenses. Loans are made at an interest rate not to exceed 5 percent if the facilities to be financed are needed to meet minimum health and sanitary standards and the median household income of the service area is below the poverty level.

Funding available for this program in Texas for FY 1987 is reported to be about $14.6 million for loans and $4.7 million for grants. The many (more than 600 active) rural water supply corporations throughout the state will compete for these funds.

<u>Economic Development Administration's Grants For Public Works Facilities and Public Works Impact Projects</u>

The Department of Commerce's Economic Development Administration (EDA) currently has grant programs which might be applicable to help finance water and wastewater facility development for the colonias of the Lower Rio Grande Valley. The EDA's programs vary somewhat in their main focus and purpose from those of the EPA and FmHA discussed above in that the facilities and the services EDA helps finance are not the primary objective of their program, but rather the program focuses at the jobs and economic stimulus created by the facilities.

EDA's Economic Development Grants for Public Works and Development Facilities were established in 1965 to assist in the construction of public facilities needed to "initiate and encourage the creation of permanent jobs in the private sector in designated geographic areas where economic growth is lagging behind the rest of the nation." A companion project provides grants for Public Works Impact Projects to provide work to unemployed and underemployed persons in designated project areas. To be eligible for this latter program, the county or city in which the project is to be built must be designated as a redevelopment area under Section 401(a) of the Public Works and Economic Development Act of 1965. All these counties and several of the cities in the Lower Rio Grande Valley are so designated. If other eligibility requirements are met, the programs are available to nonprofit corporations as well as cities, counties, and other political subdivisions.

These programs are available to a wide variety of development projects and, while both programs have been used for funding water and sewer facility development in the past, there are only two of many types of facilities for which these funds have been used. In addition, because the emphasis of the programs is on economic development, utility systems that have been funded generally are associated with some specific economic development project such as an industrial park or a commercial development area.

Earlier, these programs were reported to be scheduled for termination in FY 1987. However, at the time of this writing the two programs are reported to have a budget of about $120 million for FY 1987.

Housing and Urban Development Community Development Block Grants

The Department of Housing and Urban Development (HUD) has two broad categories of Community Development Block Grants--formula grants, which are allocated directly to larger cities (over 50,000 population) and urban counties (over 200,000 population); and project grants for smaller cities which, in most cases (including Texas), are administered by the states. In the case of Texas, these grant funds are administered by the Texas Department of Community Affairs.

The objectives of both of these programs are very broad, as are the types of projects they support. Their purpose is to enhance the living environment and economic opportunities of both low and moderate income persons. Because of this, these grant funds seldom go to single major projects but most often are allotted to many relatively small projects which are unable to qualify for other types of funding. In the Lower Rio Grande Valley, Brownsville, McAllen, and Harlingen each will receive between $1 million and $2 million this year in Community Development Block Grants from HUD.

Texas Community Development Program

The funds the Texas Department of Community Affairs (TDCA) receives from the HUD Community Development Block Grant Program (see above) go to fund the Texas Community Development Program. There are three major funds under the program: the Community Development Project Fund, the Area Revitalization Fund, and the Emergency/Urgent Need Fund.

The Community Development Project Fund allocates funds among the state's 24 planning regions to cities and counties for "public facilities/services and housing assistance projects." Water and sewer construction projects are eligible under this program but, as with the other financial assistance programs, operating and maintenance expenses are not. The Area Revitalization Fund provides statewide competition for projects to cities and counties who have not applied under the Community Development Project Fund Program. The Emergency/Urgent Need Fund is established to respond to natural disasters and to projects that pose a threat to the immediate health and safety of the local residents.

The total funding for the three programs in FY 1986 was about $54 million. The maximum allowed in any one grant is $500,000.

Texas Water Development Board's Financial Assistance and Water Bond Insurance Programs

Under the Texas Water Code, the Texas Water Development Board (TWDB) administers programs of financial assistance for projects involving "water conservation, water development, and water quality enhancement" as well as flood control and drainage. These programs are for loans and loan insurance and do not currently include construction grants. Matching grants are available for planning and engineering some of these facilities.

The TWDB's financial assistance and bond insurance programs are available to any "political subdivision" of the State which specifically includes "any nonprofit water supply corporation." The Board has considerable latitude regarding the terms and conditions of loans made, including interest deferral or the capitalization of interest and can make loans for durations of up to 50 years.

The TWDB can also acquire, lease, construct, or reconstruct projects with funds from the so-called "state participation account" and thus own up to 50 percent of a project. In turn, the state can then "sell, transfer, or lease its ownership" to an eligible applicant. This can be undertaken so long as the

TWDB can reasonably "expect that the state will recover its investment in the facility."

While the TWDB currently has no grant program for facility construction, such a program has been considered. A Rural Water Task Force established by the Texas Department of Agriculture and the Texas Department of Health recently made recommendations for a "hardship grant program" specifically to assist water and wastewater facility development to serve colonias in South Texas. The recommended program would make grants to local entities to help build water and wastewater systems for those entities unable to meet their financing needs with the TWDB's loan program "if the absence of such a system would pose a public health threat" (Texas Pollution Report, October 22, 1986).

FUNDING REQUIREMENTS

Because the ultimate use of funds will often influence the method best suited for securing the funding, the financial needs of a typical water or wastewater service should be examined by use category. In this way, a financial program can be established which may comprise a variety of financing sources, each designed to accommodate a separate funding need.

Funding Operations and Maintenance Costs

The costs of operating and maintaining a water or wastewater system are daily costs that require a continuous flow of funds. The anticipated operations and maintenance (O&M) expenses for a fiscal period are generally budgeted prior to the beginning of the period. Consideration must also be given to an operating fund balance. These budgeted funding needs are then converted into per-unit costs for financing purposes.

If the O&M expenses are to be financed through user charges, the budgeted figures can be converted into monthly charges per gallon of water used or per service connection. Revenues derived from these charges are then used to finance the O&M expenses during the period. Obviously, the ability of this financing method to accurately generate needed funds is dependent on the ability to accurately predict both the O&M expenses and the volume of water and number of connections forthcoming to contribute revenue during the budget period. Because the volume of water used often is significantly affected by weather conditions, long-term demand projections can be quite unreliable, resulting in lesser or greater amounts of revenue than anticipated.

As shown in Table V-4, the monthly costs for operations and maintenance for the region as a whole range from $4 to $52 for Classification 1 and 2 systems. O&M costs for Classification 3 systems can be as high as $175 per month. Assuming this cost is to be paid by the customer as a monthly user charge, this wide variation obviously results in varying potentials for customer affordability. With monthly water bills now running $8 to $30, it is doubtful that colonia customers will be able to pay in excess of $10 per month more for wastewater disposal. Systems with average O&M costs in excess of this amount would probably need to be subsidized to be feasible.

If O&M expenses are to be subsidized with tax revenues, the budgeted O&M expenses need to be added to the other financing needs to be covered by the specific tax involved. While tax revenue generation is not considered as "fair and equitable" as user charges in paying for utility operations, taxes are generally a more reliable and predictable form of revenue generation.

Debt financing is almost never used to finance O&M expenses. In fact, most bond covenants will specifically prohibit bond funds from being used for O&M expenses.

Capital Funding of New Systems

The major funding need of a utility system is for financing the design and construction of new facilities. These new facilities may represent an entirely new utility system or they may be a major component in the expansion of an existing system. Whether a water supply system or a wastewater disposal system, the facilities can generally be subdivided into three categories: (1) treatment or supply facilities, (2) collection or distribution facilities, and (3) onsite feeder lines and plumbing. Each category may be financed somewhat differently, depending upon the specific circumstances involved.

Some characteristics that are common to all facility financing will tend to influence the funding alternatives to be considered. First, there is generally a requirement for a relatively large capital funding commitment over a relatively short duration; i.e., during construction. Second, the amount of funds required for a specific project can usually be quite accurately estimated before a financing commitment is made. Third, most new facilities will be useful and productive over an extended time period far beyond the initial funding time frame.

Because of these common characteristics, most financing of new facilities will involve some form of debt. By issuing debt, the utility can obtain a relatively large sum of money needed for the initial construction and amortize the repayment of the debt over the estimated useful life of the system. In this way, the repayment of the debt takes the form of annual payments similar to the annual depreciation expense of the newly financed facility. Those entering the system after it is built are required to share in its initial cost in the form of amortized debt service as part of their annual user fees.

While federal grants may be available to help fund a portion of the capital costs, some of these costs will likely require local debt financing. It follows that if most, if not all, of the customers' affordable monthly charge will need to be allotted to paying O&M costs, little, if any, user charge revenue is left with which to amortize the local share of the capital costs.

Justification for using general tax revenue in support of capital funding of wastewater facilities can be made based on general public benefits received. The potential pollution and health hazards created by poor wastewater disposal methods is widespread and can affect the entire region. Obviously, the ineffective systems now employed at many of the colonias is a detriment to the entire region. While a case can be made that those who create the problem (the colonia residents) should pay to correct it, if they cannot afford the cost and no correction is undertaken the problem extends far beyond the individual residence discharging the wastewater.

An alternative to general tax support to fund necessary facility expansion is enforcement of subdivision ordinances requiring developers to pay for the necessary improvements. This has the effect of having the buyer of the property pay, as the developer's costs are passed on to the buyer in the form of a higher purchase price. This financing method has two major drawbacks. It, of course, is not applicable to financing facilities to serve existing residences. In addition, the problem of affordability and enforceability again arises. Those who cannot afford the higher property prices will have to go elsewhere. Past experience shows that to reduce property prices to an affordable range, some developers may move to more remote rural areas of the Valley where the subdivision restrictions do not apply or are not enforced. Thus the problem is not solved, but rather is only dispersed.

Capital Funds For Repair and Replacement of Existing Systems

Probably the most ignored or abused funding requirements of water and wastewater utility systems are those required for facility repair and replacement (R&R). Wastewater systems in particular often are in need of facility replacement or repair that goes unfulfilled due to lack of required funding. This type of financial oversight generally results in a system which operates ineffectively.

Financing system repair and replacement needs generally differs from new facility financing. While the funding needs for R&R can be significant, particularly as a system gets older, R&R funding is not as predictable or preplanned as funding new or expanded facilities. Therefore, R&R financing generally makes use of a reserve fund created by regular periodic contributions until the fund reaches some preset balance. Thereafter, contributions are made only as necessary to retain the preset balance.

ENTITIES TO MANAGE AND OPERATE UTILITY SYSTEMS

The types of entities currently serving the colonias of the Lower Rio Grande Valley include:

- Regional Authorities
- Incorporated Cities
- Nonprofit Water Supply Corporations
- Utility Districts
- County Governments

In considering which entities are best suited to manage and operate new or expanded utilities to serve the colonias in the future, the following considerations should be taken into account.

Regional Authorization

In 1967 the State created the Rio Grande Valley Pollution Control Authority "for the purposes of gathering, transporting, treating, and disposing of waste....that may cause impairment of the quality of waters in the State." The boundaries of the Authority include all of Cameron and Hidalgo counties, although it has authority to construct and operate facilities beyond its boundaries. The Authority is prohibited from storing or distributing water for municipal use or irrigation. Although the Authority may issue revenue bonds, it is prohibited from levying a tax.

While the Authority was formed and a Board of Directors appointed (for two-year terms), there is no indication that the Authority ever undertook the construction or acquisition of any waste disposal facilities. However, it is a potential financial vehicle and operating entity to develop and provide waste disposal service to the rural subdivisions of the region. This Authority could also develop regional wastewater treatment facilities and trunklines to accept and treat wastewater collected by the various cities in the Valley. Its region-wide jurisdiction gives it the broad representation and responsibility to regionalize wastewater treatment plants without regard to local political boundaries or jurisdictions. At the same time, the ability to receive and treat wastewater collected by the local jurisdictions would allow the Authority to operate and yet not be a threat to those municipalities that operate their own systems.

While the Authority could act as a recipient of funds from most federal and state programs, it cannot itself become a taxing entity. Financing would be limited to revenue-supported funding.* It seems unlikely that such an authority could receive the necessary voter approval to become a taxing entity at this time.

Incorporated Cities

Most of the offsite wastewater utilities currently offering service to rural subdivisions are owned and operated by various incorporated cities and towns throughout the three-county area. Because most of the incorporated cities already have established sewage systems in place, it is logical to "regionalize" these systems by extending them to nearby rural subdivisions. Assuming the respective cities will eventually annex these areas, it is also logical to have the cities' utility systems serving the annexed area. There are, however, several concerns regarding leaving the responsibility to serve the colonias to individual cities. For one, the colonias are, by definition, in rural

*As currently constituted, the Authority is limited to a maximum interest of 6 percent on the revenue bonds it may issue.

locations, at least when they are first subdivided. Our analysis shows that the majority of the colonias studied (those in classes 2, 3, and 4) are beyond the generally practical distance from the nearest city to receive service from a city's existing sewage system. In addition, left to the discretion of individual cities, priorities for service extensions to each colonia will be made in the best interests of the city, which may not be in the best interest of the colonias and their residents. Finally, most of the colonias, even those located near cities, currently receive their water supply from one of the water supply corporations (see the Classification 1 colonias' water sources in Table A-1).

Nonprofit Water Supply Corporations

While water supply corporations (WSCs) are the major supplier of water to the colonias, only Military Highway WSC, with its new treatment plant at Progresso, is currently prepared to offer sewage service to its customers. Yet because of their important position as water suppliers and potential future water suppliers of newly developed colonias, there is a certain logic and administrative efficiency in extending the WSC's role to include sewage service generally. Major limitations for the WSCs are their lack of authority and restrictive eligibility for certain grant programs. These limitations restrict their financing and revenue-generating options. In addition, without the right of eminent domain, right-of-way and other land acquisition requirements of the utility can be seriously restricted.

Utility Districts

Perhaps the most flexible and unrestricted entity for providing utility services to the colonias and other rural (and urban) subdivisions of the Lower Rio Grande Valley is the special utility district. The special utility district was specifically designed by the Legislature in 1983 to "purchase, own, hold, lease, and otherwise acquire sources of water," and sell it to various users, including "towns, cities, and other political subdivisions of this state, to private business entities, and to individuals." The special utility district can also provide sanitary sewer service and fire-fighting activities.

The utility district as a subdivision of the State of Texas, qualifies for most federal and state grant and loan programs. It has the right to condemn property (eminent domain) and to gain rights-of-way across and along public roads. The special utility district's service area may include more than one county and all or part of any city or other public agency. The land comprising the district need not be contiguous and may consist of areas separated by land not included in the district. It is also significant that there are specific provisions for converting nonprofit water supply corporations into special utility districts.

There appears to be at least two major concerns regarding the creation of special utility districts to provide water and wastewater service in the Lower Rio Grande Valley. First is the general concern for establishing "another layer of government" in the area. However, if a district is formed to replace one or more WSCs and/or small municipal utility districts, it could actually reduce the total number of entities serving the area. A more subtle concern involves public representation. The WSCs, as nonprofit corporations, are controlled by boards of directors who are elected by the "owners," who are de facto the customers of the WSC. Citizenship is not a requirement to vote for or be a director of a WSC. If converted to a special utility district, on the other hand, the board of directors must be U.S. citizens and are elected by the registered voters who live in the district. Because of the large number of resident aliens living in the area, it is feared that many who currently are members of the WSCs and possibly some of the current directors would be disenfranchized if the WSCs were converted to special utility districts.

County Governments

All three counties in the study area have authority over private septic systems. Cameron and Hidalgo counties inspect private systems and offer permits. Willacy County issues permits for new septic systems. Both Cameron and Hidalgo counties have subdivision regulations prohibiting the development of subdivisions without potable water supply availability.

Counties in Texas have authority to construct and operate wastewater collection and treatment facilities. However, limitation on their taxing and bonding capacity and other legal questions concerning the specific extent of their powers in these areas have generally limited any large-scale county involvement in these areas. None of the three counties currently operates water supply or wastewater treatment facilities.

Because of their county-wide jurisdiction and historical responsibility for other public services in rural areas, county governments can be considered as potential candidates to serve the rural colonias. However, because they have no current involvement or experience in these activities, a new layer of government within the current county government structure would be required, and most likely new enabling legislation. Thus, there would be no apparent advantage over use of the special utility district concept for this purpose, and the latter offers much greater flexibility and enabling legislation already in place.

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APPENDIX A

Table A-1

This table summarizes each of the 435 colonias identified in this study. An explanation of this table is provided on pages II-10 and II-11.

Table A-2

This table presents a detailed summary of capital, O&M, and total monthly per-dwelling-unit costs for five types of alternative collection systems considered in this study. The alternative systems include the conventional gravity system, septic tank effluent pumping (pressure sewer) system, grinder pump (pressure sewer) system, small diameter gravity (SDG) system, and vacuum sewer system. The tabulation lists costs for each of the colonias except for those considered for colonia grouping (see page IV-9 for discussions on colonia grouping). Because collection systems are not necessary, colonias categorized into Classification 4 (see Table IV-5) are not included in this table. The collection system costs associated with the colonias considered for the groupings are presented in Table A-3. Classification 1 colonias are designated with a letter (city code) that corresponds to Table IV-1. Refer to page IV-8 for further explanation.

Table A-3

This table presents a detailed summary of capital, O&M, and total monthly per-dwelling-unit costs for five types of alternative collection systems considered in this study. The tabulation lists costs for each of the colonia groupings (see page IV-9 for discussions on colonia grouping). The collection system costs for the individual colonias are presented in Table A-2. Classification 1 colonia groupings are designated with a letter (city code) that corresponds to Table IV-1. Refer to page IV-8 for further explanation.

Table A-4

This table presents a detailed summary of capital, O&M, and total monthly per-dwelling-unit costs for three wastewater treatment alternatives considered in this study for colonia Classifications 1, 2, and 3. The alternative systems include the centralized oxidation pond, the centralized activated sludge plant, and the alternative of tying into an existing treatment system. The latter alternative is solely available to those colonias and colonia groupings categorized into Classification 1 (see Table IV-5). Classification 1 colonias are designated with a letter (city code) that corresponds to Table IV-1. Refer to page IV-8 for further explanation. The tabulation lists costs for each of the colonias except for those considered for colonia grouping (see page IV-9 for discussions on colonia grouping). Treatment system costs for grouped colonias are presented in Table A-5. Treatment system costs for Classification 4 colonias are presented in Table A-7.

Table A-5

This table presents a detailed summary of capital, O&M, and total monthly per-dwelling-unit costs for three wastewater treatment alternatives for grouped colonias categorized into Classifications 1 and 2. For discussion concerning colonia grouping, refer to page IV-9. Classification 1 colonias are designated with a letter (city code) that corresponds to Table IV-1. Refer to page IV-8 for further explanation. Please note that the treatment alternative of tying into an existing treatment system is solely available for Classification 1 colonias and colonia groupings.

Table A-6

This table presents a detailed summary of capital, O&M, and total monthly per-dwelling-unit costs for five types of alternative wastewater treatment alternatives considered specifically for those colonias categorized into Classification 3 (see Table IV-5). The alternative systems include the cluster septic tank/drainfield system, the cluster septic tank/evapotranspiration (ET) system, the cluster septic tank/dosing mound system, the cluster septic tank/sand filter system, and the cluster septic tank/sand filter with drainfield system.

Table A-7

This table presents a detailed summary of capital, O&M, and total monthly per-dwelling-unit costs for five types of alternative wastewater treatment alternatives considered specifically for those colonias categorized into Classification 4 (see Table IV-5). These five alternatives correspond to the five alternatives listed above in the description of Table A-6, with the exception of using an individual onsite septic tank in place of the community cluster septic tank. Capital per-unit costs and annual O&M per-unit costs were assigned to each of the five alternatives and are presented under the appropriate table heading.

TABLE A-1
COLONIAS OF THE LOWER RIO GRANDE VALLEY

HIDALGO COUNTY

(1) MAP NO.	(2) COLONIA NAME	(3) WATER SUPPLY SOURCE	(4) 1986 HSNG UNITS	(5) 2010 HSNG UNITS	(6) 1986 POP.	(7) 2010 POP.	(8) COLONIA AREA (acres)	(9) 1986 COLONIA DENSITY (units/ac)	(10) 2010 COLONIA DENSITY (units/ac)
1	Seminary Est	Sharyland	1	2	5	10	10.0	0.1	0.2
2	Hoehn Drive	Sharyland	25	56	113	251	40.0	0.6	1.4
3	Ramseyer Gardens	Cistern Wls	18	40	81	181	98.5	0.2	0.4
4	Tierra De Luz	None	8	18	36	80	18.0	0.4	1.0
5	R.O.W. (Roger Road)	Unknown	31	69	140	312	20.0	1.6	3.5
6	Tierra Buena #1 & 2	None	31	69	140	312	23.9	1.3	2.9
7	River Bend - (Jinks)	Sharyland	8	18	36	80	14.8	0.5	1.2
8	Floresta	Sharyland	15	34	68	151	12.3	1.2	2.7
9	Tierra Maria #II	Sharyland	9	20	41	91	9.9	0.9	2.0
10	Adan Lee	Sharyland	3	7	14	30	0.8	3.9	8.7
11	Lull	Lull	222	496	999	2233	80.0	2.8	6.2
12	South Seminary	Sharyland	2	4	9	20	10.0	0.2	0.4
14	Americana Sub	No. Alamo	43	96	194	432	30.0	1.4	3.2
15	MonteMayor(SantaCruzGds#3)	No. Alamo	30	67	135	302	10.0	3.0	6.7
16	El Seco Sub	No. Alamo	20	45	90	201	8.0	2.5	5.6
26	Garza, Lazaro	Sharyland	15	34	68	151	10.0	1.5	3.4
32	Ranchitos #2	MHWS	43	96	194	432	20.0	2.2	4.8
40	Tagle, Roberta	Sharyland	8	18	36	80	11.7	0.7	1.5
41	Crouse	Sharyland	8	18	36	80	1.3	6.0	13.4
43	N. McColl	Sharyland	7	16	32	70	4.7	1.5	3.3
61	Ranchette Est	Sharyland	7	16	32	70	10.0	0.7	1.6
74	Closner Sub	No. Alamo	50	112	225	503	46.9	1.1	2.4
75	Colonia Rodriquez #1 & #2	No. Alamo	30	67	135	302	2.3	12.9	28.8
81	Lopezville	No. Alamo	198	443	891	1991	60.0	3.3	7.4
83	Villa Del Mundo	No. Alamo	41	92	185	412	30.0	1.4	3.1
87	Terry	No. Alamo	30	67	135	302	11.1	2.7	6.0
90	Sandy Ridge	No. Alamo	30	67	135	302	20.0	1.5	3.4
92	Bar II	No. Alamo	25	56	113	251	16.5	1.5	3.4
96	Meadow Lands	No. Alamo	16	36	72	161	40.0	0.4	0.9
97	Evergreen	No. Alamo	21	47	95	211	5.5	3.8	8.5
103	Schunior Sub(NuevaSeca)	No. Alamo	27	60	122	272	15.0	1.8	4.0
105	Colonia Garza #2	No. Alamo	38	85	171	382	11.7	3.2	7.2
111	Jackson's New World/Griesel	No. Alamo	10	22	45	101	20.0	0.5	1.1
113	Freedom Est	No. Alamo	27	60	122	272	8.3	3.2	7.2
116	Palma & Palmas #2	No. Alamo	16	36	72	161	20.1	0.8	1.8
118	Las Brisas Est	No. Alamo	2	4	9	20	10.0	0.2	0.4
119	San Carlos Community	No. Alamo	120	268	540	1207	69.3	1.7	3.9
120	Villarreal, D.T. Sub	No. Alamo	4	9	18	40	11.0	0.4	0.8
121	San Carlos Acres	No. Alamo	41	92	185	412	9.5	4.3	9.7
122	Rankin	No. Alamo	15	34	68	151	7.3	2.1	4.6
128	Harmel	No. Alamo	6	13	27	60	4.8	1.3	2.8
130	Delta West Sub	No. Alamo	42	94	189	422	52.3	0.8	1.8

TABLE A-1 (Cont.)
COLONIAS OF THE LOWER RIO GRANDE VALLEY

HIDALGO COUNTY

(1) MAP NO.	(2) COLONIA NAME	(3) WATER SUPPLY SOURCE	(4) 1986 HSNG UNITS	(5) 2010 HSNG UNITS	(6) 1986 POP.	(7) 2010 POP.	(8) COLONIA AREA (acres)	(9) 1986 COLONIA DENSITY (units/ac)	(10) 2010 COLONIA DENSITY (units/ac)
132	Mary Ann's Sub	No. Alamo	29	65	131	292	19.4	1.5	3.3
133	Brenda Gay Sub	No. Alamo	12	27	54	121	14.2	0.8	1.9
136	Lopez-Gutierrez	No. Alamo	6	13	27	60	10.0	0.6	1.3
138	Tropicana Sub	No. Alamo	7	16	32	70	10.0	0.7	1.6
139	Cinco Hermanas	No. Alamo	22	49	99	221	10.0	2.2	4.9
140	Imperial	No. Alamo	10	22	45	101	8.7	1.2	2.6
146	Sunnybrook Sub	No. Alamo	11	25	50	111	29.7	0.4	0.8
152	South Port Sub	No. Alamo	12	27	54	121	19.0	0.6	1.4
154	Tierra Del Valle 1 & 2	No. Alamo	20	45	90	201	35.0	0.6	1.3
155	Muniz	No. Alamo	28	63	126	282	46.0	0.6	1.4
158	Yokum Hall	No. Alamo	27	60	122	272	12.5	2.2	4.8
160	Tower Sub	No. Alamo	20	45	90	201	5.6	3.6	8.0
161	Green Valley Dev	No. Alamo	17	38	77	171	7.9	2.2	4.8
163	Evergreen	No. Alamo	21	47	95	211	5.4	3.9	8.7
165	El Mesquite Sub Phase 1	No. Alamo	6	13	27	60	23.6	0.3	0.6
166	L & P Sub	No. Alamo	30	67	135	302	18.0	1.7	3.7
167	El Trunifo	No. Alamo	9	20	41	91	3.7	2.4	5.4
172	Austin Stonebaker/CRJS Sub	Sharyland	10	22	45	101	20.0	0.5	1.1
174	Laborsita	No. Alamo	36	80	162	362	37.0	1.0	2.2
175	Hacienda De Los Vega	No. Alamo	20	45	90	201	7.2	2.8	6.2
176	Gumero, Daniel	No. Alamo	8	18	36	80	3.7	2.1	4.8
177	Longoria Sub with Pride	La Joya	15	34	68	151	20.0	0.8	1.7
178	Krista Estates	Sharyland	5	11	23	50	12.3	0.4	0.9
179	Bougainvillea	Sharyland	1	2	5	10	20.0	0.1	0.1
180	La Homa Ranch(ComptonGrove)	Sharyland	8	18	36	80	30.0	0.3	0.6
181	Diamond #2	Sharyland	7	16	32	70	10.0	0.7	1.6
182	Sosa	No. Alamo	26	58	117	261	13.3	2.0	4.4
185	Alta Vista Sub	Sharyland	16	36	72	161	41.0	0.4	0.9
186	Casa De Los Vecinos	Sharyland	32	72	144	322	24.0	1.3	3.0
187	Valley Rancheros	Well	8	18	36	80	18.0	0.4	1.0
188	Chucos Est #1	La Joya	10	22	45	101	10.0	1.0	2.2
189	Palmeras	Sharyland	14	31	63	141	10.0	1.4	3.1
190	Leal, Ramon	None	6	13	27	60	20.0	0.3	0.7
191	El Paraiso (Rudy Vela)	Sharyland	16	36	72	161	10.0	1.6	3.6
192	Wahon	La Joya	14	31	63	141	10.0	1.4	3.1
193	Los Ebanos	Sharyland	10	22	45	101	10.0	1.0	2.2
194	Tierra Estates Sub	Sharyland	25	56	113	251	23.4	1.1	2.4
195	Bryan Acres	Sharyland	20	45	90	201	5.0	4.0	8.9
197	Regal Est	La Joya	4	9	18	40	10.0	0.4	0.9
198	Hinojosa, Ariel #3	La Joya	8	18	36	80	20.0	0.4	0.9
199	Nuevo Alton	Sharyland	155	346	698	1559	100.0	1.6	3.5
200	Rocky	La Joya	9	20	41	91	10.0	0.9	2.0

TABLE A-1 (Cont.)
COLONIAS OF THE LOWER RIO GRANDE VALLEY

HIDALGO COUNTY

(1) MAP NO.	(2) COLONIA NAME	(3) WATER SUPPLY SOURCE	(4) 1986 HSNG UNITS	(5) 2010 HSNG UNITS	(6) 1986 POP.	(7) 2010 POP.	(8) COLONIA AREA (acres)	(9) 1986 COLONIA DENSITY (units/ac)	(10) 2010 COLONIA DENSITY (units/ac)
201	Ruthven	No. Alamo	45	101	203	453	12.5	3.6	8.0
202	Cantu (Diaz)	Sharyland(w)	20	45	90	201	30.0	0.7	1.5
203	Palm Drive North	La Joya	14	31	63	141	16.2	0.9	1.9
205	Chula Vista Acres	La Joya	6	13	27	60	20.0	0.3	0.7
207	Twin Acres	Sharyland	9	20	41	91	17.8	0.5	1.1
214	Cantu, Jose	Sharyland	23	51	104	231	10.0	2.3	5.1
215	Lopez Bibiano	Sharyland	3	7	14	30	30.2	0.1	0.2
217	Acosta	Sharyland	10	22	45	101	32.0	0.3	0.7
218	Mitchell, Albert	Sharyland	4	9	18	40	23.0	0.2	0.4
219	Acosta 107	Sharyland	8	18	36	80	11.6	0.7	1.5
221	Country View Est #2	No. Alamo	61	136	275	614	20.0	3.1	6.8
227	Val Verde North	Sharyland	5	11	23	50	10.0	0.5	1.1
228	Los Ninos	Sharyland	4	9	18	40	6.6	0.6	1.3
229	Citrus Shadows	Sharyland	9	20	41	91	6.0	1.5	3.4
232	L.J. Sub #1	No. Alamo	20	45	90	201	30.0	0.7	1.5
235	Basham #5	Sharyland	15	34	68	151	20.0	0.8	1.7
236	Basham #4	Sharyland	15	34	68	151	20.0	0.8	1.7
242	Alvarez	No. Alamo	7	16	32	70	5.0	1.4	3.1
245	Basham #11	None	36	80	162	362	10.0	3.6	8.0
246	El Leon	No. Alamo	20	45	90	201	10.8	1.8	4.1
248	La Homa Grove Est	Sharyland	12	27	54	121	2.1	5.8	13.0
250	Stables, The	No. Alamo	6	13	27	60	10.0	0.6	1.3
251	Basham #1	Sharyland	20	45	90	201	19.0	1.1	2.4
253	Black V.A.	No. Alamo	5	11	23	50	20.8	0.2	0.5
254	Basham #2	Sharyland	4	9	18	40	33.2	0.1	0.3
255	Basham #10	None	3	7	14	30	20.0	0.2	0.3
256	Basham #6	Sharyland	14	31	63	141	20.0	0.7	1.6
259	Randolph/Barnett #1	Sharyland	10	22	45	101	5.0	2.0	4.5
260	Cavazos, Alex	None	10	22	45	101	7.5	1.3	3.0
261	Villa Capri	Sharyland	40	89	180	402	11.9	3.4	7.5
262	Leal, Carlos II	Sharyland	30	67	135	302	10.0	3.0	6.7
263	Rodriguez Est #2	Sharyland	6	13	27	60	2.3	2.7	6.0
267	Basham #8/Country Est W.	Sharyland	40	89	180	402	20.0	2.0	4.5
268	Matt	No. Alamo	10	22	45	101	10.6	0.9	2.1
269	Coyne	Sharyland	16	36	72	161	1.5	10.7	23.9
271	Friendly Acres	Sharyland	25	56	113	251	29.0	0.9	1.9
272	Good Valley	Sharyland	8	18	36	80	13.5	0.6	1.3
273	Bernal	No. Alamo	10	22	45	101	15.5	0.6	1.4
275	Hinojosa Ariel #2	Sharyland	25	56	113	251	20.0	1.3	2.8
277	N. Country Est #2	Sharyland	10	22	45	101	5.6	1.8	4.0
278	Randolph/Barnett #2	Sharyland	30	67	135	302	5.0	6.0	13.4
280	Linda Vista Est(Popular)	Sharyland	40	89	180	402	40.0	1.0	2.2

TABLE A-1 (Cont.)
COLONIAS OF THE LOWER RIO GRANDE VALLEY

HIDALGO COUNTY

(1) MAP NO.	(2) COLONIA NAME	(3) WATER SUPPLY SOURCE	(4) 1986 HSNG UNITS	(5) 2010 HSNG UNITS	(6) 1986 POP.	(7) 2010 POP.	(8) COLONIA AREA (acres)	(9) 1986 COLONIA DENSITY (units/ac)	(10) 2010 COLONIA DENSITY (units/ac)
283	Dude Hill #1	Sharyland	5	11	23	50	10.0	0.5	1.1
284	Diamond (L)	Sharyland	20	45	90	201	10.0	2.0	4.5
287	Vereda Tropical	Sharyland	17	38	77	171	10.0	1.7	3.8
288	N. Country Est #1	Sharyland	30	67	135	302	17.0	1.8	3.9
289	Tangerine Est	Sharyland	8	18	36	80	10.2	0.8	1.8
290	Monica Acres	Sharyland	4	9	18	40	17.0	0.2	0.5
294	North Cross Est	Sharyland	14	31	63	141	10.0	1.4	3.1
300	Rabbit Patch 1 & 2	Sharyland	5	11	23	50	32.4	0.2	0.3
301	Merrill	No. Alamo	30	67	135	302	13.5	2.2	5.0
304	Amberland Sub	Sharyland	4	9	18	40	31.0	0.1	0.3
306	Guardian Angel Est	Sharyland	6	13	27	60	27.0	0.2	0.5
308	Jardin Terrace	Sharyland	24	54	108	241	9.9	2.4	5.4
309	Thompson Rd	No. Alamo	36	80	162	362	14.7	2.4	5.5
310	Klement, W.J.	Sharyland	7	16	32	70	2.6	2.7	6.0
312	TWA	Sharyland	6	13	27	60	10.0	0.6	1.3
320	Bar V	No. Alamo	37	83	167	372	23.0	1.6	3.6
323	Stewart Place Sub #1	Sharyland	22	49	99	221	29.5	0.7	1.7
325	Citrus City	La Joya	15	34	68	151	30.0	0.5	1.1
326	Western Estate	La Joya	11	25	50	111	10.0	1.1	2.5
328	North Lopezville	No. Alamo	80	179	360	805	60.0	1.3	3.0
329	Austin Gardens	None	12	27	54	121	22.0	0.5	1.2
333	Bazan, Enrique	La Joya	10	22	45	101	6.8	1.5	3.3
334	Celso	Well	10	22	45	101	5.0	2.0	4.5
335	Basham #13	well	10	22	45	101	5.2	1.9	4.3
336	La Paloma Sites	La Joya	11	25	50	111	5.0	2.2	4.9
337	Munoz Estates	La Joya	20	45	90	201	15.9	1.3	2.8
338	Goodwin Heights #1	La Joya	35	78	158	352	20.0	1.8	3.9
339	Palmerina	La Joya	8	18	36	80	3.0	2.7	6.0
340	Kountry Hill Est	La Joya	20	45	90	201	19.2	1.0	2.3
342	Acevedo #3	La Joya	20	45	90	201	18.3	1.1	2.4
343	Basham #12	La Joya	8	18	36	80	4.2	1.9	4.3
345	Alberta Acres	No. Alamo	15	34	68	151	5.0	3.0	6.7
347	Colonia Gonzales	No. Alamo	11	25	50	111	7.2	1.5	3.4
350	East of Eden Sub	No. Alamo	26	58	117	261	15.0	1.7	3.9
351	La Paloma	No. Alamo	18	40	81	181	4.2	4.3	9.6
354	Los Tinacos	No. Alamo	4	9	18	40	12.0	0.3	0.7
358	Minnesota Rd	No. Alamo	7	16	32	70	15.0	0.5	1.0
359	Leal, Ramiro	No. Alamo	8	18	36	80	8.0	1.0	2.2
361	Roosevselt Rd Sub(Chapa#3)	No. Alamo	52	116	234	523	20.0	2.6	5.8
362	Laguna Park	Alamo	7	16	32	70	15.3	0.5	1.0
366	Noreste	No. Alamo	50	112	225	503	29.8	1.7	3.8
367	Barbosa Lopez 1, 2, 3	Weslaco	25	56	113	251	20.0	1.3	2.8

TABLE A-1 (Cont.)
COLONIAS OF THE LOWER RIO GRANDE VALLEY

HIDALGO COUNTY

(1) MAP NO.	(2) COLONIA NAME	(3) WATER SUPPLY SOURCE	(4) 1986 HSNG UNITS	(5) 2010 HSNG UNITS	(6) 1986 POP.	(7) 2010 POP.	(8) COLONIA AREA (acres)	(9) 1986 COLONIA DENSITY (units/ac)	(10) 2010 COLONIA DENSITY (units/ac)
368	Tierra Bone	No. Alamo	20	45	90	201	4.6	4.3	9.6
369	Bar VII Sub(DelValle)/Babbs#2	Well	49	110	221	493	22.7	2.2	4.8
371	Colonia Del Valle	No. Alamo	51	114	230	513	12.6	4.0	9.1
380	Clark's Sub	No. Alamo	30	67	135	302	30.8	1.0	2.2
386	Carroll Rd Acres	No. Alamo	8	18	36	80	16.5	0.5	1.1
398	Walston Farms Sub	No. Alamo	60	134	270	603	27.3	2.2	4.9
405	La Blanca Heights(N.11thPl.)	No. Alamo	35	78	158	352	30.0	1.2	2.6
414	Unknown	Unknown	30	67	135	302	11.1	2.7	6.0
415	Victoria Acres	No. Alamo	26	58	117	261	10.0	2.6	5.8
416	Delta Court Sub	No. Alamo	20	45	90	201	32.0	0.6	1.4
418	Barbosa-Lopez 1, 2, & 3	None	40	89	180	402	48.0	0.8	1.9
419	Sun Country Est	No. Alamo	85	190	383	855	31.4	2.7	6.0
420	Mile 9 Rd Sub	No. Alamo	30	67	135	302	16.7	1.8	4.0
421	Flora	No. Alamo	49	110	221	493	16.0	3.1	6.9
422	Expressway Heights	Weslaco	120	268	540	1207	61.6	1.9	4.4
430	Martin Sub #1	No. Alamo	30	67	135	302	11.1	2.7	6.0
436	El Gato	No. Alamo	8	18	36	80	11.5	0.7	1.5
439	Avila IB	No. Alamo	20	45	90	201	7.7	2.6	5.8
442	Tierra Bella	No. Alamo	36	80	162	362	27.8	1.3	2.9
443	Tierra Prieta	No. Alamo	40	89	180	402	20.0	2.0	4.5
444	La Donna	No. Alamo	30	67	135	302	61.7	0.5	1.1
445	Colonia Tijerina	No. Alamo	23	51	104	231	4.2	5.5	12.4
459	Rosedale Heights	No. Alamo	10	22	45	101	19.3	0.5	1.2
460	Mid-Way Village(Mid Valley)	No. Alamo	25	56	113	251	20.0	1.3	2.8
461	La Palma #1	No. Alamo	152	340	684	1529	45.0	3.4	7.5
462	Mile 7 Sub	No. Alamo	20	45	90	201	7.7	2.6	5.8
469	Ramosville	Unknown	1	2	5	10	0.6	1.8	3.9
476	Chapa #4	No. Alamo	33	74	149	332	25.5	1.3	2.9
477	Tropical Farms Sub	No. Alamo	15	34	68	151	24.5	0.6	1.4
478	Mile Doce West Sub	No. Alamo	13	29	59	131	5.0	2.6	5.8
479	Sunrise Sub Unit 2	No. Alamo	79	177	356	795	65.3	1.2	2.7
489	Olivarez #4	No. Alamo	10	22	45	101	3.9	2.6	5.7
490	Country Village Sub 1 & 2	No. Alamo	15	34	68	151	42.3	0.4	0.8
492	Puerta Del Sol Sub	No. Alamo	6	13	27	60	35.0	0.2	0.4
493	Puesta Del Sol	No. Alamo	30	67	135	302	42.9	0.7	1.6
494	Tijerina Est	No. Alamo	6	13	27	60	16.6	0.4	0.8
495	Mesquite Sub Unit #1	No. Alamo	10	22	45	101	10.0	1.0	2.2
496	Chapa #2 and others	No. Alamo	60	134	270	603	30.8	1.9	4.3
498	Campacuas Sub	No. Alamo	6	13	27	60	13.8	0.4	1.0
499	La Mesa	No. Alamo	44	98	198	443	76.7	0.6	1.3
500	Harmony Hill and others	MHWS	25	56	113	251	38.6	0.6	1.4
501	La Paloma I & II	No. Alamo	50	112	225	503	29.3	1.7	3.8

TABLE A-1 (Cont.)
COLONIAS OF THE LOWER RIO GRANDE VALLEY

HIDALGO COUNTY

(1) MAP NO.	(2) COLONIA NAME	(3) WATER SUPPLY SOURCE	(4) 1986 HSNG UNITS	(5) 2010 HSNG UNITS	(6) 1986 POP.	(7) 2010 POP.	(8) COLONIA AREA (acres)	(9) 1986 COLONIA DENSITY (units/ac)	(10) 2010 COLONIA DENSITY (units/ac)
510	Los Reyes Acres	None	10	22	45	101	20.6	0.5	1.1
514	Wes Mar Sub	No. Alamo	80	179	360	805	41.1	1.9	4.3
515	Chapa #5	No. Alamo	20	45	90	201	12.4	1.6	3.6
516	Tideland	No. Alamo	10	22	45	101	15.5	0.6	1.4
517	Heidelberg	No. Alamo	132	295	594	1328	67.8	1.9	4.4
518	Old Rebel Field Sub	No. Alamo	20	45	90	201	45.2	0.4	1.0
519	Capisallo Park	No. Alamo	80	179	360	805	30.8	2.6	5.8
520	Olympic Sub	No. Alamo	15	34	68	151	7.8	1.9	4.3
522	Cuellar A.C. 1, 2, 3	Weslaco	71	159	320	714	37.9	1.9	4.2
525	Los Castillos/Agua Dulce	Weslaco	100	224	450	1006	46.2	2.2	4.8
532	Villa Verde #1, #3	Weslaco	117	261	527	1177	53.6	2.2	4.9
535	Llano Grande #1	Weslaco	160	358	720	1609	78.9	2.0	4.5
549	Eastland Park	No. Alamo	10	22	45	101	40.0	0.3	0.6
552	Mile 15 North Sub	No. Alamo	10	22	45	101	5.6	1.8	4.0
556	Balli Sub #2	No. Alamo	20	45	90	201	10.0	2.0	4.5
560	La Coma Heights	No. Alamo	2	4	9	20	1330.0	0.0	0.0
561	Hargill, City of	No. Alamo	250	559	1125	2514	64.2	3.9	8.7
575	Ranchitos #1	MHWS	148	331	666	1489	38.0	3.9	8.7
578	Villas Del Valle	MHWS	125	279	563	1257	46.2	2.7	6.0
580	Las Brisas Del Sur	Unknown	64	143	288	644	35.5	1.8	4.0
584	Beto Acres	MHWS	35	78	158	352	13.0	2.7	6.0
587	Southfork Est	MHWS	30	67	135	302	20.0	1.5	3.4
595	Country Terrace	Srylnd80%	20	45	90	201	10.0	2.0	4.5
596	Thrasher Terrace	Sharyland	20	45	90	201	10.0	2.0	4.5
599	Beamsley	Sharyland(w)	50	112	225	503	40.0	1.3	2.8
604	Villa Del Carmen	Sharyland	6	13	27	60	12.0	0.5	1.1
609	Villa Del Sol	No. Alamo	22	49	99	221	22.9	1.0	2.1
610	Sevilla Park #1	No. Alamo	12	27	54	121	11.7	1.0	2.3
612	El Charro Sub #1 (West)	No. Alamo	11	25	50	111	52.7	0.2	0.5
614	El Castilleja	No. Alamo	16	36	72	161	75.8	0.2	0.5
615	Mesquite Acres	No. Alamo	21	47	95	211	15.0	1.4	3.1
616	Arco Iris #2	Well Water	57	127	257	573	18.0	3.2	7.1
620	Aldamas & No. 2	No. Alamo	48	107	216	483	18.5	2.6	5.8
622	Las Palmas	No. Alamo	10	22	45	101	19.3	0.5	1.2
623	Eldora Gardens Sub	No. Alamo	16	36	72	161	8.9	1.8	4.0
625	Small Sub #2	No. Alamo	50	112	225	503	33.5	1.5	3.3
626	Los Brisas	No. Alamo	62	139	279	624	30.0	2.1	4.6
631	Nadia	No. Alamo	21	47	95	211	8.0	2.6	5.9
634	R.S.W. #1	No. Alamo	37	83	167	372	7.6	4.9	10.8
636	Bar VI (Barra Privies)	No. Alamo	70	156	315	704	32.0	2.2	4.9
654	Val Bar Estates	No. Alamo	41	92	185	412	30.0	1.4	3.1
657	Small Sub #1	No. Alamo	50	112	225	503	24.0	2.1	4.7

TABLE A-1 (Cont.)
COLONIAS OF THE LOWER RIO GRANDE VALLEY

HIDALGO COUNTY

(1) MAP NO.	(2) COLONIA NAME	(3) WATER SUPPLY SOURCE	(4) 1986 HSNG UNITS	(5) 2010 HSNG UNITS	(6) 1986 POP.	(7) 2010 POP.	(8) COLONIA AREA (acres)	(9) 1986 COLONIA DENSITY (units/ac)	(10) 2010 COLONIA DENSITY (units/ac)
662	Regency Acres	Alamo	85	190	383	855	20.0	4.3	9.5
667	Cole	No. Alamo	6	13	27	60	20.0	0.3	0.7
676	Garza Terrace	MHWS	42	94	189	422	20.0	2.1	4.7
677	Tract W. of Garza Terr	MHWS	42	94	189	422	40.0	1.1	2.3
680	Colonia Estrella	MHWS	37	83	167	372	18.0	2.1	4.6
681	El Sol	MHWS	25	56	113	251	30.8	0.8	1.8
688	Angela	Weslaco	30	67	135	302	15.5	1.9	4.3
699	King Ranch #1 & #2	Tierra Blnca	50	112	225	503	20.0	2.5	5.6
700	Nuevo Penitas	Tierra Blnca	50	112	225	503	20.0	2.5	5.6
701	Penitas	La Joya	205	458	923	2062	42.1	4.9	10.9
702	El Rio	La Joya	20	45	90	201	11.7	1.7	3.8
706	Chihuahua	La Joya	30	67	135	302	12.4	2.4	5.4
708	Perezville	La Joya	80	179	360	805	16.4	4.9	10.9
709	Catalina Estates	Hid Mud#1	5	11	23	50	4.0	1.3	2.8
711	Country Grove	La Joya	20	45	90	201	6.7	3.0	6.6
713	Mata	La Joya	55	123	248	553	16.1	3.4	7.6
717	Tierra Maria/Valle Sac Bella	La Joya	30	67	135	302	11.1	2.7	6.0
719	Los Trevino 1, 2, 3, 4	La Joya	100	224	450	1006	75.0	1.3	3.0
721	Plainview	None	5	11	23	50	13.0	0.4	0.9
725	South Minnesota Rd 1,2,3	La Joya	40	89	180	402	12.3	3.2	7.2
730	Acevedo #1 (Esquivel Jr)	La Joya	25	56	113	251	15.0	1.7	3.7
731	Acevedo #2 (Esquivel)	La Joya	50	112	225	503	41.1	1.2	2.7
740	La Homa Rd	Unknown	25	56	113	251	9.3	2.7	6.0
742	Abram (Ojo de Agua)/ChapaJosep	La Joya	206	460	927	2072	80.0	2.6	5.8
746	Johnson, Paul	Sharyland	45	101	203	453	10.0	4.5	10.1
747	La Homa Rd. North	Unknown	30	67	135	302	30.0	1.0	2.2
748	Ramirez Est.	La Joya	8	18	36	80	4.5	1.8	4.0
749	Acevedo, Daniel Sub	Sharyland	15	34	68	151	8.1	1.8	4.1
751	Henojosa, Ariel #1	Sharyland	14	31	63	141	18.0	0.8	1.7
754	Lakeside	La Joya	15	34	68	151	15.0	1.0	2.2
756	Quarto Vientos	None	36	80	162	362	8.9	4.0	9.0
760	La Camellia	La Joya	45	101	203	453	15.0	3.0	6.7
767	Carlos	La Joya	40	89	180	402	10.0	4.0	8.9
770	Hilda #1	La Joya	80	179	360	805	35.0	2.3	5.1
772	Colonia Lucero Del Norte	No. Alamo	5	11	23	50	10.4	0.5	1.1
773	Sunrise Hill Sub	No. Alamo	71	159	320	714	150.2	0.5	1.1
774	Acevedo #4	La Joya	35	78	158	352	15.0	2.3	5.2
796	Polonski Sub	Sharyland	30	67	135	302	10.0	3.0	6.7
798	Doolittle Acres	No. Alamo	6	13	27	60	3.0	2.0	4.5
821	Grovewood	Sharyland	9	20	41	91	30.0	0.3	0.7
822	Perlas De Naranja	Sharyland	14	31	63	141	9.9	1.4	3.2
840	Tierra Del Sol	No. Alamo	6	13	27	60	2.2	2.7	6.1

TABLE A-1 (Cont.)
COLONIAS OF THE LOWER RIO GRANDE VALLEY

HIDALGO COUNTY

(1) MAP NO.	(2) COLONIA NAME	(3) WATER SUPPLY SOURCE	(4) 1986 HSNG UNITS	(5) 2010 HSNG UNITS	(6) 1986 POP.	(7) 2010 POP.	(8) COLONIA AREA (acres)	(9) 1986 COLONIA DENSITY (units/ac)	(10) 2010 COLONIA DENSITY (units/ac)
867	Mid Valley Est	No. Alamo	15	34	68	151	29.0	0.5	1.2
868	Lorenzana	No. Alamo	15	34	68	151	40.0	0.4	0.8
888	Madero/Wheel City	Sharyland(wc	160	358	720	1609	140.0	1.1	2.6
906	Granjeno (Loop Area)	Sharyland(w)	100	224	450	1006	100.0	1.0	2.2
911	Redgate	No. Alamo	11	25	50	111	2.7	4.0	9.0
915	Faysville, Town of	No. Alamo	200	447	900	2012	100.0	2.0	4.5
919	Colonia Las Palos	MHWS	33	74	149	332	6.4	5.2	11.5
920	Progreso	Unknown	360	805	1620	3621	258.7	1.4	3.1
928	Colonia Capitallo	Unknown	30	67	135	302	8.7	3.4	7.7
930	Relampago	Unknown	30	67	135	302	15.4	1.9	4.3
933	Colonia Jesus Maria	Unknown	30	67	135	302	8.7	3.4	7.7
936	Los Pampas	Unknown	3	7	14	30	1.1	2.6	5.9
937	Los Pampas #2	Unknown	3	7	14	30	1.6	1.9	4.2
940	El Monte	Unknown	13	29	59	131	16.7	0.8	1.7
941	Lookingbill, George	No. Alamo	12	27	54	121	14.6	0.8	1.8
952	La Palma	No. Alamo	19	42	86	191	24.8	0.8	1.7
959	Delta Lake Colonia	Unknown	9	20	41	91	4.7	1.9	4.3
960	Havana Sub	La Joya	40	89	180	402	30.0	1.3	3.0
961	Linn Siding	Unknown	8	18	36	80	3.0	2.7	6.0
965	Valle Vista	La Joya	20	45	90	201	4.1	4.8	10.8
968	Flores	La Joya	35	78	158	352	12.6	2.8	6.2
969	Colonia Rodrigue/Sullivan City	La Joya	225	503	1013	2263	83.2	2.7	6.0
970	Fisher	La Joya	60	134	270	603	45.0	1.3	3.0
974	La Aurora	La Joya	40	89	180	402	13.6	2.9	6.6
975	Cuevitas (Town)	La Joya	42	94	189	422	70.0	0.6	1.3
977	San Miguel	La Joya	15	34	68	151	4.7	3.2	7.2
978	Las Cuevas #2	La Joya	70	156	315	704	25.0	2.8	6.3
979	Unknown	Unknown	2	4	9	20	0.5	3.7	8.3
980	Los Ebanos Community	La Joya	225	503	1013	2263	125.0	1.8	4.0
981	Havana(Community)/Havana Lomas	La Joya	10	22	45	101	62.5	0.2	0.4
985	El Flaco	La Joya	12	27	54	121	60.0	0.2	0.4
986	Unknown	Unknown	10	22	45	101	3.3	3.0	6.7
987	Basham #15	None	25	56	113	251	20.0	1.3	2.8
988	Regency Acres	None	14	31	63	141	20.0	0.7	1.6
991	Bogert	Sharyland	3	7	14	30	0.8	3.9	8.7
993	Orange Hill	No Developme	4	9	18	40	3.0	1.3	3.0
994	Basham #7	Sharyland	9	20	41	91	20.0	0.5	1.0
996	Anaqua	No. Alamo	6	13	27	60	4.7	1.3	2.9
999	Highland Farms	No. Alamo	55	123	248	553	20.4	2.7	6.0
3000	La Riena	Unknown	50	112	225	503	15.4	3.2	7.2
3003	Scissors	Unknown	100	224	450	1006	77.0	1.3	2.9
3004	Unknown	Unknown	15	34	68	151	4.7	3.2	7.2

TABLE A-1 (Cont.)
COLONIAS OF THE LOWER RIO GRANDE VALLEY

HIDALGO COUNTY

(1) MAP NO.	(2) COLONIA NAME	(3) WATER SUPPLY SOURCE	(4) 1986 HSNG UNITS	(5) 2010 HSNG UNITS	(6) 1986 POP.	(7) 2010 POP.	(8) COLONIA AREA (acres)	(9) 1986 COLONIA DENSITY (units/ac)	(10) 2010 COLONIA DENSITY (units/ac)
3005	Unknown	Unknown	6	13	27	60	12.4	0.5	1.1
3006	Unknown	Unknown	25	56	113	251	12.9	1.9	4.3
3007	Unknown	Unknown	20	45	90	201	15.4	1.3	2.9
3050	Unknown	Unknown	16	36	72	161	3.5	4.6	10.3
3051	Mila Doce Sub	No. Alamo	10	22	45	101	7.8	1.3	2.9
3052	Stewart Place Sub #2	Sharyland	9	20	41	91	10.6	0.8	1.9
3061	Unknown	Unknown	20	45	90	201	9.3	2.2	4.8
5001	Unknown	Unknown	3	7	14	30	0.6	4.7	10.4
5002	Unknown	Unknown	12	27	54	121	3.0	4.0	9.0
5003	Unknown	Unknown	1	2	5	10	0.3	3.6	8.0
5004	Unknown	Unknown	6	13	27	60	1.3	4.8	10.7
5005	Unknown	Unknown	6	13	27	60	5.0	1.2	2.7
5006	Unknown	Unknown	6	13	27	60	1.6	3.8	8.6
5007	Unknown	Unknown	30	67	135	302	4.6	6.5	14.4
5008	Unknown	Unknown	40	89	180	402	6.2	6.5	14.5
5009	Unknown	Unknown	20	45	90	201	4.1	4.8	10.8
5010	Unknown	Unknown	40	89	180	402	9.9	4.0	9.0
5011	Unknown	Unknown	25	56	113	251	3.2	7.7	17.3
5020	Unknown	Unknown	15	34	68	151	2.3	6.4	14.3
5021	Unknown	Unknown	25	56	113	251	5.2	4.8	10.8
6000	Unknown	Unknown	4	9	18	40	1.0	3.9	8.8
6015	M & S	Sharyland	8	18	36	80	10.0	0.8	1.8
6016	Palm Sub	Sharyland	4	9	18	40	8.3	0.5	1.1
6018	Monger Line	Sharyland	9	20	41	91	3.0	3.0	6.7
6019	Dimas	Sharyland	5	11	23	50	4.0	1.3	2.8
6021	Rasham MB	Sharyland	30	67	135	302	20.0	1.5	3.4
6022	Salas	Sharyland	6	13	27	60	4.8	1.3	2.8
6025	Edinburg East Sub	No. Alamo	5	11	23	50	10.0	0.5	1.1
6027	Isaacs	No. Alamo	3	7	14	30	35.0	0.1	0.2
6028	Big John	No. Alamo	10	22	45	101	15.0	0.7	1.5
Count: 366			11512	25729	51804	115782	Ave: 25.4	Ave: 1.9	Ave: 4.2

TABLE A-1 (Cont.)
COLONIAS OF THE LOWER RIO GRANDE VALLEY

CAMERON COUNTY

(1) MAP NO.	(2) COLONIA NAME	(3) WATER SUPPLY SOURCE	(4) 1986 HSNG UNITS	(5) 2010 HSNG UNITS	(6) 1986 POP.	(7) 2010 POP.	(8) COLONIA AREA (acres)	(9) 1986 COLONIA DENSITY (units/ac)	(10) 2010 COLONIA DENSITY (units/ac)
1022	21 (See El Jardin)	El Jardin	10	19	45	84	4.6	2.2	4.0
1026	La Coma Del Norte	E.Rio Hondo	130	241	585	1086	55.0	2.4	4.4
1027	Cisneros (Limon)	E.Rio Hondo	10	19	45	84	3.1	3.2	6.0
1035	Los Cuates	E.Rio Hondo	18	33	81	150	5.6	3.2	6.0
1042	Orason Acres/ChulaVista/Shoema	E.Rio Hondo	30	56	135	251	9.2	3.2	6.0
1049	La Tina Ranch	E.Rio Hondo	50	93	225	418	15.4	3.3	6.0
1073	Rice Tracts	MHWS	26	48	117	217	65.0	0.4	0.7
1074	Lago Sub	MHWS	81	150	365	677	24.9	3.3	6.0
1095	Villa Cavazos	MHWS	50	93	225	418	38.0	1.3	2.4
1099	Olmito	Olmito	274	509	1233	2288	84.1	3.3	6.0
1108	Los Indios	MHWS	80	148	360	668	24.6	3.3	6.0
1109	Carricitos-Landrum	MHWS	45	84	203	376	13.8	3.3	6.0
1110	Polo Arizmendi/Padilla	MHWS	19	35	86	159	12.0	1.6	2.9
1112	La Paloma	MHWS	100	186	450	835	25.6	3.9	7.3
1115	Montalvo	MHWS	50	93	225	418	27.0	1.9	3.4
1117	El Calaboz	MHWS	36	67	162	301	11.1	3.2	6.0
1118	(El) Ranchito	MHWS	113	210	509	944	34.7	3.3	6.0
1119	Encantada	MHWS	131	243	590	1094	40.2	3.3	6.0
1151	Leal Sub	MHWS	25	46	113	209	15.0	1.7	3.1
1154	Las Yescas	E.Rio Hondo	40	74	180	334	17.0	2.4	4.4
1158	Lozano	E.Rio Hondo	120	223	540	1002	36.0	3.3	6.2
1161	Glenwood Acres Sub	E.Rio Hondo	25	46	113	209	7.7	3.2	6.0
1163	Santa Maria	MHWS	239	444	1076	1996	25.5	9.4	17.4
1164	Bluetown	MHWS	91	169	410	760	9.7	9.4	17.4
1166	El Venadito	MHWS	46	85	207	384	14.1	3.3	6.0
1226	San Pedro/Carmen/Barrera Gd.	MHWS	80	148	360	668	24.6	3.3	6.0
1230	Villa Nueva	MHWS	83	154	374	693	25.5	3.3	6.0
1241	Valle Hermosa	El Jardin	20	37	90	167	6.6	3.0	5.6
1242	Alabama/Arkansas (La Coma)	El Jardin	50	93	225	418	28.8	1.7	3.2
1244	Cameron Park 1	MHWS	500	928	2250	4176	85.2	5.9	10.9
1255	Stuart Sub	El Jardin	200	371	900	1670	34.1	5.9	10.9
1263	Barrio Sub	El Jardin	40	74	180	334	4.3	9.3	17.3
1264	Illinois Heights	El Jardin	20	37	90	167	6.2	3.2	6.0
1266	King Sub	El Jardin	130	241	585	1086	13.9	9.4	17.4
1272	Los Cuates	El Jardin	38	71	171	317	11.7	3.3	6.0
1273	Coronado	El Jardin	29	54	131	242	3.1	9.3	17.3
1274	Pleasant Meadows	El Jardin	50	93	225	418	15.4	3.3	6.0
1281	Valle Escondido	El Jardin	15	28	68	125	14.2	1.1	2.0
1282	Saldivar	El Jardin	25	46	113	209	7.7	3.2	6.0
1284	Villa Pancho	None	62	115	279	518	19.1	3.3	6.0
1295	25	E.Rio Hondo	12	22	54	100	3.7	3.2	6.0
1297	Escamilla's	MHWS	10	19	45	84	10.0	1.0	1.9

TABLE A-1 (Cont.)
COLONIAS OF THE LOWER RIO GRANDE VALLEY

CAMERON COUNTY

(1) MAP NO.	(2) COLONIA NAME	(3) WATER SUPPLY SOURCE	(4) 1986 HSNG UNITS	(5) 2010 HSNG UNITS	(6) 1986 POP.	(7) 2010 POP.	(8) COLONIA AREA (acres)	(9) 1986 COLONIA DENSITY (units/ac)	(10) 2010 COLONIA DENSITY (units/ac)
1299	Palmer	MHWS	30	56	135	251	9.2	3.2	6.0
1300	Lasana	E.Rio Hondo	30	56	135	251	3.2	9.3	17.3
1301	26	E.Rio Hondo	60	111	270	501	18.4	3.3	6.0
1302	Laguna Escondido Heights	E.Rio Hondo	11	20	50	92	5.7	1.9	3.6
1304	Iglesia Antigua	MHWS	32	59	144	267	9.9	3.2	6.0
1305	S Cluster of houses along rd.	Ind. Well	11	20	50	92	12.0	0.9	1.7
1306	T 2 Unknown Sub along rd	Ind. Well	69	128	311	576	18.0	3.8	7.1
1308	Q Unknown Sub	Ind. Well	27	50	122	226	18.0	1.5	2.8
1310	X Unknown Sub	Ind. Well	12	22	54	100	5.0	2.4	4.5
1311	R Unknown Sub	Ind. Well	12	22	54	100	10.0	1.2	2.2
1313	W Cluster of houses along rd.	Ind. Well	22	41	99	184	12.0	1.8	3.4
1334	Unnamed B	El Jardin	10	19	45	84	3.1	3.2	6.0
1336	Unnamed D	3/Wells	25	46	113	209	2.7	9.3	17.2
1339	Saldivar	El Jardin	30	56	135	251	3.2	9.3	17.3
1340	Unnamed C	El Jardin	15	28	68	125	8.7	1.7	3.2
1341	Del Mar Heights	MHWS	47	87	212	393	252.0	0.2	0.3
7000	Unknown	Unknown	7	13	32	58	2.2	3.2	6.0
7001	Unknown	Unknown	35	65	158	292	10.8	3.2	6.0
7002	Unknown	Unknown	20	37	90	167	6.2	3.2	6.0
7004	Unknown	Unknown	12	22	54	100	3.7	3.2	6.0
7005	Unknown	Unknown	25	46	113	209	7.7	3.2	6.0
7006	Unknown	Unknown	15	28	68	125	2.6	5.8	10.8
7007	Unknown	Unknown	26	48	117	217	8.0	3.2	6.0
Count: 65			3786	7027	17037	31621	Ave: 21.0	Ave: 3.6	Ave: 6.7

TABLE A-1 (Cont.)
COLONIAS OF THE LOWER RIO GRANDE VALLEY

WILLACY COUNTY

(1) MAP NO.	(2) COLONIA NAME	(3) WATER SUPPLY SOURCE	(4) 1986 HSNG UNITS	(5) 2010 HSNG UNITS	(6) 1986 POP.	(7) 2010 POP.	(8) COLONIA AREA (acres)	(9) 1986 COLONIA DENSITY (units/ac)	(10) 2010 COLONIA DENSITY (units/ac)
2001	Santa Monica	No. Alamo	20	27	90	119	3.7	5.4	7.2
2007	LaSara	No. Alamo	137	182	617	818	25.1	5.5	7.3
2019	Willamar	No. Alamo	4	5	18	24	0.8	5.2	6.9
2034	Sebastian	Sebastian	425	564	1913	2538	124.3	3.4	4.5
Count: 4			586	778	2637	3499	Ave: 38.5	Ave: 4.9	Ave: 6.5

TABLE A-2
ALTERNATIVE COLLECTION SYSTEM COSTS
FOR INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 CLASS	2010 COLONIAS DENSITY (cap/ac)	GRAVITY SYSTEM CAPITAL COST	GRINDER SYSTEM CAPITAL COST	STEP SYSTEM CAPITAL COST	SDG SYSTEM CAPITAL COST	VACUUM SYSTEM CAPITAL COST	GRAVITY SYSTEM O&M COST $/MONTH	GRINDER SYSTEM O&M COST $/MONTH	STEP SYSTEM O&M COST $/MONTH	SDG SYSTEM O&M COST $/MONTH	VACUUM SYSTEM O&M COST $/MONTH	GRAVITY SYSTEM TOTAL COST $/MO/UNIT	GRINDER SYSTEM TOTAL COST $/MO/UNIT	STEP SYSTEM TOTAL COST $/MO/UNIT	SDG SYSTEM TOTAL COST $/MO/UNIT	VACUUM SYSTEM TOTAL COST $/MO/UNIT
	HIDALGO COUNTY CLASS 1 GROUP																	
11	Lull	C	27.9	775,000	1,102,000	1,167,000	929,000	853,000	1,450	3,510	2,890	1,860	3,930	16	26	26	20	23
578	Villas Del Valle	D	27.2	442,000	622,000	658,000	528,000	483,000	810	1,980	1,630	1,050	2,210	16	26	26	20	23
422	Expressway Heights	G	19.6	500,000	610,000	645,000	565,000	496,000	780	1,900	1,560	1,010	2,120	19	26	26	22	24
532	Villa Verde #1, #3	G	22.0	460,000	590,000	624,000	530,000	472,000	760	1,850	1,530	980	2,070	18	26	26	21	23
419	Sun Country Est	G	27.2	301,000	423,000	447,000	359,000	328,000	550	1,350	1,110	710	1,500	16	26	26	20	23
3000	La Riena	X	32.6	162,000	246,000	261,000	199,000	187,000	330	790	650	420	880	15	26	26	19	22
796	Polonski Sub	A	30.2	101,000	148,000	157,000	122,000	114,000	200	470	390	250	530	16	26	26	19	22
75	Colonia Rodriquez #1 & #2	C	129.7	49,000	139,000	148,000	82,000	91,000	200	470	390	250	530	9	25	25	14	19
444	La Donna**	F	4.9	249,000	174,000	183,000	238,000	178,000	200	470	390	250	530	35	29	29	34	30
933	Colonia Jesus Maria	X	34.7	94,000	147,000	156,000	117,000	111,000	200	470	390	250	530	15	26	26	19	22
928	Colonia Capitallo	X	34.7	94,000	147,000	156,000	117,000	111,000	200	470	390	250	530	15	26	26	19	22
158	Yokum Hall	C	21.7	107,000	136,000	144,000	123,000	109,000	180	430	350	230	480	18	26	26	21	23
681	El Sol	D	8.2	161,000	137,000	144,000	162,000	128,000	160	400	330	210	440	27	28	28	28	27
462	Mile 7 Sub	F	26.0	72,000	100,000	106,000	86,000	78,000	130	320	260	170	350	17	26	26	20	23
3007		E	13.0	102,000	105,000	111,000	109,000	91,000	130	320	260	170	350	22	27	27	25	25
368	Tierra Bone	E	43.3	56,000	97,000	103,000	73,000	71,000	130	320	260	170	350	14	26	25	18	21
552	Mile 15 North Sub	J	18.0	43,000	51,000	54,000	49,000	42,000	70	160	130	80	180	19	27	26	22	24
549	Eastland Park	H	2.5	115,000	64,000	67,000	105,000	73,000	70	160	130	80	180	47	31	31	43	36
386	Carroll Rd Acres	E	4.9	66,000	46,000	49,000	64,000	47,000	50	130	100	70	140	34	29	29	34	30
436	El Gato	E	7.0	56,000	45,000	47,000	55,000	43,000	50	130	100	70	140	29	29	28	30	28
362	Laguna Park	E	4.6	60,000	41,000	43,000	57,000	42,000	50	110	90	60	120	36	29	29	35	30
43	N. McColl	C	14.9	33,000	36,000	38,000	36,000	31,000	50	110	90	60	120	21	27	26	23	24
310	Klement, W.J.	B	26.9	25,000	35,000	37,000	30,000	27,000	50	110	90	60	120	17	26	26	20	22
61	Ranchette Est	B	7.0	48,000	39,000	41,000	48,000	37,000	50	110	90	60	120	29	28	28	30	28
996	Anaqua	G	12.8	31,000	32,000	33,000	33,000	27,000	40	90	80	50	110	23	27	27	25	25
840	Tierra Del Sol	F	27.5	21,000	30,000	32,000	25,000	23,000	40	90	80	50	110	16	26	26	20	23
604	Villa Del Carmen	B	5.0	49,000	35,000	36,000	47,000	35,000	40	90	80	50	110	34	29	29	33	30
	Subtotal	27		$4,272,000	$5,377,000	$5,687,000	$4,888,000	$4,328,000	$6,970	$16,810	$13,840	$8,920	$18,780					
	HIDALGO COUNTY CLASS 2 GROUP																	
561	Hargill, City of	2	39.2	738,000	1,218,000	1,291,000	941,000	902,000	1,630	3,960	3,260	2,100	4,420	14	26	25	18	22
980	Los Ebanos Community	2	18.1	974,000	1,150,000	1,215,000	1,089,000	946,000	1,470	3,560	2,930	1,890	3,980	19	26	26	22	24
742	Abram (Ojo de Agua)/ChapaJosep	2	25.9	747,000	1,028,000	1,087,000	884,000	803,000	1,340	3,260	2,690	1,730	3,640	17	26	26	20	23
915	Faysville, Town of	2	20.1	822,000	1,015,000	1,073,000	934,000	822,000	1,300	3,170	2,610	1,680	3,540	19	26	26	21	24
888	Madero/Wheel City	2	11.5	868,000	848,000	895,000	912,000	749,000	1,040	2,530	2,090	1,340	2,830	24	27	27	25	26
199	Nuevo Alton	2	15.6	723,000	801,000	846,000	791,000	675,000	1,010	2,450	2,020	1,300	2,740	21	27	27	23	24
517	Heidelberg	2	19.6	550,000	671,000	709,000	622,000	546,000	860	2,090	1,720	1,110	2,340	19	26	26	22	24
906	Granjeno (Loop Area)	2	10.1	580,000	537,000	566,000	599,000	484,000	650	1,580	1,300	840	1,770	25	27	27	27	26
662	Regency Acres	2	42.7	240,000	412,000	437,000	311,000	302,000	550	1,350	1,110	710	1,500	14	26	25	18	21
361	Roosevselt Rd Sub(Chapa#3)	2	26.1	188,000	259,000	274,000	222,000	202,000	340	820	680	440	920	17	26	26	20	23
369	Bar VII Sub(DelValle)/Babbs#2	2	21.7	194,000	247,000	262,000	223,000	198,000	320	780	640	410	870	18	26	26	21	23
499	La Mesa	2	5.8	336,000	250,000	263,000	327,000	248,000	290	700	570	370	780	32	29	28	32	29
14	Americana Sub	2	14.4	208,000	224,000	236,000	226,000	191,000	280	680	560	360	760	21	27	27	24	25

TABLE A-2 (Cont.)
ALTERNATIVE COLLECTION SYSTEM COSTS
FOR INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 CLASS	2010 COLONIAS DENSITY (cap/ac)	GRAVITY SYSTEM CAPITAL COST	GRINDER SYSTEM CAPITAL COST	STEP SYSTEM CAPITAL COST	SDG SYSTEM CAPITAL COST	VACUUM SYSTEM CAPITAL COST	GRAVITY SYSTEM O&M COST $/MONTH	GRINDER SYSTEM O&M COST $/MONTH	STEP SYSTEM O&M COST $/MONTH	SDG SYSTEM O&M COST $/MONTH	VACUUM SYSTEM O&M COST $/MONTH	GRAVITY SYSTEM TOTAL COST $/MO/UNIT	GRINDER SYSTEM TOTAL COST $/MO/UNIT	STEP SYSTEM TOTAL COST $/MO/UNIT	SDG SYSTEM TOTAL COST $/MO/UNIT	VACUUM SYSTEM TOTAL COST $/MO/UNIT
975	Cuevitas (Town)	2	6.0	314,000	238,000	250,000	306,000	234,000	270	660	550	350	740	31	29	28	31	29
725	South Minnesota Rd 1,2,3	2	32.7	129,000	197,000	208,000	159,000	149,000	260	630	520	340	710	15	26	26	19	22
186	Casa De Los Vecinos	2	13.4	161,000	167,000	177,000	172,000	144,000	210	510	420	270	570	22	27	27	24	25
587	Southfork Est	2	15.1	142,000	155,000	164,000	155,000	132,000	200	470	390	250	530	21	27	27	23	25
930	Relampago	2	19.5	125,000	153,000	161,000	141,000	124,000	200	470	390	250	530	19	26	26	22	24
706	Chihuahua	2	24.3	112,000	150,000	159,000	131,000	118,000	200	470	390	250	530	17	26	26	20	23
380	Clark's Sub	2	9.8	176,000	161,000	170,000	181,000	146,000	200	470	390	250	530	25	27	27	27	26
155	Muniz*	2	6.1	208,000	158,000	166,000	203,000	155,000	180	440	370	230	500	31	28	28	31	29
271	Friendly Acres	2	8.7	156,000	136,000	143,000	158,000	126,000	160	400	330	210	440	27	28	28	28	27
3006		2	19.5	104,000	127,000	134,000	118,000	103,000	160	400	330	210	440	19	26	26	22	24
2	Hoehn Drive	2	6.3	183,000	141,000	148,000	179,000	138,000	160	400	330	210	440	31	29	28	31	29
500	Harmony Hill and others	2	6.5	180,000	140,000	147,000	177,000	136,000	160	400	330	210	440	30	28	28	31	29
97	Evergreen	2	38.2	63,000	102,000	109,000	80,000	76,000	140	330	270	180	370	14	25	25	18	22
160	Tower Sub	2	36.1	61,000	98,000	104,000	77,000	73,000	130	320	260	170	350	14	26	26	18	22
154	Tierra Del Valle 1 & 2	2	5.7	153,000	114,000	120,000	149,000	113,000	130	320	260	170	350	32	29	29	32	29
965	Valle Visto	2	48.7	53,000	96,000	102,000	71,000	70,000	130	320	260	170	350	13	25	25	17	21
711	Country Grove	2	29.8	68,000	99,000	105,000	82,000	76,000	130	320	260	170	350	16	26	26	19	22
3061		2	21.7	79,000	101,000	107,000	91,000	81,000	130	320	260	170	350	18	26	26	21	23
	Subtotal	31		$9,635,000	$11,193,000	$11,828,000	$10,711,000	$9,262,000	$14,230	$34,580	$28,490	$18,340	$38,610					
	HIDALGO COUNTY CLASS 3 GROUP																	
952	La Palma	3	7.7	126,000	105,000	110,000	126,000	99,000	120	300	250	160	340	28	28	28	29	28
477	Tropical Farms Sub	3	6.2	111,000	85,000	89,000	109,000	83,000	100	240	200	130	270	31	29	28	31	29
325	Citrus City	3	5.0	123,000	87,000	91,000	118,000	88,000	100	240	200	130	270	34	29	29	34	30
26	Garza, Lazaro	3	15.1	71,000	78,000	82,000	77,000	66,000	100	240	200	130	270	21	27	27	23	25
177	Longoria Sub with Pride	3	7.5	100,000	83,000	87,000	100,000	78,000	100	240	200	130	270	28	28	28	29	28
189	Palmeras	3	14.1	69,000	73,000	77,000	74,000	62,000	90	220	180	120	250	22	27	27	24	25
940	El Monte*	3	7.8	85,000	71,000	75,000	86,000	67,000	80	210	170	110	230	28	28	28	29	27
941	Lookingbill, George*	3	8.3	77,000	66,000	69,000	77,000	61,000	80	190	160	100	210	27	28	28	28	27
152	South Port Sub	3	6.4	87,000	67,000	71,000	86,000	66,000	80	190	160	100	210	31	28	28	31	29
326	Western Estate	3	11.1	61,000	59,000	62,000	64,000	52,000	70	170	140	90	190	24	27	27	26	26
911	Redgate	3	40.3	32,000	54,000	57,000	41,000	39,000	70	170	140	90	190	14	26	25	18	21
273	Bernal	3	15.5	47,000	52,000	55,000	51,000	44,000	70	160	130	80	180	21	27	27	23	25
268	Matt	3	9.5	60,000	54,000	57,000	61,000	49,000	70	160	130	80	180	26	28	27	27	27
172	Austin Stonebaker/CRJS Sub	3	5.0	82,000	58,000	61,000	79,000	59,000	70	160	130	80	180	34	29	29	34	30
6028	Big John	3	6.7	71,000	56,000	59,000	70,000	54,000	70	160	130	80	180	30	28	28	30	29
959	Delta Lake Colonia	3	19.4	38,000	46,000	48,000	43,000	37,000	60	140	120	80	160	19	26	26	22	24
207	Twin Acres	3	5.1	73,000	52,000	55,000	70,000	53,000	60	140	120	80	160	34	29	29	34	30
6018	Monger Line	3	30.2	30,000	44,000	47,000	37,000	34,000	60	140	120	80	160	16	26	26	20	22
176	Gumero, Daniel	3	21.5	32,000	40,000	43,000	37,000	32,000	50	130	100	70	140	18	26	26	21	23
961	Linn Siding	3	26.9	28,000	40,000	42,000	34,000	31,000	50	130	100	70	140	16	26	26	20	23
272	Good Valley	3	6.0	60,000	45,000	48,000	59,000	45,000	50	130	100	70	140	31	29	28	32	29
7	River Bend - (Jinks)	3	5.4	63,000	46,000	48,000	61,000	46,000	50	130	100	70	140	33	29	28	33	30
219	Acosta 107	3	7.0	56,000	45,000	47,000	55,000	43,000	50	130	100	70	140	29	29	28	30	28
359	Leal, Ramira	3	10.0	46,000	43,000	45,000	48,000	39,000	50	130	100	70	140	25	28	27	27	26

TABLE A-2 (Cont.)
ALTERNATIVE COLLECTION SYSTEM COSTS
FOR INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 CLASS	2010 COLONIAS DENSITY (cap/ac)	GRAVITY SYSTEM CAPITAL COST	GRINDER SYSTEM CAPITAL COST	STEP SYSTEM CAPITAL COST	SDG SYSTEM CAPITAL COST	VACUUM SYSTEM CAPITAL COST	GRAVITY SYSTEM O&M COST $/MONTH	GRINDER SYSTEM O&M COST $/MONTH	STEP SYSTEM O&M COST $/MONTH	SDG SYSTEM O&M COST $/MONTH	VACUUM SYSTEM O&M COST $/MONTH	GRAVITY SYSTEM TOTAL COST $/MO/UNIT	GRINDER SYSTEM TOTAL COST $/MO/UNIT	STEP SYSTEM TOTAL COST $/MO/UNIT	SDG SYSTEM TOTAL COST $/MO/UNIT	VACUUM SYSTEM TOTAL COST $/MO/UNIT
358	Minnesota Rd	3	4.7	59,000	41,000	43,000	56,000	42,000	50	110	90	60	120	35	29	29	34	31
138	Tropicana Sub	3	7.0	48,000	39,000	41,000	48,000	37,000	50	110	90	60	120	29	28	28	30	28
181	Diamond #2	3	7.0	48,000	39,000	41,000	48,000	37,000	50	110	90	60	120	29	28	28	30	28
6022	Salas	3	12.7	31,000	32,000	33,000	33,000	27,000	40	90	80	50	110	23	27	27	25	25
128	Harmel#	3	12.7	31,000	32,000	33,000	33,000	27,000	40	90	80	50	110	23	27	27	25	25
312	TWA	3	6.0	45,000	34,000	36,000	44,000	33,000	40	90	80	50	110	31	28	29	32	29
136	Lopez-Gutierrez	3	6.0	45,000	34,000	36,000	44,000	33,000	40	90	80	50	110	31	28	29	32	29
3005		3	4.9	50,000	35,000	37,000	48,000	36,000	40	90	80	50	110	35	29	29	34	31
250	Stables, The#	3	6.0	45,000	34,000	36,000	44,000	33,000	40	90	80	50	110	31	28	29	32	29
6025	Edinburg East Sub	3	5.0	41,000	29,000	30,000	39,000	29,000	30	80	70	40	90	34	29	29	33	30
772	Colonia Lucero Del Norte	3	4.8	42,000	29,000	30,000	40,000	30,000	30	80	70	40	90	35	29	29	34	31
709	Catalina Estates	3	12.6	26,000	26,000	28,000	28,000	23,000	30	80	70	40	90	22	27	28	25	26
6019	Dimas	3	12.6	26,000	26,000	28,000	28,000	23,000	30	80	70	40	90	22	27	28	25	26
993	Orange Hill	3	13.4	20,000	21,000	22,000	22,000	18,000	30	60	50	30	70	22	27	26	24	25
6000		3	39.5	12,000	19,000	21,000	15,000	14,000	30	60	50	30	70	15	25	26	18	21
6016	Palm Sub	3	4.8	33,000	23,000	24,000	32,000	24,000	30	60	50	30	70	35	29	28	34	31
991	Bogert	3	39.0	9,000	15,000	15,000	11,000	11,000	20	50	40	30	50	14	26	25	18	21
937	Los Pampas #2	3	18.9	13,000	15,000	16,000	14,000	13,000	20	50	40	30	50	19	26	26	22	24
10	Adan Lee	3	39.0	9,000	15,000	15,000	11,000	11,000	20	50	40	30	50	14	26	25	18	21
5001		3	46.8	8,000	14,000	15,000	11,000	10,000	20	50	40	30	50	13	25	25	18	20
936	Los Pampas	3	26.4	11,000	15,000	16,000	13,000	12,000	20	50	40	30	50	17	26	26	21	23
979		3	37.4	6,000	10,000	10,000	8,000	7,000	10	30	30	20	40	14	26	26	20	22
469	Ramosville	3	17.6	4,000	5,000	5,000	5,000	4,000	10	20	10	10	20	20	28	23	23	24
	Subtotal	47		$2,290,000	$2,031,000	$2,136,000	$2,338,000	$1,861,000	$2,470	$5,920	$4,900	$3,180	$6,640					
	HIDALGO COUNTY TOTAL	105		$16,197,000	$18,601,000	$19,651,000	$17,937,000	$15,451,000	$23,670	$57,310	$47,230	$30,440	$64,030					
	CAMERON COUNTY CLASS 1 GROUP																	
1244	Cameron Park 1	0	49.0	1,097,000	2,000,000	2,121,000	1,462,000	1,442,000	2,710	6,570	5,410	3,480	7,350	13	25	25	17	21
1255	Stuart Sub	0	49.0	439,000	800,000	848,000	585,000	577,000	1,080	2,630	2,170	1,390	2,940	13	25	25	17	21
1266	King Sub	0	78.2	276,000	510,000	541,000	334,000	349,000	700	1,710	1,410	900	1,910	11	25	25	15	20
1284	Villa Pancho	0	27.2	182,000	256,000	271,000	217,000	199,000	340	820	670	430	910	16	26	26	20	23
1301	26	M	27.2	176,000	248,000	262,000	210,000	192,000	320	790	650	420	880	16	26	26	20	23
1339	Saldivar	0	77.7	52,000	118,000	125,000	77,000	81,000	160	390	320	210	440	11	25	25	16	20
1073	Rice Tracts	N	3.3	216,000	132,000	138,000	201,000	144,000	140	340	280	180	380	41	30	30	39	33
1336	Unnamed D	0	77.6	44,000	98,000	104,000	64,000	67,000	140	330	270	170	370	11	25	25	15	20
1151	Leal Sub	N	13.9	102,000	108,000	114,000	110,000	93,000	140	330	270	170	370	22	27	27	24	25
1035	Los Cuates	P	27.1	53,000	74,000	79,000	63,000	58,000	100	240	190	130	260	16	26	26	20	23
7004	Unknown	0	27.0	35,000	50,000	52,000	42,000	39,000	60	160	130	80	180	16	26	26	20	23
	Subtotal	11		$2,622,000	$4,394,000	$4,655,000	$3,365,000	$3,241,000	$5,890	$14,310	$11,770	$7,560	$15,990					

CAMERON COUNTY CLASS 2 GROUP

TABLE A-2 (Cont.)
ALTERNATIVE COLLECTION SYSTEM COSTS
FOR INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 CLASS	2010 COLONIAS DENSITY (cap/ac)	GRAVITY SYSTEM CAPITAL COST	GRINDER SYSTEM CAPITAL COST	STEP SYSTEM CAPITAL COST	SDG SYSTEM CAPITAL COST	VACUUM SYSTEM CAPITAL COST	GRAVITY SYSTEM O&M COST $/MONTH	GRINDER SYSTEM O&M COST $/MONTH	STEP SYSTEM O&M COST $/MONTH	SDG SYSTEM O&M COST $/MONTH	VACUUM SYSTEM O&M COST $/MONTH	GRAVITY SYSTEM TOTAL COST $/MO/UNIT	GRINDER SYSTEM TOTAL COST $/MO/UNIT	STEP SYSTEM TOTAL COST $/MO/UNIT	SDG SYSTEM TOTAL COST $/MO/UNIT	VACUUM SYSTEM TOTAL COST $/MO/UNIT
1099	Olmito	2	27.2	805,000	1,132,000	1,198,000	960,000	879,000	1,480	3,600	2,970	1,910	4,030	16	26	26	20	23
1163	Santa Maria	2	78.3	415,000	937,000	995,000	613,000	642,000	1,290	3,140	2,590	1,660	3,510	11	25	25	15	20
1158	Lozano	2	27.8	348,000	495,000	524,000	417,000	383,000	650	1,580	1,300	840	1,760	16	26	26	20	22
1164	Bluetown	2	78.2	158,000	357,000	379,000	234,000	244,000	490	1,200	990	630	1,340	11	25	25	15	20
1230	Villa Nueva	2	27.2	244,000	343,000	363,000	291,000	266,000	450	1,090	900	580	1,220	16	26	26	20	23
1074	Lago Sub	2	27.2	238,000	335,000	354,000	284,000	260,000	440	1,060	880	560	1,190	16	26	26	20	23
1108	Los Indios	2	27.2	235,000	330,000	350,000	280,000	257,000	430	1,050	870	560	1,180	16	26	26	20	23
1226	San Pedro/Carmen/Barrera Gd.	2	27.2	235,000	330,000	350,000	280,000	257,000	430	1,050	870	560	1,180	16	26	26	20	23
1306	T 2 Unknown Sub along rd	2	32.0	187,000	282,000	299,000	230,000	214,000	370	910	750	480	1,010	15	26	26	19	22
1242	Alabama/Arkansas (La Coma)	2	14.5	201,000	216,000	228,000	217,000	184,000	270	660	540	350	730	21	27	27	24	25
1049	La Tina Ranch	2	27.2	147,000	207,000	219,000	175,000	160,000	270	660	540	350	730	16	26	26	20	23
1166	El Venadito	2	27.2	135,000	190,000	201,000	161,000	148,000	250	600	500	320	680	16	26	26	20	23
1109	Carricitos-Landrum	2	27.2	132,000	186,000	197,000	158,000	144,000	240	590	490	310	660	16	26	26	20	23
1263	Barrio Sub	2	77.9	70,000	157,000	167,000	103,000	108,000	220	530	430	280	590	11	25	25	16	20
1154	Las Yescas	2	19.7	138,000	169,000	178,000	156,000	137,000	220	530	430	280	590	19	26	26	22	24
7001	Unknown	2	27.1	103,000	145,000	153,000	123,000	112,000	190	460	380	240	510	16	26	26	20	22
1304	Iglesia Antigua	2	27.1	94,000	132,000	140,000	112,000	103,000	170	420	350	220	470	16	26	26	20	23
1299	Palmer	2	27.1	88,000	124,000	131,000	105,000	96,000	160	390	320	210	440	16	26	26	20	23
1300	Lasana	2	77.7	52,000	118,000	125,000	77,000	81,000	160	390	320	210	440	11	25	25	16	20
1042	Orason Acres/ChulaVista/Shoema	2	27.1	88,000	124,000	131,000	105,000	96,000	160	390	320	210	440	16	26	26	20	23
7007	Unknown	2	27.1	77,000	107,000	114,000	91,000	83,000	140	340	280	180	380	16	26	26	20	22
1282	Saldivar	2	27.1	74,000	103,000	109,000	88,000	80,000	140	330	270	170	370	17	26	26	20	23
1161	Glenwood Acres Sub	2	27.1	74,000	103,000	109,000	88,000	80,000	140	330	270	170	370	17	26	26	20	23
	Subtotal	23		$4,338,000	$6,622,000	$7,014,000	$5,348,000	$5,014,000	$8,760	$21,300	$17,560	$11,280	$23,820					
	CAMERON COUNTY CLASS 3 GROUP																	
1313	W Cluster of houses along rd.	3	15.3	86,000	95,000	100,000	94,000	80,000	120	290	240	150	320	21	27	27	23	24
7002	Unknown	3	27.1	59,000	83,000	87,000	70,000	64,000	110	260	220	140	290	16	26	26	20	22
1310	X Unknown Sub	3	20.0	41,000	51,000	53,000	47,000	41,000	60	160	130	80	180	18	27	26	22	24
1302	Laguna Escondido Heights	3	16.2	42,000	47,000	50,000	46,000	39,000	60	140	120	80	160	20	26	27	23	24
7000	Unknown	3	26.8	21,000	29,000	31,000	25,000	23,000	40	90	80	50	100	17	26	26	20	23
	Subtotal	5		$249,000	$305,000	$321,000	$282,000	$247,000	$390	$940	$790	$500	$1,050					
	CAMERON COUNTY TOTAL	39		$7,209,000	$11,321,000	$11,990,000	$8,995,000	$8,502,000	$15,040	$36,550	$30,120	$19,340	$40,860					
	WILLACY COUNTY CLASS 2 GROUP																	
2034	Sebastian	2	14.6	1,216,000	1,311,000	1,385,000	1,318,000	1,115,000	1,650	4,000	3,290	2,120	4,470	21	27	27	24	25
2007	LaSara	2	23.3	310,000	408,000	432,000	361,000	324,000	530	1,290	1,060	680	1,440	17	26	26	21	23
	Subtotal	2		$1,526,000	$1,719,000	$1,817,000	$1,679,000	$1,439,000	$2,180	$5,290	$4,350	$2,800	$5,910					
	WILLACY COUNTY CLASS 3 GROUP																	

TABLE A-2 (Con't.)
ALTERNATIVE COLLECTION SYSTEM COSTS
FOR INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 CLASS	2010 COLONIAS DENSITY (cap/ac)	GRAVITY SYSTEM CAPITAL COST	GRINDER SYSTEM CAPITAL COST	STEP SYSTEM CAPITAL COST	SDG SYSTEM CAPITAL COST	VACUUM SYSTEM CAPITAL COST	GRAVITY SYSTEM O&M COST $/MONTH	GRINDER SYSTEM O&M COST $/MONTH	STEP SYSTEM O&M COST $/MONTH	SDG SYSTEM O&M COST $/MONTH	VACUUM SYSTEM O&M COST $/MONTH	GRAVITY SYSTEM TOTAL COST $/MO/UNIT	GRINDER SYSTEM TOTAL COST $/MO/UNIT	STEP SYSTEM TOTAL COST $/MO/UNIT	SDG SYSTEM TOTAL COST $/MO/UNIT	VACUUM SYSTEM TOTAL COST $/MO/UNIT
2001	Santa Monica	3	23.1	45,000	59,000	63,000	53,000	47,000	80	190	150	100	210	17	26	26	21	23
2019	Willamar	3	22.7	9,000	12,000	13,000	11,000	10,000	20	40	30	20	40	18	27	26	21	23
	Subtotal	2		$54,000	$71,000	$76,000	$64,000	$57,000	$100	$230	$180	$120	$250					
	WILLACY COUNTY TOTAL	4		$1,580,000	$1,790,000	$1,893,000	$1,743,000	$1,496,000	$2,280	$5,520	$4,530	$2,920	$6,160					
	GRAND TOTAL	148		$24,986,000	$31,712,000	$33,534,000	$28,675,000	$25,449,000	$40,990	$99,380	$81,880	$52,700	$111,050					

TABLE A-3
ALTERNATIVE COLLECTION SYSTEM COSTS
FOR GROUPED COLONIAS

MAP NO.	COLONIA NAME	REGIONAL /CENTRAL SERVICE GROUP NO.	2010 GROUP CLASS	2010 GROUP DENSITY (cap/ac)	GRAVITY SYSTEM CAPITAL COST	GRINDER SYSTEM CAPITAL COST	STEP SYSTEM CAPITAL COST	SDG SYSTEM CAPITAL COST	VACUUM SYSTEM CAPITAL COST	GRAVITY SYSTEM O&M COST $/MONTH	GRINDER SYSTEM O&M COST $/MONTH	STEP SYSTEM O&M COST $/MONTH	SDG SYSTEM O&M COST $/MONTH	VACUUM SYSTEM O&M COST $/MONTH	GRAVITY SYSTEM TOTAL COST $/MO/UNIT	GRINDER SYSTEM TOTAL COST $/MO/UNIT	STEP SYSTEM TOTAL COST $/MO/UNIT	SDG SYSTEM TOTAL COST $/MO/UNIT	VACUUM SYSTEM TOTAL COST $/MO/UNIT
	HIDALGO COUNTY CLASS 1 GROUP																		
40	Tagle, Roberto	102	C																
41	Crouse	102	C	6.7	113,000	89,000	94,000	112,000	86,000	100	250	210	130	280	30	28	28	30	28
595	Country Terrace	103	B																
596	Thrasher Terrace	103	B																
599	Beamsley	103	B	6.5	647,000	505,000	531,000	637,000	491,000	590	1,420	1,170	750	1,590	30	28	28	31	29
32	Ranchitos #2	104	D																
575	Ranchitos #1	104	D																
676	Garza Terrace	104	D																
677	Tract W. of Garza Terr	104	D																
680	Colonia Estrella	104	D	12.9	1,597,000	1,638,000	1,728,000	1,703,000	1,420,000	2,030	4,940	4,070	2,610	5,520	22	27	27	24	25
580	Las Brisas Del Sur	105	D																
584	Reta Acres	105	D	10.9	550,000	527,000	556,000	574,000	469,000	650	1,570	1,290	830	1,750	24	27	27	26	26
103	Schunior Sub(NuevaSeca)	108	C																
105	Colonia Garza #2	108	C	5.3	519,000	374,000	392,000	501,000	377,000	420	1,030	850	540	1,150	33	29	29	33	30
74	Closner Sub	109	C																
87	Terry	109	C																
221	Country View Est #2	109	C																
309	Thompson Rd	109	C	7.7	1,171,000	975,000	1,026,000	1,173,000	920,000	1,150	2,800	2,310	1,480	3,130	28	28	28	29	28
81	Lopezville	110	C																
83	Villa Del Mundo	110	C																
328	North Lopezville	110	C																
609	Villa Del Sol	110	C																
610	Sevilla Park #1	110	C																
612	El Charro Sub #1 (West)	110	C																
615	Mesquite Acres	110	C																
616	Arco Iris #2*	110	C																
620	Aldamas * No. 2	110	C																
622	Las Palmas	110	C	7.7	3,306,000	2,754,000	2,899,000	3,314,000	2,600,000	3,260	7,920	6,520	4,190	8,850	28	28	28	29	28
623	Eldora Gardens Sub	111	G																
634	R.S.W. #1	111	G	7.2	363,000	294,000	309,000	361,000	281,000	350	840	690	440	940	29	28	28	30	28
631	Nadia	112	G																
636	Bar VI (Barra Privies)	112	G	9.9	530,000	489,000	515,000	547,000	442,000	590	1,440	1,190	760	1,610	25	27	27	27	26
625	Small Sub #2	113	G																
626	Las Brisas	113	G																
657	Small Sub #1	113	G	5.3	1,296,000	931,000	978,000	1,249,000	940,000	1,060	2,560	2,110	1,360	2,870	33	29	29	33	30
350	East of Eden Sub	117	E																
654	Val Bar Estates	117	E	7.7	442,000	369,000	388,000	443,000	348,000	440	1,060	870	560	1,190	28	28	28	29	28
398	Walston Farms Sub	120	F																
999	Highland Farms	120	F	12.4	600,000	606,000	639,000	636,000	528,000	750	1,820	1,500	960	2,030	23	27	27	25	25
132	Mary Ann's Sub	123	I																
133	Brenda Gay Sub	123	I	5.8	312,000	233,000	245,000	304,000	231,000	270	650	530	340	730	32	29	28	32	29
161	Green Valley Dev	124	I																
163	Evergreen	124	I																
167	El Trunifo	124	I	7.0	327,000	262,000	275,000	324,000	252,000	310	740	610	390	830	29	28	28	30	28
165	El Mesquite Sub Phase 1	125	I																

TABLE A-3 (Cont.)
ALTERNATIVE COLLECTION SYSTEM COSTS
FOR GROUPED COLONIAS

MAP NO.	COLONIA NAME	REGIONAL /CENTRAL SERVICE GROUP NO.	2010 GROUP CLASS	2010 GROUP DENSITY (cap/ac)	GRAVITY SYSTEM CAPITAL COST	GRINDER SYSTEM CAPITAL COST	STEP SYSTEM CAPITAL COST	SDG SYSTEM CAPITAL COST	VACUUM SYSTEM CAPITAL COST	GRAVITY SYSTEM O&M COST $/MONTH	GRINDER SYSTEM O&M COST $/MONTH	STEP SYSTEM O&M COST $/MONTH	SDG SYSTEM O&M COST $/MONTH	VACUUM SYSTEM O&M COST $/MONTH	GRAVITY SYSTEM TOTAL COST $/MO/UNIT	GRINDER SYSTEM TOTAL COST $/MO/UNIT	STEP SYSTEM TOTAL COST $/MO/UNIT	SDG SYSTEM TOTAL COST $/MO/UNIT	VACUUM SYSTEM TOTAL COST $/MO/UNIT
166	L & P Sub	125	I	8.2	230,000	197,000	207,000	233,000	184,000	230	570	470	300	640	27	28	28	28	27
242	Alvarez	126	F																
405	La Blanca Heights(N.11thPl.)	126	F	7.3	286,000	233,000	245,000	285,000	222,000	270	660	550	350	740	29	28	28	30	28
366	Noreste	127	F																
367	Barbosa Lopez 1, 2, 3	127	F																
414		127	F																
415	Victoria Acres	127	F																
416	Delta Court Sub	127	F																
418	Barbosa-Lopez 1, 2, & 3	127	F																
420	Mile 9 Rd Sub	127	F	7.0	1,534,000	1,230,000	1,294,000	1,522,000	1,181,000	1,440	3,500	2,880	1,850	3,910	29	28	28	30	28
421	Flora	128	F																
430	Martin Sub #1	128	F	12.8	406,000	415,000	438,000	432,000	360,000	510	1,250	1,030	660	1,400	22	27	27	25	25
459	Rosedale Heights	129	F																
460	Mid-Way Village(Mid Valley)	129	F																
461	La Palma #1	129	F	9.2	1,134,000	1,012,000	1,067,000	1,159,000	928,000	1,220	2,960	2,440	1,570	3,310	26	28	28	27	27
439	Avila IB	130	F																
442	Tierra Bella	130	F																
443	Tierra Prieta	130	F																
556	Bulli Sub #2	130	F																
3003		130	F	5.9	1,631,000	1,225,000	1,288,000	1,590,000	1,211,000	1,410	3,420	2,820	1,810	3,820	32	29	28	32	29
515	Chapa #5	137	G																
3004		137	G	8.6	219,000	191,000	201,000	223,000	177,000	230	550	460	290	620	27	28	28	28	27
522	Cuellar A.C. 1, 2, 3	138	G																
525	Los Castillos/Agua Dulce	138	G																
535	Llano Grande #1	138	G																
688	Angela	138	G	10.4	2,057,000	1,931,000	2,036,000	2,135,000	1,734,000	2,350	5,720	4,710	3,030	6,390	25	27	27	26	26
919	Colonia Las Palos	139	X																
920	Progreso	139	X	14.9	1,874,000	2,039,000	2,153,000	2,038,000	1,728,000	2,560	6,220	5,120	3,290	6,950	21	27	27	23	25
516	Tideland	140	H																
519	Capisello Park	140	H																
520	Olympic Sub	140	H	6.5	757,000	589,000	620,000	745,000	573,000	680	1,660	1,370	880	1,860	30	28	28	31	29
774	Acevedo #4	208	A																
5020		208	A																
5021		208	A	6.9	526,000	418,000	440,000	520,000	403,000	490	1,190	980	630	1,330	30	28	28	30	28
754	Lakeside	209	A																
756	Quarto Vientos ###	209	A																
760	La Camellia	209	A																
767	Carlos	209	A																
770	Hilda #1	209	A	8.8	1,335,000	1,174,000	1,236,000	1,359,000	1,083,000	1,410	3,420	2,820	1,810	3,820	26	28	28	28	27
740	La Homa Rd	210	A																
748	Ramirez Est.	210	A																
751	Henojosa, Ariel #1	210	A																
987	Basham #15	210	A	5.7	551,000	410,000	431,000	536,000	407,000	470	1,140	940	600	1,270	32	29	29	32	29
	Subtotal	88			$24,313,000	$21,110,000	$22,231,000	$24,655,000	$19,576,000	$25,240	$61,300	$50,510	$32,410	$68,530					

HIDALGO COUNTY CLASS 2 GROUP

TABLE A-3 (Cont.)
ALTERNATIVE COLLECTION SYSTEM COSTS
FOR GROUPED COLONIAS

MAP NO.	COLONIA NAME	REGIONAL /CENTRAL SERVICE GROUP NO.	2010 GROUP CLASS	2010 GROUP DENSITY (cap/ac)	GRAVITY SYSTEM CAPITAL COST	GRINDER SYSTEM CAPITAL COST	STEP SYSTEM CAPITAL COST	SDG SYSTEM CAPITAL COST	VACUUM SYSTEM CAPITAL COST	GRAVITY SYSTEM O&M COST $/MONTH	GRINDER SYSTEM O&M COST $/MONTH	STEP SYSTEM O&M COST $/MONTH	SDG SYSTEM O&M COST $/MONTH	VACUUM SYSTEM O&M COST $/MONTH	GRAVITY SYSTEM TOTAL COST $/MO/UNIT	GRINDER SYSTEM TOTAL COST $/MO/UNIT	STEP SYSTEM TOTAL COST $/MO/UNIT	SDG SYSTEM TOTAL COST $/MO/UNIT	VACUUM SYSTEM TOTAL COST $/MO/UNIT
5	R.O.W. (Roger Road)	101																	
6	Tierra Buena #1 & 2	101																	
329	Austin Gardens	101																	
3050		101	2	8.2	576,000	492,000	519,000	582,000	460,000	590	1,420	1,170	750	1,590	27	28	28	28	27
90	Sandy Ridge	106																	
798	Doolittle Acres	106	2	6.8	253,000	201,000	211,000	250,000	194,000	230	570	470	300	640	30	28	28	30	28
15	MonteMayor(SantaCruzGds#3)	107																	
16	El Seco Sub#	107																	
92	Bar II#	107																	
301	Merrill	107																	
320	Bar V	107	2	5.7	1,090,000	808,000	850,000	1,059,000	804,000	930	2,250	1,850	1,190	2,510	32	29	29	32	29
111	Jackson's New World/Griesel	114																	
116	Palma & Palmas #2	114	2	6.5	187,000	146,000	153,000	184,000	142,000	170	410	340	220	460	30	28	28	31	29
232	L.J. Sub #1	115																	
345	Alberto Acres	115																	
371	Colonia Del Valle	115	2	6.3	630,000	484,000	509,000	618,000	474,000	560	1,360	1,120	720	1,520	31	28	28	31	29
347	Colonia Gonzales	116																	
351	La Paloma	116	2	5.3	231,000	167,000	175,000	223,000	168,000	190	460	380	240	510	33	29	29	33	30
118	Las Brisas Est	118																	
119	San Carlos Community	118																	
120	Villarreal, D.T. Sub	118																	
121	San Carlos Acres	118																	
122	Rankin	118																	
182	Sosa	118																	
201	Ruthven	118	2	6.4	1,831,000	1,421,000	1,495,000	1,801,000	1,384,000	1,650	4,010	3,300	2,120	4,480	30	28	28	31	29
130	Delta West Sub	122																	
139	Cinco Hermanos	122																	
140	Imperial#	122	2	5.0	607,000	428,000	450,000	583,000	436,000	480	1,170	960	620	1,310	34	29	29	34	30
246	El Leon	132																	
445	Colonia Tijerina	132																	
478	Mile Doce West Sub	132																	
489	Olivarez #4	132																	
495	Mesquite Sub Unit #1	132																	
501	La Paloma I & II#	132																	
3051	Mila Doce Sub	132	2	5.8	1,034,000	773,000	812,000	1,007,000	766,000	890	2,150	1,770	1,140	2,410	32	29	28	32	29
479	Sunrise Sub Unit 2	133																	
493	Puesta Del Sol#	133																	
773	Sunrise Hill Sub	133	2	7.0	1,247,000	1,001,000	1,054,000	1,238,000	961,000	1,170	2,850	2,350	1,510	3,180	29	28	28	30	28
476	Chapa #4	135																	
496	Chapa #2 and others	135																	
867	Mid Valley Est	135	2	5.8	820,000	613,000	645,000	798,000	607,000	700	1,710	1,410	910	1,910	32	29	29	32	29
510	Los Reyes Acres##	136																	
514	Wes Mar Sub	136	2	9.4	539,000	486,000	512,000	552,000	443,000	590	1,420	1,170	750	1,590	26	28	27	27	27
113	Freedom Est##	141																	
174	Laborsita	141																	
175	Hacienda De Los Vega	141	2	7.1	573,000	461,000	485,000	569,000	442,000	540	1,310	1,080	700	1,470	29	28	28	30	28
8	Floresta	143																	

TABLE A-3 (Cont.)
ALTERNATIVE COLLECTION SYSTEM COSTS
FOR GROUPED COLONIAS

MAP NO.	COLONIA NAME	REGIONAL /CENTRAL SERVICE GROUP NO.	2010 GROUP CLASS	2010 GROUP DENSITY (cap/ac)	GRAVITY SYSTEM CAPITAL COST	GRINDER SYSTEM CAPITAL COST	STEP SYSTEM CAPITAL COST	SDG SYSTEM CAPITAL COST	VACUUM SYSTEM CAPITAL COST	GRAVITY SYSTEM O&M COST $/MONTH	GRINDER SYSTEM O&M COST $/MONTH	STEP SYSTEM O&M COST $/MONTH	SDG SYSTEM O&M COST $/MONTH	VACUUM SYSTEM O&M COST $/MONTH	GRAVITY SYSTEM TOTAL COST $/MO/UNIT	GRINDER SYSTEM TOTAL COST $/MO/UNIT	STEP SYSTEM TOTAL COST $/MO/UNIT	SDG SYSTEM TOTAL COST $/MO/UNIT	VACUUM SYSTEM TOTAL COST $/MO/UNIT
9	Tierra Maria #II	143	2	4.7	202,000	140,000	147,000	193,000	144,000	160	380	310	200	420	35	29	29	34	31
968	Flores	201																	
969	Colonia Rodrigue/Sullivan City	201																	
970	Fisher	201																	
974	La Aurora	201																	
977	San Miguel	201																	
978	Las Cuevas #2	201	2	13.4	2,240,000	2,329,000	2,458,000	2,400,000	2,008,000	2,900	7,040	5,800	3,730	7,870	22	27	27	24	25
960	Havana Sub	202																	
981	Havana(Community)/Havana Lomas	202	2	5.4	395,000	287,000	301,000	381,000	288,000	330	790	650	420	880	33	29	29	33	30
699	King Ranch #1 & #2	203																	
702	El Rio	203	2	8.7	436,000	381,000	401,000	443,000	352,000	460	1,110	910	590	1,240	27	28	28	28	27
700	Nuevo Penitas	204																	
701	Penitas	204	2	11.4	1,389,000	1,353,000	1,427,000	1,457,000	1,197,000	1,660	4,040	3,320	2,140	4,510	24	27	27	25	26
708	Perezville	205																	
713	Mata	205																	
717	Tierra Maria/Valle Sac Bella	205																	
721	Plainview	205	2	11.2	932,000	903,000	952,000	976,000	800,000	1,110	2,690	2,220	1,420	3,010	24	27	27	26	26
719	Los Trevino 1, 2, 3, 4	207																	
730	Acevedo #1 (Esquivel Jr)	207																	
731	Acevedo #2 (Esquivel)	207	2	13.4	878,000	915,000	966,000	942,000	789,000	1,140	2,770	2,280	1,470	3,100	22	27	27	24	25
338	Goodwin Heights #1	211																	
339	Palmerino	211																	
340	Kountry Hill Est	211	2	7.1	433,000	350,000	368,000	431,000	335,000	410	1,000	820	530	1,110	29	28	28	30	28
197	Regal Est	212																	
203	Palm Drive North	212																	
245	Basham #11	212																	
251	Basham #1	212																	
254	Basham #2	212																	
255	Basham #10	212																	
256	Basham #6	212																	
259	Randolph/Barnett #1	212																	
260	Cavazos, Alex	212																	
261	Villa Capri	212																	
262	Leal, Carlos II	212																	
263	Rodriguez Est #2	212																	
269	Coyne	212																	
275	Hinojosa Ariel #2	212																	
277	N. Country Est #2	212																	
278	Randolph/Barnett #2	212																	
746	Johnson, Paul	212																	
747	La Homa Rd. North	212																	
749	Acevedo, Daniel Sub	212																	
994	Basham #7	212																	
6021	Basham MH	212	2	5.0	3,274,000	2,317,000	2,434,000	3,145,000	2,356,000	2,610	6,350	5,230	3,360	7,100	34	29	29	34	30
821	Grovewood	213																	
822	Perlas De Naranja	213	2	5.8	175,000	131,000	137,000	171,000	130,000	150	360	300	190	410	32	29	28	32	29
333	Bazan, Enrique	214																	

TABLE A-3 (Cont.)
ALTERNATIVE COLLECTION SYSTEM COSTS
FOR GROUPED COLONIAS

MAP NO.	COLONIA NAME	REGIONAL /CENTRAL SERVICE GROUP NO.	2010 GROUP CLASS	2010 GROUP DENSITY (cap/ac)	GRAVITY SYSTEM CAPITAL COST	GRINDER SYSTEM CAPITAL COST	STEP SYSTEM CAPITAL COST	SDG SYSTEM CAPITAL COST	VACUUM SYSTEM CAPITAL COST	GRAVITY SYSTEM O&M COST $/MONTH	GRINDER SYSTEM O&M COST $/MONTH	STEP SYSTEM O&M COST $/MONTH	SDG SYSTEM O&M COST $/MONTH	VACUUM SYSTEM O&M COST $/MONTH	GRAVITY SYSTEM TOTAL COST $/MO/UNIT	GRINDER SYSTEM TOTAL COST $/MO/UNIT	STEP SYSTEM TOTAL COST $/MO/UNIT	SDG SYSTEM TOTAL COST $/MO/UNIT	VACUUM SYSTEM TOTAL COST $/MO/UNIT
334	Celso	214																	
335	Basham #13	214																	
336	La Paloma Sites	214																	
337	Munoz Estates	214																	
343	Basham #12	214																	
986		214	2	5.3	627,000	453,000	476,000	606,000	456,000	510	1,250	1,030	660	1,400	33	29	29	33	30
188	Chucas Est #1	215																	
192	Wahon	215																	
198	Hinojosa, Ariel #3	215																	
200	Rocky	215																	
205	Chula Vista Acres	215																	
235	Basham #5	215																	
236	Basham #4	215																	
248	La Homa Grove Est##	215																	
267	Basham #8/Country Est W.	215																	
342	Acevedo #3	215	2	4.8	1,252,000	867,000	910,000	1,196,000	891,000	970	2,360	1,940	1,250	2,640	35	29	29	34	31
280	Linda Vista Est(Popular)	216																	
284	Diamond (L)	216																	
288	N. Country Est #1	216																	
289	Tangerine Est	216																	
290	Monica Acres	216	2	6.5	737,000	573,000	602,000	725,000	557,000	660	1,610	1,330	850	1,800	30	28	28	31	29
283	Dude Hill #1	217																	
287	Vereda Tropical	217																	
5002		217																	
5003		217	2	4.9	290,000	203,000	213,000	278,000	208,000	230	550	460	290	620	34	29	29	34	31
294	North Cross Est	218																	
300	Rabbit Patch 1 & 2	218																	
5011		218	2	5.5	343,000	251,000	264,000	332,000	251,000	290	700	570	370	780	33	29	29	32	30
191	El Paraiso (Rudy Vela)	221																	
193	Los Ebanos	221	2	10.1	151,000	140,000	147,000	156,000	126,000	170	410	340	220	460	25	28	27	27	26
194	Tierra Estates Sub	222																	
195	Bryan Acres	222																	
214	Cantu, Jose	222																	
227	Val Verde North	222																	
228	Los Ninos	222																	
229	Citrus Shadows	222																	
308	Jardin Terrace	222																	
323	Stewart Place Sub #1	222																	
3052	Stewart Place Sub #2	222																	
5006		222																	
5007		222																	
5008		222																	
5009		222																	
5010		222																	
6015	M & S	222	2	5.3	2,272,000	1,637,000	1,720,000	2,192,000	1,650,000	1,860	4,510	3,720	2,390	5,040	33	29	29	33	30
190	Leal, Ramon	223																	
202	Cantu (Diaz)	223	2	4.8	219,000	151,000	159,000	209,000	155,000	170	410	340	220	460	35	29	29	34	31

TABLE A-4
ALTERNATIVE WASTEWATER TREATMENT SYSTEM COST
FOR INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 CLASS	2010 COLONIAS DENSITY (cap/ac)	OXIDATION POND CAPITAL COST	ACTIVATED SLUDGE PLANT CAPITAL COST	OXIDATION POND O&M COST $/MONTH	ACTIVATED SLUDGE PLANT O&M COST $/MONTH	OXIDATION POND TOTAL COST $/MO/UNIT	ACTIVATED SLUDGE PLANT TOTAL COST $/MO/UNIT	REGIONAL SYSTEM CAPITAL COST	REGIONAL SYSTEM O&M COST $/MONTH	REGIONAL SYSTEM TOTAL COST $/MO/UNIT
HIDALGO COUNTY CLASS 1 GROUP												
11	Lull	C	27.9	456,000	656,000	420	3,950	10	20	593,700	4,960	20
578	Villas Del Valle	D	27.2	298,000	459,000	290	3,080	10	20	319,700	2,790	20
422	Expressway Heights	G	19.6	289,000	447,000	290	3,020	10	30	336,800	2,680	20
532	Villa Verde #1, #3	G	22.0	284,000	440,000	280	2,990	10	30	310,800	2,610	20
419	Sun Country Est	G	27.2	224,000	361,000	230	2,600	10	30	252,900	1,900	20
3000	La Riena	X	32.6	152,000	260,000	160	2,060	10	40	160,300	1,120	20
796	Polonski Sub	A	30.2	104,000	189,000	120	1,650	10	50	196,600	670	30
75	Colonia Rodriquez #1 & #2	C	129.7	104,000	189,000	120	1,650	10	50	103,800	670	20
444	La Donna**	F	4.9	104,000	189,000	120	1,650	10	50	103,500	670	20
933	Colonia Jesus Maria	X	34.7	104,000	189,000	120	1,650	10	50	112,600	670	20
928	Colonia Capitallo	X	34.7	104,000	189,000	120	1,650	10	50	112,600	670	20
158	Yokum Hall	C	21.7	97,000	177,000	110	1,580	20	50	96,200	600	20
681	El Sol	D	8.2	91,000	169,000	110	1,530	20	50	91,700	560	20
462	Mile 7 Sub	F	26.0	78,000	147,000	90	1,390	20	60	132,700	450	40
3007		E	13.0	78,000	147,000	90	1,390	20	60	104,900	450	30
368	Tierra Bone	E	43.3	78,000	147,000	90	1,390	20	60	104,900	450	30
552	Mile 15 North Sub	J	18.0	47,000	96,000	60	1,020	20	80	92,300	220	40
549	Eastland Park	H	2.5	47,000	96,000	60	1,020	20	80	105,800	220	50
386	Carroll Rd Acres	E	4.9	40,000	83,000	50	930	20	90	52,800	180	40
436	El Gato	E	7.0	40,000	83,000	50	930	20	90	52,800	180	40
362	Laguna Park	E	4.6	36,000	77,000	50	880	20	100	48,100	160	40
43	N. McColl	C	14.9	36,000	77,000	50	880	20	100	41,100	160	30
310	Klement, W.J.	B	26.9	36,000	77,000	50	880	20	100	204,100	160	120
61	Ranchette Est	B	7.0	36,000	77,000	50	880	20	100	50,700	160	40
996	Anaqua	G	12.8	32,000	70,000	40	820	20	110	36,600	130	30
840	Tierra Del Sol	F	27.5	32,000	70,000	40	820	20	110	35,000	130	30
604	Villa Del Carmen	B	5.0	32,000	70,000	40	820	20	110	45,500	130	40
	Subtotal	27		$3,059,000	$5,231,000	$3,300	$43,110			$3,879,500	$23,750	
HIDALGO COUNTY CLASS 2 GROUP												
561	Hargill, City of	2	39.2	497,000	706,000	450	4,160	10	20			
980	Los Ebanos Community	2	18.1	460,000	661,000	420	3,930	10	20			
742	Abram (Ojo de Agua)/ChapaJosep	2	25.9	431,000	626,000	400	3,830	10	20			
915	Faysville, Town of	2	20.1	422,000	615,000	390	3,780	10	20			
889	Madero/Wheel City	2	11.5	358,000	535,000	340	3,430	10	20			
199	Nuevo Alton	2	15.6	349,000	525,000	330	3,380	10	20			
517	Heidelberg	2	19.6	310,000	475,000	300	3,150	10	20			
906	Granjeno (Loop Area)	2	10.1	253,000	400,000	250	2,790	10	30			
662	Regency Acres	2	42.7	224,000	361,000	230	2,600	10	30			
361	Roosevselt Rd Sub(Chapa#3)	2	26.1	156,000	266,000	170	2,100	10	40			
369	Bar VII Sub(DelValle)/Babbs#2	2	21.7	150,000	256,000	160	2,050	10	40			
499	La Mesa	2	5.8	138,000	240,000	150	1,950	10	40			
14	Americana Sub	2	14.4	136,000	236,000	150	1,930	10	40			

TABLE A-4 (Cont.)
ALTERNATIVE WASTEWATER TREATMENT SYSTEM COST
FOR INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 CLASS	2010 COLONIAS DENSITY (cap/ac)	OXIDATION POND CAPITAL COST	ACTIVATED SLUDGE PLANT CAPITAL COST	OXIDATION POND O&M COST $/MONTH	ACTIVATED SLUDGE PLANT O&M COST $/MONTH	OXIDATION POND TOTAL COST $/MO/UNIT	ACTIVATED SLUDGE PLANT TOTAL COST $/MO/UNIT	REGIONAL SYSTEM CAPITAL COST	REGIONAL SYSTEM O&M COST $/MONTH	REGIONAL SYSTEM TOTAL COST $/MO/UNIT
975	Cuevitas (Town)	2	6.0	134,000	233,000	150	1,910	10	40			
725	South Minnesota Rd 1,2,3	2	32.7	129,000	226,000	140	1,870	10	40			
186	Casa De Los Vecinos	2	13.4	110,000	197,000	120	1,700	10	50			
587	Southfork Est	2	15.1	104,000	189,000	120	1,650	10	50			
930	Relampago	2	19.5	104,000	189,000	120	1,650	10	50			
706	Chihuahua	2	24.3	104,000	189,000	120	1,650	10	50			
380	Clark's Sub	2	9.8	104,000	189,000	120	1,650	10	50			
155	Muniz*	2	6.1	99,000	181,000	110	1,600	20	50			
271	Friendly Acres	2	8.7	91,000	169,000	110	1,530	20	50			
3006		2	19.5	91,000	169,000	110	1,530	20	50			
2	Hoehn Drive	2	6.3	91,000	169,000	110	1,530	20	50			
500	Harmony Hill and others	2	6.5	91,000	169,000	110	1,530	20	50			
97	Evergreen	2	38.2	80,000	151,000	100	1,410	20	60			
160	Tower Sub	2	36.1	78,000	147,000	90	1,390	20	60			
154	Tierra Del Valle 1 & 2	2	5.7	78,000	147,000	90	1,390	20	60			
965	Valle Vista	2	48.7	78,000	147,000	90	1,390	20	60			
711	Country Grove	2	29.8	78,000	147,000	90	1,390	20	60			
3061		2	21.7	78,000	147,000	90	1,390	20	60			
	Subtotal	31		$5,606,000	$9,057,000	$5,730	$67,290					
	HIDALGO COUNTY CLASS 3 GROUP											
952	La Palma	3	7.7	75,000	142,000	90	1,350	20	60			
477	Tropical Farms Sub	3	6.2	63,000	123,000	80	1,220	20	70			
325	Citrus City	3	5.0	63,000	123,000	80	1,220	20	70			
26	Garza, Lazaro	3	15.1	63,000	123,000	80	1,220	20	70			
177	Longoria Sub with Pride	3	7.5	63,000	123,000	80	1,220	20	70			
189	Palmeras	3	14.1	60,000	118,000	70	1,190	20	70			
940	El Monte*	3	7.8	57,000	112,000	70	1,150	20	70			
941	Lookingbill, George*	3	8.3	53,000	107,000	70	1,110	20	80			
152	South Port Sub	3	6.4	53,000	107,000	70	1,110	20	80			
326	Western Estate	3	11.1	50,000	101,000	60	1,070	20	80			
911	Redgate	3	40.3	50,000	101,000	60	1,070	20	80			
273	Bernal	3	15.5	47,000	96,000	60	1,020	20	80			
268	Matt	3	9.5	47,000	96,000	60	1,020	20	80			
172	Austin Stonebaker/CRJS Sub	3	5.0	47,000	96,000	60	1,020	20	80			
6028	Big John	3	6.7	47,000	96,000	60	1,020	20	80			
759	Delta Lake Colonia	3	19.4	43,000	89,000	60	980	20	90			
207	Twin Acres	3	5.1	43,000	89,000	60	980	20	90			
6018	Monger Line	3	30.2	43,000	89,000	60	980	20	90			
176	Gumero, Daniel	3	21.5	40,000	83,000	50	930	20	90			
961	Linn Siding	3	26.9	40,000	83,000	50	930	20	90			
272	Good Valley	3	6.0	40,000	83,000	50	930	20	90			
7	River Bend - (Jinks)	3	5.4	40,000	83,000	50	930	20	90			
219	Acosta 107	3	7.0	40,000	83,000	50	930	20	90			
359	Leal, Ramira	3	10.0	40,000	83,000	50	930	20	90			

TABLE A-4 (Cont.)
ALTERNATIVE WASTEWATER TREATMENT SYSTEM COST
FOR INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 CLASS	2010 COLONIAS DENSITY (cap/ac)	OXIDATION POND CAPITAL COST	ACTIVATED SLUDGE PLANT CAPITAL COST	OXIDATION POND O&M COST $/MONTH	ACTIVATED SLUDGE PLANT O&M COST $/MONTH	OXIDATION POND TOTAL COST $/MO/UNIT	ACTIVATED SLUDGE PLANT TOTAL COST $/MO/UNIT	REGIONAL SYSTEM CAPITAL COST	REGIONAL SYSTEM O&M COST $/MONTH	REGIONAL SYSTEM TOTAL COST $/MO/UNIT
358	Minnesota Rd	3	4.7	36,000	76,000	50	870	20	100			
138	Tropicana Sub	3	7.0	36,000	77,000	50	880	20	100			
131	Diamond #2	3	7.0	36,000	77,000	50	880	20	100			
6022	Salas	3	12.7	32,000	70,000	40	820	20	110			
128	Harmel*	3	12.7	32,000	70,000	40	820	20	110			
312	TWA	3	6.0	32,000	70,000	40	820	20	110			
136	Lopez-Gutierrez	3	6.0	32,000	70,000	40	820	20	110			
3005		3	4.9	32,000	70,000	40	820	20	110			
250	Stables, The*	3	6.0	32,000	70,000	40	820	20	110			
6025	Edinburg East Sub	3	5.0	28,000	62,000	40	760	20	120			
772	Colonia Lucero Del Norte	3	4.8	28,000	62,000	40	760	20	120			
709	Catalina Estates	3	12.6	28,000	62,000	40	760	20	120			
6019	Dimas	3	12.6	28,000	62,000	40	760	20	120			
993	Orange Hill	3	13.4	24,000	54,000	30	690	30	130			
6000		3	39.5	24,000	54,000	30	690	30	130			
6016	Palm Sub	3	4.8	24,000	54,000	30	690	30	130			
971	Bogert	3	39.0	19,000	45,000	30	610	30	150			
937	Los Pampas #2	3	18.9	19,000	45,000	30	610	30	150			
10	Adan Lee	3	39.0	19,000	45,000	30	610	30	150			
5001		3	46.8	19,000	45,000	30	610	30	150			
936	Los Pampas	3	26.4	19,000	45,000	30	610	30	150			
979		3	37.4	15,000	35,000	20	510	30	180			
469	Ramosville	3	17.6	9,000	23,000	10	380	40	260			
	Subtotal	47		$1,810,000	$3,772,000	$2,350	$42,130					
	HIDALGO COUNTY TOTAL	105		$10,475,000	$18,060,000	$11,380	$152,530					
	CAMERON COUNTY CLASS 1 GROUP											
1244	Cameron Park 1	0	49.0	725,000	968,000	620	5,190	10	10	829,600	9,280	20
1255	Stuart Sub	0	49.0	368,000	548,000	350	3,480	10	20	464,000	3,710	20
1266	King Sub	0	78.2	267,000	419,000	270	2,890	10	30	316,300	2,410	20
1284	Villa Pancho	0	27.2	155,000	264,000	170	2,090	10	40	172,900	1,150	20
1301	26	N	27.2	151,000	259,000	160	2,060	10	40	267,100	1,110	30
1339	Saldivar	0	77.7	91,000	168,000	110	1,520	20	50	112,700	560	30
1073	Rice Tracts	N	3.3	82,000	154,000	100	1,430	20	60	166,100	480	40
1336	Unnamed D	0	77.6	80,000	150,000	90	1,410	20	60	86,700	460	30
1151	Leal Sub	N	13.9	80,000	150,000	90	1,410	20	60	112,000	460	30
1035	Los Cuates	P	27.1	63,000	123,000	80	1,220	20	70	117,700	330	40
7004	Unknown	0	27.0	47,000	95,000	60	1,020	20	80	57,200	220	30
	Subtotal	11		$2,109,000	$3,298,000	$2,100	$23,720			$2,702,300	$20,170	

CAMERON COUNTY CLASS 2 GROUP

TABLE A-4 (Cont.)
ALTERNATIVE WASTEWATER TREATMENT SYSTEM COST
FOR INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 CLASS	2010 COLONIAS DENSITY (cap/ac)	OXIDATION POND CAPITAL COST	ACTIVATED SLUDGE PLANT CAPITAL COST	OXIDATION POND O&M COST $/MONTH	ACTIVATED SLUDGE PLANT O&M COST $/MONTH	OXIDATION POND TOTAL COST $/MO/UNIT	ACTIVATED SLUDGE PLANT TOTAL COST $/MO/UNIT	REGIONAL SYSTEM CAPITAL COST	REGIONAL SYSTEM O&M COST $/MONTH	REGIONAL SYSTEM TOTAL COST $/MO/UNIT
1099	Olmito	2	27.2	464,000	666,000	430	4,000	10	20			
1163	Santa Maria	2	78.3	419,000	612,000	390	3,770	10	20			
1158	Lozano	2	27.8	252,000	399,000	250	2,790	10	30			
1164	Bluetown	2	78.2	206,000	336,000	210	2,470	10	30			
1230	Villa Nueva	2	27.2	192,000	317,000	200	2,380	10	30			
1074	Lago Sub	2	27.2	189,000	312,000	200	2,350	10	30			
1108	Los Indios	2	27.2	187,000	310,000	200	2,340	10	30			
1226	San Pedro/Carmen/Barrera Gd.	2	27.2	187,000	310,000	200	2,340	10	30			
1306	T 2 Unknown Sub along rd	2	32.0	168,000	283,000	180	2,190	10	40			
1242	Alabama/Arkansas (La Coma)	2	14.5	133,000	231,000	150	1,900	10	40			
1049	La Tina Ranch	2	27.2	133,000	231,000	150	1,900	10	40			
1166	El Venadito	2	27.2	125,000	220,000	140	1,840	10	40			
1109	Carricitos-Landrum	2	27.2	123,000	217,000	140	1,820	10	40			
1263	Barrio Sub	2	77.9	113,000	201,000	130	1,730	10	50			
1154	Los Yescas	2	19.7	113,000	201,000	130	1,730	10	50			
7001	Unknown	2	27.1	102,000	185,000	120	1,630	20	50			
1304	Iglesia Antigua	2	27.1	96,000	175,000	110	1,570	20	50			
1299	Palmer	2	27.1	91,000	168,000	110	1,520	20	50			
1300	Lasana	2	77.7	91,000	168,000	110	1,520	20	50			
1042	Orason Acres/ChulaVista/Shoema	2	27.1	91,000	168,000	110	1,520	20	50			
7007	Unknown	2	27.1	82,000	154,000	100	1,430	20	60			
1282	Saldivar	2	27.1	80,000	150,000	90	1,410	20	60			
1131	Glenwood Acres Sub	2	27.1	80,000	150,000	90	1,410	20	60			
	Subtotal	23		$3,717,000	$6,164,000	$3,940	$47,560					
	CAMERON COUNTY CLASS 3 GROUP											
1313	W Cluster of houses along rd.	3	15.3	73,000	139,000	90	1,330	20	60			
7002	Unknown	3	27.1	68,000	131,000	80	1,280	20	60			
1310	X Unknown Sub	3	20.0	47,000	95,000	60	1,020	20	80			
1302	Laguna Escondido Heights	3	16.2	44,000	90,000	60	980	20	90			
7000	Unknown	3	26.8	32,000	68,000	40	810	20	110			
	Subtotal	5		$264,000	$523,000	$330	$5,420					
	CAMERON COUNTY TOTAL	39		$6,090,000	$9,985,000	$6,370	$76,700					
	WILLACY COUNTY CLASS 2 GROUP											
2034	Sebastian	2	14.6	501,000	710,000	450	4,180	10	20			
2007	LaSara	2	23.3	217,000	351,000	220	2,550	10	30			
	Subtotal	2		$718,000	$1,061,000	$670	$6,730					
	WILLACY COUNTY CLASS 3 GROUP											

TABLE A-4 (Con't.)
ALTERNATIVE WASTEWATER TREATMENT SYSTEM COST
FOR INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 CLASS	2010 COLONIAS DENSITY (cap/ac)	OXIDATION POND CAPITAL COST	ACTIVATED SLUDGE PLANT CAPITAL COST	OXIDATION POND O&M COST $/MONTH	ACTIVATED SLUDGE PLANT O&M COST $/MONTH	OXIDATION POND TOTAL COST $/MO/UNIT	ACTIVATED SLUDGE PLANT TOTAL COST $/MO/UNIT	REGIONAL SYSTEM CAPITAL COST	REGIONAL SYSTEM O&M COST $/MONTH	REGIONAL SYSTEM TOTAL COST $/MO/UNIT
2001	Santa Monica	3	23.1	53,000	106,000	70	1,100	20	80			
2019	Willamar	3	22.7	17,000	39,000	20	550	30	170			
	Subtotal	2		$70,000	$145,000	$90	$1,650					
	WILLACY COUNTY TOTAL	4		$788,000	$1,206,000	$760	$3,380					
	GRAND TOTAL	148		$17,353,000	$29,251,000	$18,510	$237,610					

TABLE A-5
ALTERNATIVE WASTEWATER TREATMENT SYSTEM COSTS
FOR GROUPED COLONIAS

MAP NO.	COLONIA NAME	REGIONAL /CENTRAL SERVICE GROUP NO.	2010 GROUP CLASS	2010 GROUP DENSITY (cap/ac)	OXIDATION POND CAPITAL COST	ACTIVATED SLUDGE PLANT CAPITAL COST	OXIDATION POND O&M COST $/MONTH	ACTIVATED SLUDGE PLANT O&M COST $/MONTH	OXIDATION POND TOTAL COST $/MO/UNIT	ACTIVATED SLUDGE PLANT TOTAL COST $/MO/UNIT	REGIONAL SYSTEM CAPITAL COST	REGIONAL SYSTEM O&M COST $/MONTH	REGIONAL SYSTEM TOTAL COST $/MO/UNIT
HIDALGO COUNTY CLASS 1 GROUP													
40	Tagle, Roberto	102	C										
41	Crouse	102	C	6.7	66,000	120,000	80	1,257	18	66	72,000	360	27
595	Country Terrace	103	B										
596	Thrasher Terrace	103	B										
599	Beamsley	103	B	6.5	234,000	374,000	238	2,668	11	29	399,000	2,010	27
32	Ranchitos #2	104	D										
575	Ranchitos #1	104	D										
676	Garza Terrace	104	D										
677	Tract W. of Garza Terr	104	D										
680	Colonia Estrella	104	D	12.9	586,000	810,000	520	4,586	8	16	699,000	6,970	19
580	Las Brisas Del Sur	105	D										
584	Beto Acres	105	D	10.9	251,000	397,000	253	2,781	11	28	264,000	2,210	20
103	Schunior Sub(NuevoSeco)	108	C										
105	Colonia Garza #2	108	C	5.3	184,000	306,000	194	2,315	12	34	194,000	1,450	21
74	Closner Sub	109	C										
87	Terry	109	C										
221	Country View Est #2	109	C										
309	Thompson Rd	109	C	7.7	385,000	570,000	364	3,582	9	21	423,000	3,960	19
81	Lopezville	110	C										
83	Villa Del Mundo	110	C										
328	North Lopezville	110	C										
609	Villa Del Sol	110	C										
610	Sevilla Park #1	110	C										
612	El Charro Sub #1 (West)	110	C										
615	Mesquite Acres	110	C										
616	Arco Iris #2*	110	C										
620	Aldamas & No. 2	110	C										
622	Los Palmas	110	C	7.7	832,000	1,086,000	699	5,633	7	13	1,050,000	11,180	18
623	Eldora Gardens Sub	111	G										
634	R.S.W. #1	111	G	7.2	159,000	269,000	171	2,118	13	37	171,000	1,180	22
631	Nadia	112	G										
636	Bar VI (Barra Privies)	112	G	9.9	236,000	377,000	240	2,680	11	29	264,000	2,030	21
625	Small Sub #2	113	G										
626	Las Brisas	113	G										
657	Small Sub #1	113	G	5.3	361,000	539,000	344	3,447	9	22	428,000	3,620	20
350	East of Eden Sub	117	E										
654	Val Bar Estates	117	E	7.7	188,000	311,000	198	2,346	12	33	282,000	1,500	26
398	Walston Farms Sub	120	F										
999	Highland Farms	120	F	12.4	280,000	436,000	278	2,969	10	26	312,000	2,570	20
132	Mary Ann's Sub	123	I										
133	Brenda Gay Sub	123	I	5.8	131,000	230,000	145	1,894	14	42	149,000	920	24
161	Green Valley Dev	124	I										
163	Evergreen	124	I										
167	El Trunifo	124	I	7.0	145,000	250,000	158	2,010	13	39	168,000	1,050	24
165	El Mesquite Sub Phase 1	125	I										

TABLE A-5 (Cont.)
ALTERNATIVE WASTEWATER TREATMENT SYSTEM COSTS
FOR GROUPED COLONIAS

MAP NO.	COLONIA NAME	REGIONAL /CENTRAL SERVICE GROUP NO.	2010 GROUP CLASS	2010 GROUP DENSITY (cap/ac)	OXIDATION POND CAPITAL COST	ACTIVATED SLUDGE PLANT CAPITAL COST	OXIDATION POND O&M COST $/MONTH	ACTIVATED SLUDGE PLANT O&M COST $/MONTH	OXIDATION POND TOTAL COST $/MO/UNIT	ACTIVATED SLUDGE PLANT TOTAL COST $/MO/UNIT	REGIONAL SYSTEM CAPITAL COST	REGIONAL SYSTEM O&M COST $/MONTH	REGIONAL SYSTEM TOTAL COST $/MO/UNIT
156	L & P Sub	125	I	8.2	119,000	212,000	134	1,790	14	45	136,000	900	24
242	Alvarez	126	F										
405	La Blanca Heights(N.11thPl.)	126	F	7.3	134,000	233,000	147	1,914	14	41	140,000	940	23
366	Noreste	127	F										
367	Barbosa Lopez 1, 2, 3	127	F										
414		127	F										
415	Victoria Acres	127	F										
416	Delta Court Sub	127	F										
418	Barbosa-Lopez 1, 2, & 3	127	F										
420	Mile 9 Rd Sub	127	F	7.0	454,000	654,000	418	3,946	9	19	545,000	4,940	19
421	Flora	128	F										
430	Martin Sub #1	128	F	12.8	213,000	345,000	219	2,520	11	31	230,000	1,770	21
459	Rosedale Heights	129	F										
460	Mid-Way Village(Mid Valley)	129	F										
461	La Palma #1	129	F	9.2	401,000	590,000	377	3,669	9	21	472,000	4,180	20
439	Avila IB	130	F										
442	Tierra Bella	130	F										
443	Tierra Prieto	130	F										
556	Balli Sub #2	130	F										
3003		130	F	5.9	446,000	645,000	412	3,907	9	19	499,000	4,830	19
515	Chapa #5	137	G										
3004		137	G	8.6	117,000	208,000	131	1,768	14	45	159,000	780	27
522	Cuellar A.C. 1, 2, 3	138	G										
525	Los Castillos/Agua Dulce	138	G										
535	Llano Grande #1	138	G										
688	Angela	138	G	10.4	653,000	887,000	570	4,887	8	15	821,000	8,070	19
919	Colonia Las Palas	139	X										
920	Progreso	139	X	14.9	696,000	935,000	601	5,071	7	15	806,000	8,780	18
516	Tideland	140	H										
519	Copisallo Park	140	H										
520	Olympic Sub	140	H	6.5	262,000	412,000	262	2,853	11	27	272,000	2,350	20
774	Acevedo #4	208	A										
5020		208	A										
5021		208	A	6.9	205,000	334,000	212	2,464	12	32	223,000	1,680	21
754	Lakeside	209	A										
756	Quarto Vientos ***	209	A										
760	La Camellia	209	A										
767	Carlos	209	A										
770	Hilda #1	209	A	8.8	446,000	645,000	412	3,907	9	19	543,000	4,830	20
740	La Homa Rd	210	A										
748	Ramirez Est.	210	A										
751	Henojosa, Ariel #1	210	A										
937	Bashaw #15	210	A	5.7	199,000	326,000	207	2,421	12	32	216,000	1,610	21
	Subtotal	88			$8,383,000	$12,509,000	$7,984	$81,403			$9,937,000	$86,570	

HIDALGO COUNTY CLASS 2 GROUP

TABLE A-5 (Cont.)
ALTERNATIVE WASTEWATER TREATMENT SYSTEM COSTS
FOR GROUPED COLONIAS

MAP NO.	COLONIA NAME	REGIONAL /CENTRAL SERVICE GROUP NO.	2010 GROUP CLASS	2010 GROUP DENSITY (cap/ac)	OXIDATION POND CAPITAL COST	ACTIVATED SLUDGE PLANT CAPITAL COST	OXIDATION POND O&M COST $/MONTH	ACTIVATED SLUDGE PLANT O&M COST $/MONTH	OXIDATION POND TOTAL COST $/MO/UNIT	ACTIVATED SLUDGE PLANT TOTAL COST $/MO/UNIT	REGIONAL SYSTEM CAPITAL COST	REGIONAL SYSTEM O&M COST $/MONTH	REGIONAL SYSTEM TOTAL COST $/MO/UNIT
5	R.O.W. (Roger Road)	101											
6	Tierra Bueno #1 & 2	101											
329	Austin Gardens	101											
3050		101	2	8.2	234,000	374,000	238	2,668	11	29			
90	Sandy Ridge	106											
798	Doolittle Acres	106	2	6.8	119,000	212,000	134	1,790	14	45			
15	MonteMayor(SantaCruzGds#3)	107											
16	El Seco Sub#	107											
92	Bar II#	107											
301	Merrill	107											
320	Bar V	107	2	5.7	327,000	497,000	317	3,254	10	24			
111	Jackson's New World/Griesel	114											
116	Palma & Palmas #2	114	2	6.5	94,000	173,000	109	1,553	16	52			
232	L.J. Sub #1	115											
345	Alberta Acres	115											
371	Colonia Del Valle	115	2	6.3	226,000	364,000	231	2,615	11	30			
347	Colonia Gonzales	116											
351	La Paloma	116	2	5.3	102,000	185,000	117	1,629	15	49			
118	Los Brisas Est	118											
119	San Carlos Community	118											
120	Villarreal, D.T. Sub	118											
121	San Carlos Acres	118											
122	Rankin	118											
182	Sosa	118											
201	Ruthven	118	2	6.4	502,000	711,000	456	4,186	8	18			
130	Delta West Sub	122											
139	Cinco Hermanos	122											
140	Imperial#	122	2	5.0	203,000	331,000	210	2,450	12	32			
246	El Leon	132											
445	Colonia Tijerina	132											
478	Mile Dore West Sub	132											
489	Olivarez #4	132											
495	Mesquite Sub Unit #1	132											
501	La Paloma I & II#	132											
3051	Mila Doce Sub	132	2	5.8	317,000	484,000	308	3,194	10	24			
479	Sunrise Sub Unit 2	133											
493	Puesta Del Sol#	133											
773	Sunrise Hill Sub	133	2	7.0	390,000	576,000	368	3,609	9	21			
476	Chapa #4	135											
496	Chapa #2 and others	135											
967	Mid Valley Est	135	2	5.8	268,000	419,000	267	2,888	11	27			
510	Los Reyes Acres**	136											
514	Wes Mar Sub	136	2	9.4	234,000	374,000	238	2,668	11	29			
113	Freedom Est**	141											
174	Laborsita	141											
175	Hacienda De Los Vega	141	2	7.1	220,000	356,000	226	2,575	11	30			
8	Floresta	143											

TABLE A-5 (Cont.)
ALTERNATIVE WASTEWATER TREATMENT SYSTEM COSTS
FOR GROUPED COLONIAS

MAP NO.	COLONIA NAME	REGIONAL /CENTRAL SERVICE GROUP NO.	2010 GROUP CLASS	2010 GROUP DENSITY (cap/ac)	OXIDATION POND CAPITAL COST	ACTIVATED SLUDGE PLANT CAPITAL COST	OXIDATION POND O&M COST $/MONTH	ACTIVATED SLUDGE PLANT O&M COST $/MONTH	OXIDATION POND TOTAL COST $/MO/UNIT	ACTIVATED SLUDGE PLANT TOTAL COST $/MO/UNIT	REGIONAL SYSTEM CAPITAL COST	REGIONAL SYSTEM O&M COST $/MONTH	REGIONAL SYSTEM TOTAL COST $/MO/UNIT
9	Tierra Maria #II	143	2	4.7	89,000	165,000	104	1,500	16	54			
968	Flores	201											
969	Colonia Rodrigue/Sullivan City	201											
970	Fisher	201											
974	La Aurora	201											
977	San Miguel	201											
978	Las Cuevas #2	201	2	13.4	763,000	1,010,000	650	5,354	7	14			
960	Havana Sub	202											
981	Havana(Community)/Havana Lomas	202	2	5.4	152,000	260,000	164	2,065	13	38			
699	King Ranch #1 & #2	203											
702	El Rio	203	2	8.7	194,000	320,000	203	2,391	12	33			
700	Nuevo Penitas	204											
701	Penitas	204	2	11.4	505,000	715,000	458	4,200	8	18			
708	Perezville	205											
713	Mata	205											
717	Tierra Maria/Valle Sac Bella	205											
721	Plainview	205	2	11.2	374,000	556,000	355	3,520	9	22			
719	Los Trevino 1, 2, 3, 4	207											
730	Acevedo #1 (Esquivel Jr)	207											
731	Acevedo #2 (Esquivel)	207	2	13.4	382,000	566,000	361	3,565	9	21			
338	Goodwin Heights #1	211											
339	Palmerina	211											
340	Kountry Hill Est	211	2	7.1	180,000	300,000	190	2,284	12	34			
197	Regal Est	212											
203	Palm Drive North	212											
245	Basham #11	212											
251	Basham #1	212											
254	Basham #2	212											
255	Bashaw #10	212											
256	Basham #6	212											
259	Randolph/Barnett #1	212											
260	Cavazos, Alex	212											
261	Villa Capri	212											
262	Leal, Carlos II	212											
263	Rodriguez Est #2	212											
269	Coyne	212											
275	Hinojosa Ariel #2	212											
277	N. Country Est #2	212											
278	Randolph/Barnett #2	212											
746	Johnson, Paul	212											
747	La Homa Rd. North	212											
749	Acevedo, Daniel Sub	212											
994	Bashaw #7	212											
6021	Basham NE	212	2	5.0	706,000	947,000	609	5,116	7	15			
821	Grovewood	213											
822	Perlas De Naranja	213	2	5.8	86,000	160,000	101	1,472	16	55			
333	Bazan, Enrique	214											

TABLE A-5 (Cont.)
ALTERNATIVE WASTEWATER TREATMENT SYSTEM COSTS
FOR GROUPED COLONIAS

MAP NO.	COLONIA NAME	REGIONAL /CENTRAL SERVICE GROUP NO.	2010 GROUP CLASS	2010 GROUP DENSITY (cap/ac)	OXIDATION POND CAPITAL COST	ACTIVATED SLUDGE PLANT CAPITAL COST	OXIDATION POND O&M COST $/MONTH	ACTIVATED SLUDGE PLANT O&M COST $/MONTH	OXIDATION POND TOTAL COST $/MO/UNIT	ACTIVATED SLUDGE PLANT TOTAL COST $/MO/UNIT	REGIONAL SYSTEM CAPITAL COST	REGIONAL SYSTEM O&M COST $/MONTH	REGIONAL SYSTEM TOTAL COST $/MO/UNIT
334	Celso	214											
335	Basham #13	214											
336	La Paloma Sites	214											
337	Munoz Estates	214											
343	Basham #12	214											
986		214	2	5.3	213,000	345,000	219	2,520	11	31			
188	Chucas Est #1	215											
192	Wahon	215											
198	Hinojosa, Ariel #3	215											
200	Rocky	215											
205	Chula Vista Acres	215											
235	Basham #5	215											
236	Basham #4	215											
248	La Homa Grove Est**	215											
267	Basham #8/Country Est W.	215											
342	Acevedo #3	215	2	4.8	339,000	512,000	327	3,323	10	23			
280	Linda Vista Est(Popular)	216											
284	Diamond (L)	216											
288	N. Country Est #1	216											
289	Tangerine Est	216											
290	Monica Acres	216	2	6.5	257,000	404,000	257	2,817	11	27			
283	Dude Hill #1	217											
287	Vereda Tropical	217											
5002		217											
5003		217	2	4.9	117,000	208,000	131	1,768	14	45			
294	North Cross Est	218											
300	Rabbit Patch 1 & 2	218											
5011		218	2	5.5	138,000	240,000	152	1,953	13	41			
191	El Paraiso (Rudy Velo)	221											
193	Los Ebanos	221	2	10.1	94,000	173,000	109	1,553	16	52			
194	Tierra Estates Sub	222											
195	Bryan Acres	222											
214	Cantu, Jose	222											
227	Val Verde North	222											
228	Los Ninos	222											
229	Citrus Shadows	222											
308	Jardin Terrace	222											
323	Stewart Place Sub #1	222											
3052	Stewart Place Sub #2	222											
5006		222											
5007		222											
5008		222											
5009		222											
5010		222											
6015	M & S	222	2	5.3	548,000	766,000	491	4,409	8	17			
190	Leal, Ramon	223											
202	Cantu (Diaz)	223	2	4.8	94,000	173,000	109	1,553	16	52			

TABLE A-5 (Cont.)
ALTERNATIVE WASTEWATER TREATMENT SYSTEM COSTS
FOR GROUPED COLONIAS

MAP NO.	COLONIA NAME	REGIONAL /CENTRAL SERVICE GROUP NO.	2010 GROUP CLASS	2010 GROUP DENSITY (cap/ac)	OXIDATION POND CAPITAL COST	ACTIVATED SLUDGE PLANT CAPITAL COST	OXIDATION POND O&M COST $/MONTH	ACTIVATED SLUDGE PLANT O&M COST $/MONTH	OXIDATION POND TOTAL COST $/MO/UNIT	ACTIVATED SLUDGE PLANT TOTAL COST $/MO/UNIT	REGIONAL SYSTEM CAPITAL COST	REGIONAL SYSTEM O&M COST $/MONTH	REGIONAL SYSTEM TOTAL COST $/MO/UNIT
988	Regency Acres	227											
5004		227											
5005		227	2	6.2	94,000	173,000	109	1,553	16	52			
	Subtotal	144			$8,561,000	$13,049,000	$8,318	$87,994					
	HIDALGO COUNTY TOTAL	232			$25,505,000	$38,607,000	$24,621	$257,391			$9,937,000	$86,570	
	CAMERON COUNTY CLASS 1 GROUP												
1264	Illinois Heights	403	0										
1334	Unnamed B	403	0	4.8	91,000	168,000	106	1,524	16	53	113,000	560	27
1273	Coronado	404	0										
1274	Pleasant Meadows	404	0										
7006	Unknown	404	0										
1272	Los Cuates	404	0										
1022	21 (See El Jardin)	404	0										
1340	Unnamed C	404	0	5.8	307,000	471,000	300	3,135	10	24	371,000	2,910	21
1311	R Unknown Sub	301	K										
1305	S Cluster of houses along rd.	301	K										
1308	Q Unknown Sub	301	K	5.8	133,000	231,000	146	1,904	14	42	128,000	930	22
	Subtotal	11			$531,000	$870,000	$553	$6,564			$612,000	$4,400	
	CAMERON COUNTY CLASS 2 GROUP												
1115	Montalvo	302											
1119	Encantada	302											
1117	El Calaboz	302											
1297	Escamilla's	302											
1095	Villa Cavazos	302											
1118	(El) Ranchito	302	2	11.2	603,000	829,000	532	4,661	8	16			
1112	La Paloma	303											
1110	Polo Arizmendi/Padilla	303	2	6.9	251,000	397,000	252	2,779	11	28			
1027	Cisneros (Limon)	401											
1295	25	401											
1026	La Coma Del Norte	401	2	7.8	300,000	462,000	294	3,092	10	25			
1241	Valle Hermosa	405											
1281	Valle Escondido	405											
7005	Unknown	405	2	7.5	151,000	259,000	164	2,062	13	38			
	Subtotal	14			$1,305,000	$1,947,000	$1,243	$12,594					
	CAMERON COUNTY TOTAL	25			$1,836,000	$2,817,000	$1,796	$19,158			$612,000	$4,400	
	GRAND TOTAL	257			$27,341,000	$41,424,000	$26,417	$276,548			$10,549,000	$90,970	

TABLE A-8
ALTERNATIVE CLUSTER WASTE SYSTEM COSTS
FOR GROUP 3 INDIVIDUAL COLONIAS

MAP NO.	COLONIA NAME	2010 CLASS	2010 COLONIAS DENSITY (cap/ac)	SEPTIC TANK/ DRAINFIELD TOTAL CAPITAL COST	SEPTIC TANK/ ET SYSTEM TOTAL CAPITAL COST	SEPTIC TANK/ DOSING MOUND TOTAL CAPITAL COST	SEPTIC TANK/ SAND FILTR TOTAL CAPITAL COST	SEPTIC TANK/ FLT & DRNFIELD TOTAL CAPITAL COST	SEPTIC TANK/ DRAINFIELD O&M COST $/MONTH	SEPTIC TANK/ ET SYSTEM O&M COST $/MONTH	SEPTIC TANK/ DOSING MOUND O&M COST $/MONTH	SEPTIC TANK/ SAND FILTR O&M COST $/MONTH	SEPTIC TANK/ FLT & DRNFIELD O&M COST $/MONTH	SEPTIC TANK/ DRAINFIELD TOTAL COST $/MO/UNIT	SEPTIC TANK/ ET SYSTEM TOTAL COST $/MO/UNIT	SEPTIC TANK/ DOSING MOUND TOTAL COST $/MO/UNIT	SEPTIC TANK/ SAND FILTR TOTAL COST $/MO/UNIT	SEPTIC TANK/ FLT & DRNFIELD TOTAL COST $/MO/UNIT
HIDALGO COUNTY CLASS 3 GROUP																		
952	La Palma	3	7.7	71,600	210,400	203,400	135,300	139,700	120	120	210	280	210	17	45	46	34	32
477	Tropical Farms Sub	3	6.2	56,300	165,300	159,800	106,300	109,800	100	100	170	220	170	17	45	46	33	32
26	Garza, Lazaro	3	15.1	56,300	165,300	159,800	106,300	109,800	100	100	170	220	170	17	45	46	33	32
177	Longoria Sub with Pride	3	7.5	56,300	165,300	159,800	106,300	109,800	100	100	170	220	170	17	45	46	33	32
325	Citrus City	3	5.0	56,300	165,300	159,800	106,300	109,800	100	100	170	220	170	17	45	46	33	32
189	Palmeras	3	14.1	52,800	155,300	150,100	99,800	103,100	90	90	160	210	160	17	45	46	34	33
940	El Monte$	3	7.8	49,400	145,200	140,400	93,400	96,400	80	80	150	190	150	17	45	46	34	32
152	South Port Sub	3	6.4	44,400	130,300	125,900	83,800	86,500	80	80	130	170	130	17	44	45	33	32
941	Lockinghill, George$	3	8.3	44,400	130,300	125,900	83,800	86,500	80	80	130	170	130	17	44	45	33	32
326	Western Estate	3	11.1	40,900	120,300	116,200	77,300	79,800	70	70	120	160	120	17	44	45	33	32
911	Redgate	3	40.3	40,900	120,300	116,200	77,300	79,800	70	70	120	160	120	17	44	45	33	32
268	Mett	3	9.5	37,500	110,200	106,500	70,900	73,200	60	60	110	150	110	17	45	45	34	33
6028	Big John	3	6.7	37,500	110,200	106,500	70,900	73,200	60	60	110	150	110	17	45	45	34	33
172	Austin Stonebaker/CRJS Sub	3	5.0	37,500	110,200	106,500	70,900	73,200	60	60	110	150	110	17	45	45	34	32
273	Bernal	3	15.5	37,500	110,200	106,500	70,900	73,200	60	60	110	150	110	17	45	45	34	33
959	Delta Lake Colonia	3	19.4	34,100	100,200	96,800	64,400	66,500	60	60	100	130	100	17	45	46	34	33
6018	Monger Line	3	30.2	34,100	100,200	96,800	64,400	66,500	60	60	100	130	100	17	45	46	34	32
207	Twin Acres	3	5.1	34,100	100,200	96,800	64,400	66,500	60	60	100	130	100	17	45	46	34	33
176	Gamero, Daniel	3	21.5	29,000	85,300	82,300	54,800	56,600	50	50	90	110	90	17	43	44	32	32
961	Linn Siding	3	26.9	29,000	85,300	82,300	54,800	56,600	50	50	90	110	90	17	43	44	32	32
219	Acosta 107	3	7.0	29,000	85,300	82,300	54,800	56,600	50	50	90	110	90	17	43	44	32	32
272	Good Valley	3	6.0	29,000	85,300	82,300	54,800	56,600	50	50	90	110	90	17	43	44	32	32
7	River Bend - (Jinks)	3	5.4	29,000	85,300	82,300	54,800	56,600	50	50	90	110	90	17	43	44	32	32
359	Leal, Ramiro	3	10.0	29,000	85,300	82,300	54,800	56,600	50	50	80	100	80	17	43	44	33	32
358	Minnesota Rd	3	4.7	25,600	75,200	72,600	48,300	49,900	40	40	80	100	80	17	44	45	33	32
138	Tropicana Sub	3	7.0	25,600	75,200	72,600	48,300	49,900	40	40	80	100	80	17	43	45	33	32
181	Diamond #2	3	7.0	25,600	75,200	72,600	48,300	49,900	40	40	70	90	70	17	43	45	33	32
312	TWA	3	6.0	22,200	65,200	63,000	41,900	43,300	40	40	70	90	70	17	44	45	34	33
3005		3	4.9	22,200	65,200	63,000	41,900	43,300	40	40	70	90	70	17	44	45	34	33
6022	Sales	3	12.7	22,200	65,200	63,000	41,900	43,300	40	40	70	90	70	17	44	45	34	33
136	Lopez-Gutierrez	3	6.0	22,200	65,200	63,000	41,900	43,300	40	40	70	90	70	17	44	45	34	33
250	Stables, Thet	3	6.0	22,200	65,200	63,000	41,900	43,300	40	40	70	90	70	17	44	45	34	33
128	Harmel$	3	12.7	22,200	65,200	63,000	41,900	43,300	40	40	60	70	60	17	44	45	34	33
709	Catalina Estates	3	12.6	18,800	55,100	53,300	35,400	36,600	30	30	60	70	60	17	45	46	33	33
6019	Bimas	3	12.6	18,800	55,100	53,300	35,400	36,600	30	30	60	70	60	17	45	46	33	33
6025	Edinburg East Sub	3	5.0	18,800	55,100	53,300	35,400	36,600	30	30	60	70	60	17	45	46	33	33
772	Colonia Lucero Del Norte	3	4.8	18,800	55,100	53,300	35,400	36,600	30	30	40	50	40	17	45	46	33	33
6000		3	39.5	13,700	40,200	38,800	25,800	26,700	20	20	40	50	40	16	40	41	30	30
6016	Palm Sub	3	4.8	13,700	40,200	38,800	25,800	26,700	20	20	40	50	40	16	40	41	30	30
993	Orange Hill	3	13.4	13,700	40,200	38,800	25,800	26,700	20	20	30	40	30	16	40	41	30	30
936	Los Pampas	3	26.4	10,300	30,200	29,100	19,300	20,000	20	20	30	40	30	16	42	42	30	30
937	Los Pampas #2	3	18.9	10,300	30,200	29,100	19,300	20,000	20	20	30	40	30	16	42	42	30	30
991	Bogert	3	39.0	10,300	30,200	29,100	19,300	20,000	20	20	30	40	30	16	42	42	30	30
10	Adam Lee	3	39.0	10,300	30,200	29,100	19,300	20,000	20	20	30	40	30	16	42	42	30	30
5001		3	46.8	10,300	30,200	29,100	19,300	20,000	20	20	20	30	20	16	42	42	30	30
979		3	37.4	6,900	20,100	19,400	12,900	13,400	10	10	20	30	20	16	40	40	31	29
469	Ramosville	3	17.4	3,400	10,100	9,700	6,400	6,700	10	10	10	10	10	18	45	40	27	31
	Subtotal	47		$1,384,000	$4,065,500	$3,927,500	$2,612,600	$2,699,000	$2,400	$2,400	$4,200	$5,400	$4,200					
CAMERON COUNTY CLASS 3 GROUP																		
1313	W Cluster of houses along rd.	3	15.3	68,200	200,400	193,700	128,800	133,100	120	120	200	270	200	17	45	45	33	33
7002	Unknown	3	27.1	63,000	185,300	179,100	119,200	123,000	110	110	190	250	190	17	45	46	34	33
1310	X Unknown Sub	3	20.0	37,500	110,200	106,500	70,900	73,200	60	60	110	150	110	17	45	45	34	33
1302	Laguna Escondido Heights	3	16.2	34,100	100,200	96,800	64,400	66,500	60	60	100	130	100	17	45	45	33	32
7000	Unknown	3	26.8	20,500	60,300	58,100	38,700	40,000	40	40	60	80	60	16	42	42	32	31
	Subtotal			$223,300	$656,400	$634,200	$422,000	$435,800	$400	$400	$700	$900	$700					
WILLACY COUNTY CLASS 3 GROUP																		
2001	Santa Monica	3	73.1	44,300	130,300	125,900	83,700	86,500	80	80	130	170	130	17	45	45	33	33
2019	Willamar	3	22.7	8,600	25,100	24,200	16,100	16,700	10	10	30	30	30	15	41	45	32	32
	Subtotal			$52,900	$155,400	$150,100	$99,800	$103,200	$100	$100	$200	$200	$200					
	THREE COUNTY GRAND TOTAL			$1,660,200	$4,877,300	$4,711,800	$3,134,400	$3,238,000	$2,900	$2,900	$5,100	$6,500	$5,100					

TABLE A-7
ALTERNATIVE INDIVIDUAL ON-SITE WASTEWATER SYSTEM COSTS
FOR CLASS 4 COLONIAS

MAP NO.	COLONIA NAME	2010 CLASS	2010 COLONIAS DENSITY (cap/ac)	SEPTIC TANK/ DRAINFIELD TOTAL CAPITAL COST ($2000/UNIT)	SEPTIC TANK/ DRAINFIELD O&M COST $/MONTH ($35/UNIT/YR)	SEPTIC TANK/ DRAINFIELD TOTAL COST $/MONTH ($239/UNIT/YR)	SEPTIC TANK/ ET SYSTEM TOTAL CAPITAL COST ($6000/UNIT)	SEPTIC TANK/ ET SYSTEM O&M COST $/MONTH ($35/UNIT/YR)	SEPTIC TANK/ ET SYSTEM TOTAL COST $/MONTH ($646/UNIT/YR)	SEPTIC TANK/ DOSING MOUND TOTAL CAPITAL COST ($6000/UNIT)	SEPTIC TANK/ DOSING MOUND O&M COST $/MONTH ($60/UNIT/YR)	SEPTIC TANK/ DOSING MOUND TOTAL COST $/MONTH ($671/UNIT/YR)	SEPTIC TANK/ SAND FILTER TOTAL CAPITAL COST ($4000/UNIT)	SEPTIC TANK/ SAND FILTER O&M COST $/MONTH ($80/UNIT/YR)	SEPTIC TANK/ SAND FILTER TOTAL COST $/MONTH ($487/UNIT/YR)	SEPTIC TANK/ FLT & DRNFIELD TOTAL CAPITAL COST ($4000/UNIT)	SEPTIC TANK/ FLT & DRNFIELD O&M COST $/MONTH ($60/UNIT/YR)	SEPTIC TANK/ FLT & DRNFIELD TOTAL COST $/MONTH ($467/UNIT/YR)
HIDALGO COUNTY CLASS 4 GROUP																		
518	Old Rebel Field Sub	4	4.5	88,000	130	880	264,000	130	2,370	264,000	220	2,460	176,000	293	1,790	176,000	220	1,710
3	Ramseyer Gardens	4	1.8	80,000	120	800	240,000	120	2,150	240,000	200	2,240	160,000	267	1,620	160,000	200	1,560
614	El Castillejo	4	2.1	70,000	100	700	210,000	100	1,880	210,000	175	1,960	140,000	233	1,420	140,000	175	1,360
185	Alta Vista Sub	4	3.9	70,000	100	700	210,000	100	1,880	210,000	175	1,960	140,000	233	1,420	140,000	175	1,360
96	Meadow Lands	4	4.0	70,000	100	700	210,000	100	1,880	210,000	175	1,960	140,000	233	1,420	140,000	175	1,360
490	Country Village Sub 1 & 2	4	3.6	66,000	100	660	198,000	100	1,780	198,000	165	1,850	132,000	220	1,340	132,000	165	1,290
868	Lorenzana	4	3.8	66,000	100	660	198,000	100	1,780	198,000	165	1,850	132,000	220	1,340	132,000	165	1,290
985	El Flaco	4	2.0	52,000	80	520	156,000	80	1,400	156,000	130	1,450	104,000	173	1,060	104,000	130	1,010
146	Sunnybrook Sub	4	3.7	48,000	70	480	144,000	70	1,290	144,000	120	1,340	96,000	160	970	96,000	120	930
217	Acosta	4	3.1	44,000	60	440	132,000	60	1,180	132,000	110	1,230	88,000	147	890	88,000	110	860
4	Tierra De Luz	4	4.5	34,000	50	340	102,000	50	920	102,000	85	950	68,000	113	690	68,000	85	660
180	La Homa Ranch(ComptonGrove)	4	2.7	34,000	50	340	102,000	50	920	102,000	85	950	68,000	113	690	68,000	85	660
187	Valley Rancheros	4	4.5	34,000	50	340	102,000	50	920	102,000	85	950	68,000	113	690	68,000	85	660
494	Tijerina Est#	4	3.6	26,000	40	260	78,000	40	700	78,000	65	730	52,000	87	530	52,000	65	510
306	Guardian Angel Est	4	2.2	26,000	40	260	78,000	40	700	78,000	65	730	52,000	87	530	52,000	65	510
667	Cole	4	3.0	26,000	40	260	78,000	40	700	78,000	65	730	52,000	87	530	52,000	65	510
498	Compacuos Sub	4	4.4	26,000	40	260	78,000	40	700	78,000	65	730	52,000	87	530	52,000	65	510
492	Puerta Del Sol Sub	4	1.7	26,000	40	260	78,000	40	700	78,000	65	730	52,000	87	530	52,000	65	510
253	Black V.A.	4	2.4	22,000	30	220	66,000	30	590	66,000	55	620	44,000	73	450	44,000	55	430
178	Krista Estates	4	4.1	22,000	30	220	66,000	30	590	66,000	55	620	44,000	73	450	44,000	55	430
304	Amberland Sub	4	1.3	16,000	20	160	48,000	20	430	48,000	40	450	32,000	53	320	32,000	40	310
354	Los Tinacos	4	3.4	16,000	20	160	48,000	20	430	48,000	40	450	32,000	53	320	32,000	40	310
218	Mitchell, Albert	4	1.7	16,000	20	160	48,000	20	430	48,000	40	450	32,000	53	320	32,000	40	310
215	Lopez Bibiano	4	1.0	12,000	20	120	36,000	20	320	36,000	30	340	24,000	40	240	24,000	30	230
6027	Isaacs	4	0.9	12,000	20	120	36,000	20	320	36,000	30	340	24,000	40	240	24,000	30	230
12	South Seminary	4	2.0	8,000	10	80	24,000	10	220	24,000	20	220	16,000	27	160	16,000	20	160
560	La Coma Heights	4	0.0	8,000	10	80	24,000	10	220	24,000	20	220	16,000	27	160	16,000	20	160
1	Seminary Est	4	1.0	4,000	10	40	12,000	10	110	12,000	10	110	8,000	13	80	8,000	10	80
179	Bougainvillea	4	0.5	4,000	10	40	12,000	10	110	12,000	10	110	8,000	13	80	8,000	10	80
	Subtotal	29		$1,026,000	$1,510	$10,260	$3,078,000	$1,510	$27,620	$3,078,000	$2,565	$28,730	$2,052,000	$3,420	$20,810	$2,052,000	$2,565	$19,990
CAMERON COUNTY CLASS 4 GROUP																		
1341	Del Mar Heights	4	1.6	174,000	250	1,730	522,000	250	4,680	522,000	435	4,870	348,000	580	3,530	348,000	435	3,390
	Subtotal	1		$174,000	$250	$1,730	$522,000	$250	$4,680	$522,000	$435	$4,870	$348,000	$580	$3,530	$348,000	$435	$3,390
	TOTAL	30		$1,200,000	$1,760	$11,990	$3,600,000	$1,760	$32,300	$3,600,000	$3,000	$33,600	$2,400,000	$4,000	$24,340	$2,400,000	$3,000	$23,380

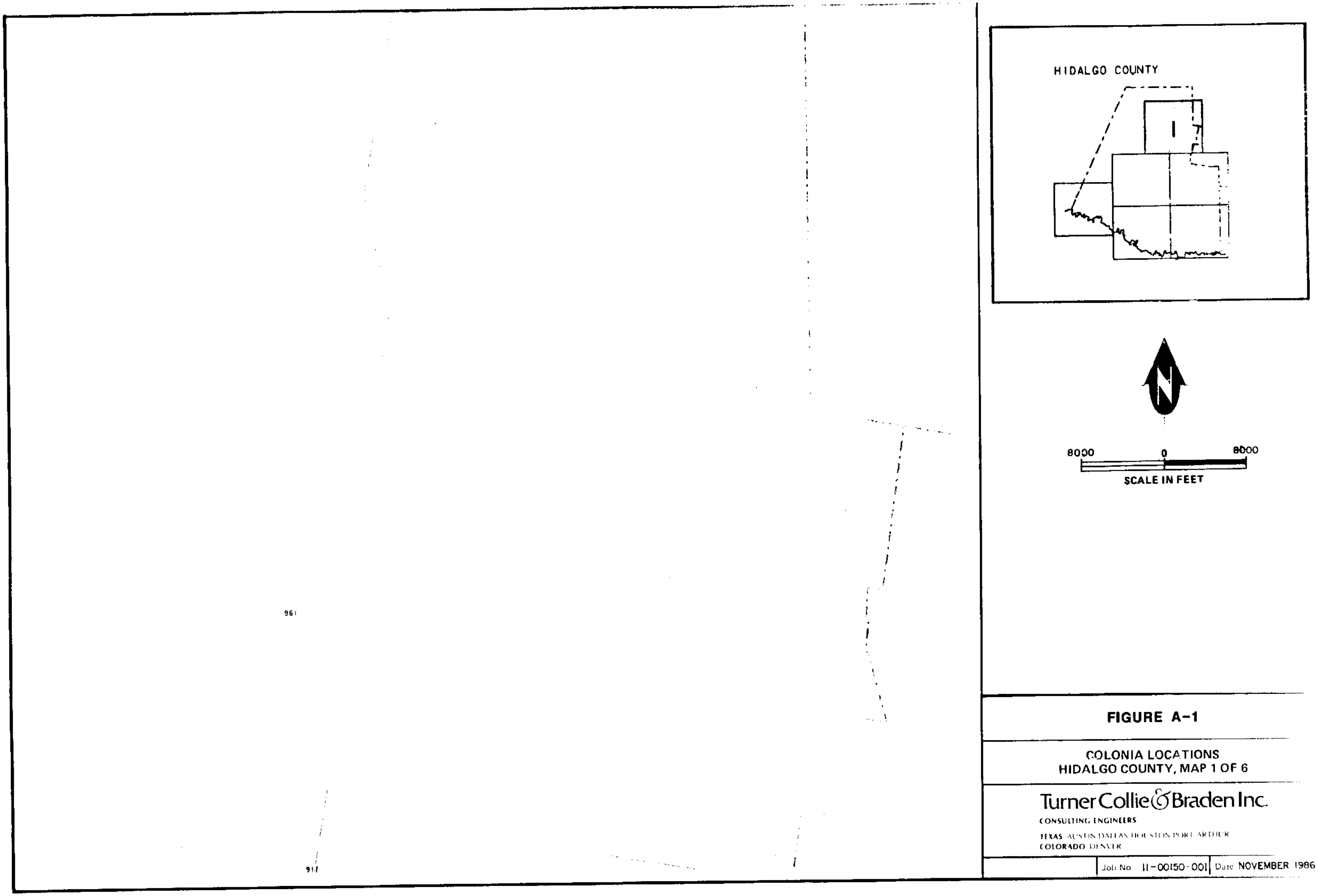
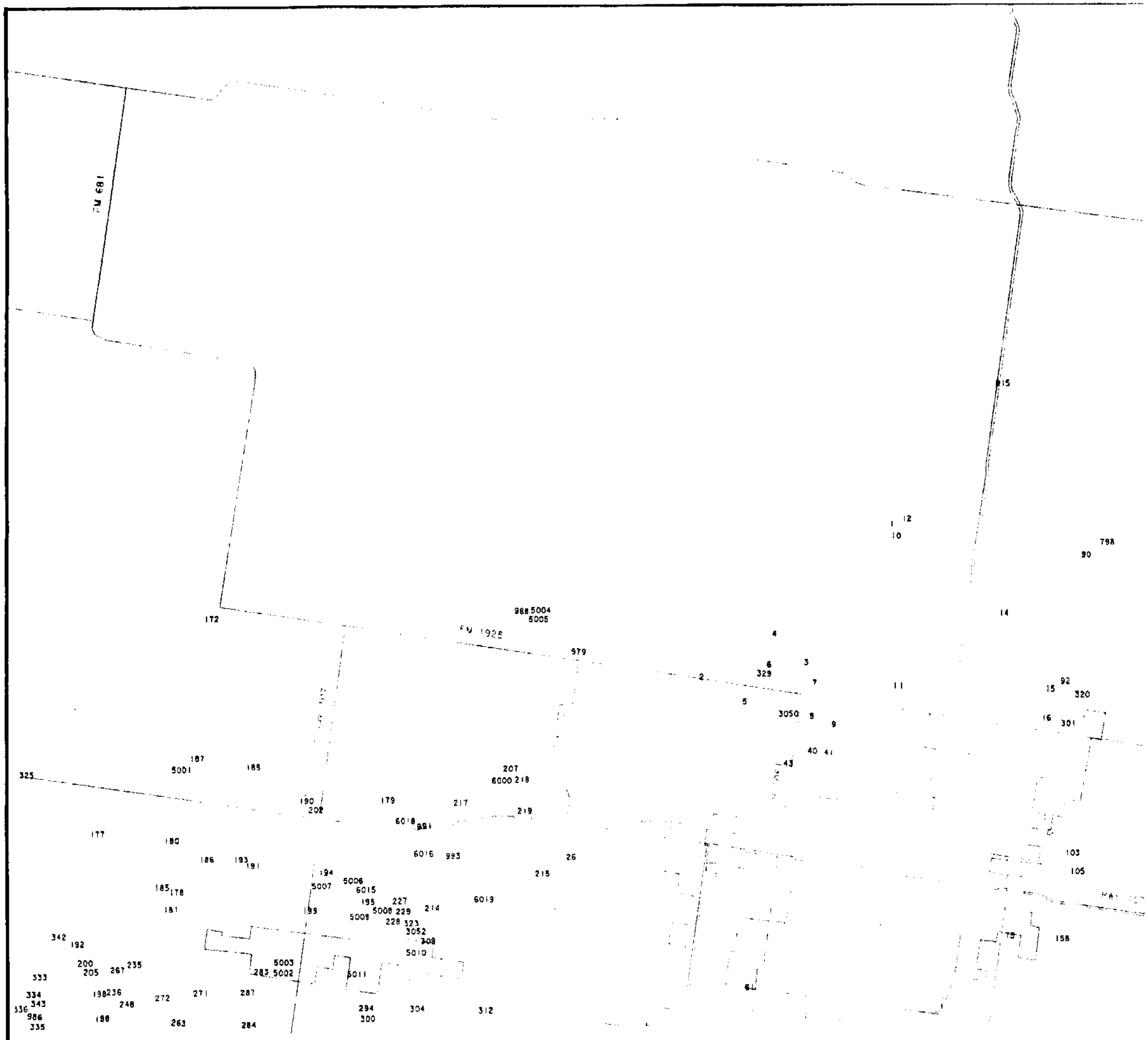


FIGURE A-1

COLONIA LOCATIONS
HIDALGO COUNTY, MAP 1 OF 6

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
TEXAS AUSTIN DALLAS HOUSTON PORT ARTHUR
COLORADO DENVER

Job No 11-00150-001 | Date NOVEMBER 1986



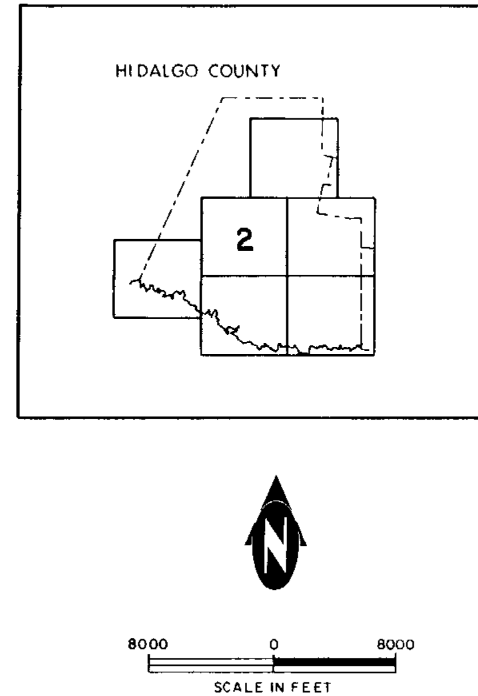


FIGURE A-2

COLONIA LOCATIONS
HIDALGO COUNTY, MAP 2 OF 6

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
TEXAS AUSTIN DALLAS HOUSTON PORT ARTHUR
COLORADO DENVER

Job No 11-00150-001 | Date NOVEMBER 1986

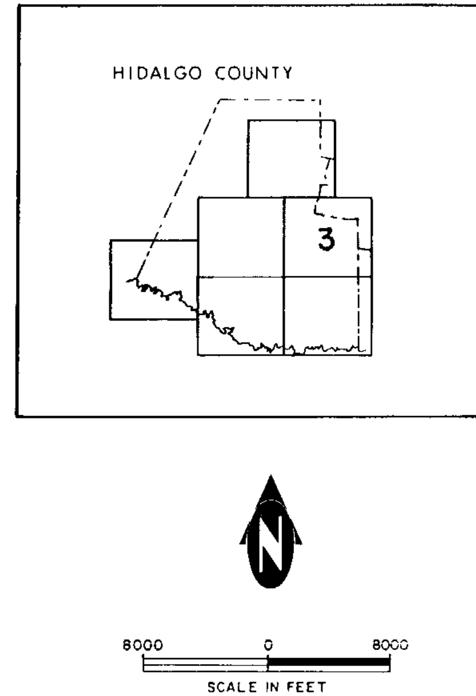
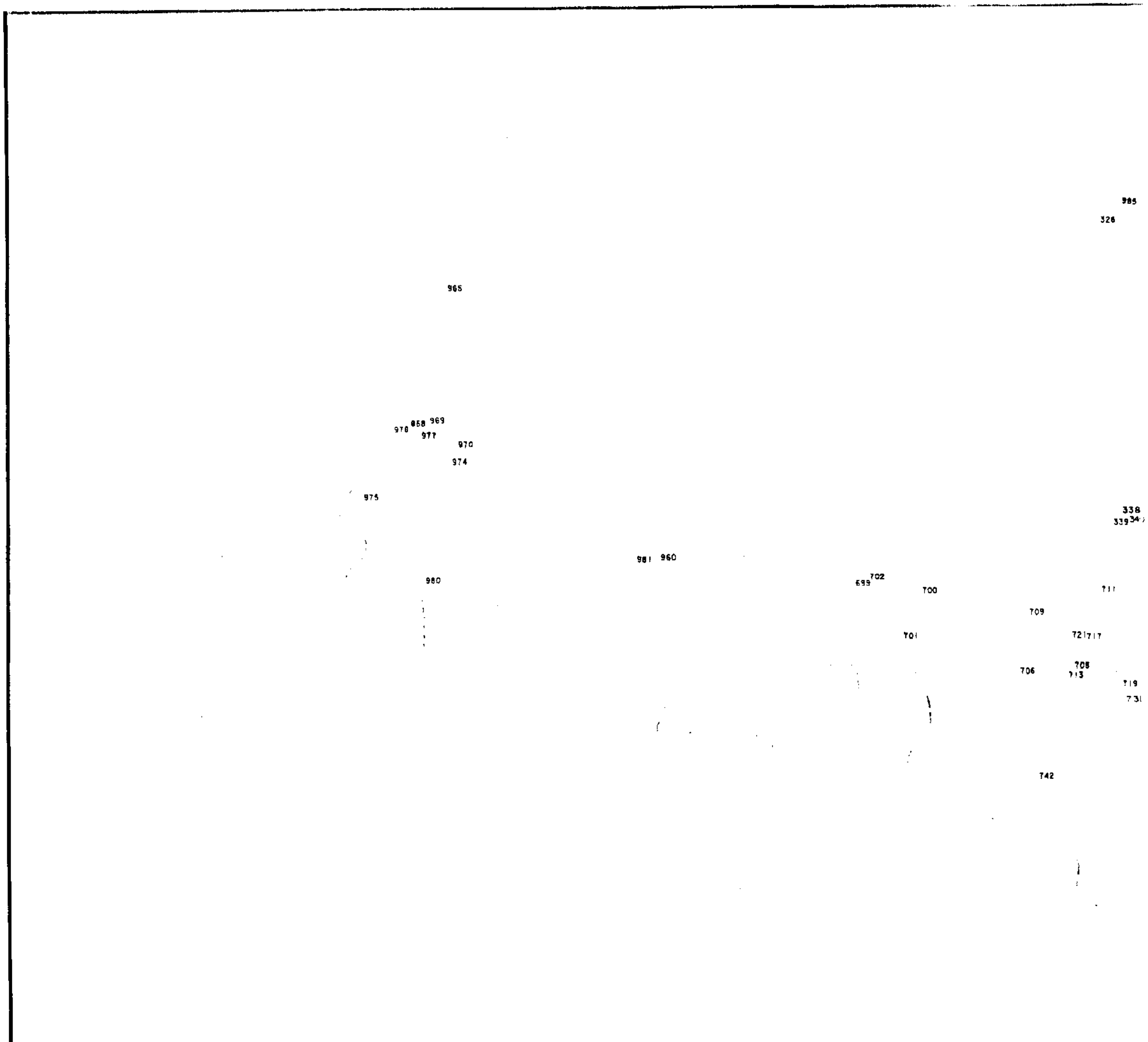


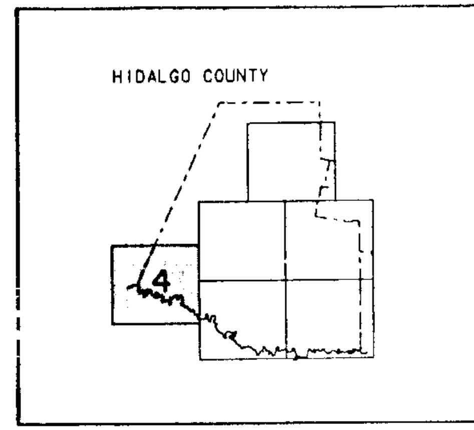
FIGURE A-3

COLONIA LOCATIONS
HIDALGO COUNTY, MAP 3 OF 6

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
TEXAS AUSTIN DALLAS HOUSTON PORT ARTHUR
COLORADO DENVER

Job No 11-00150-001 Date NOVEMBER 1986





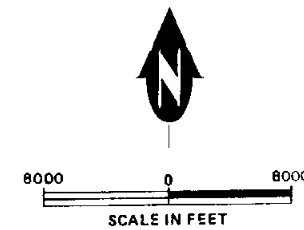
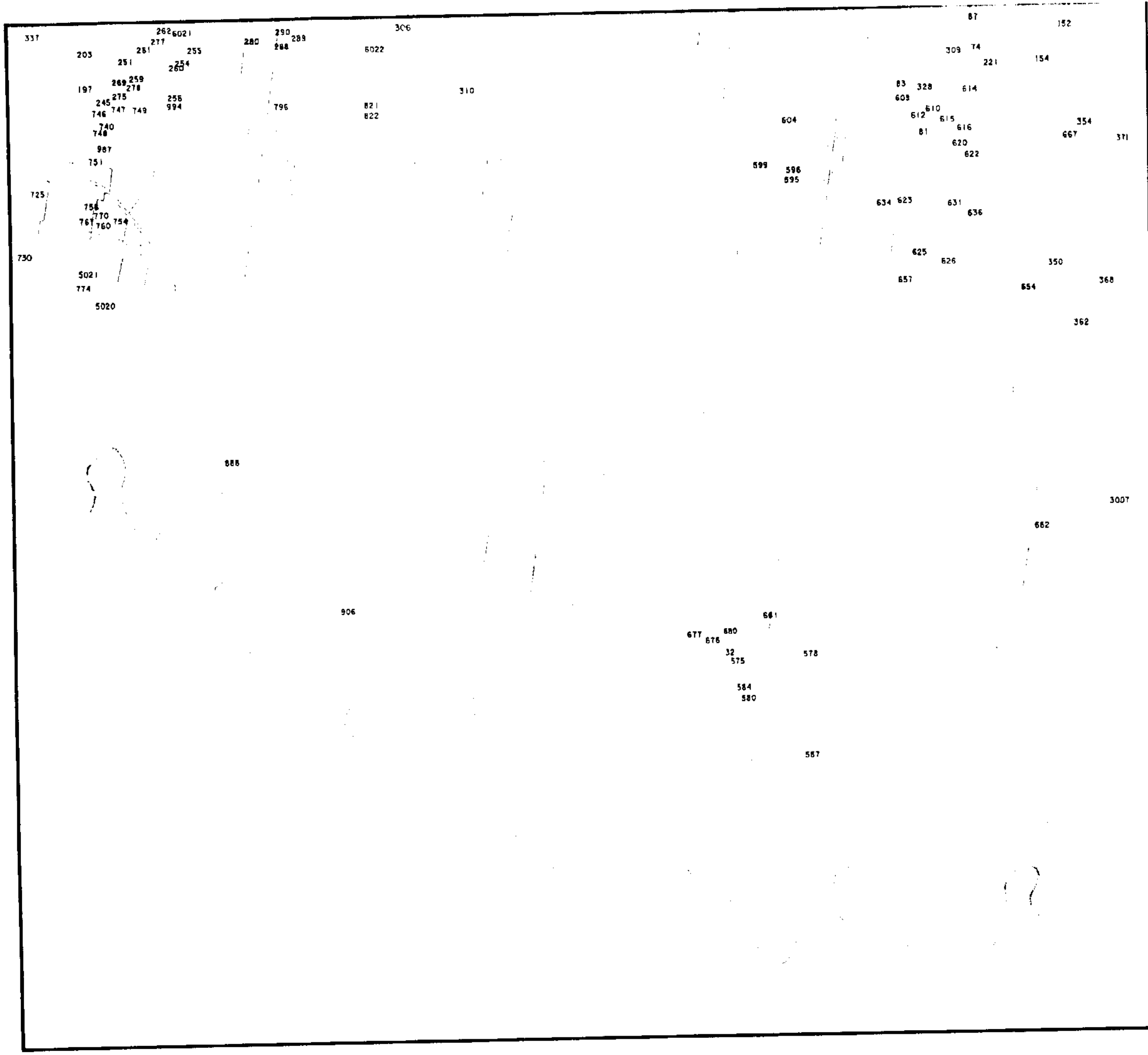


FIGURE A-4

COLONIA LOCATIONS
HIDALGO COUNTY, MAP 4 OF 6

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
COLORADO DENVER

Job No. 11-00150-001 | Date NOVEMBER 1986



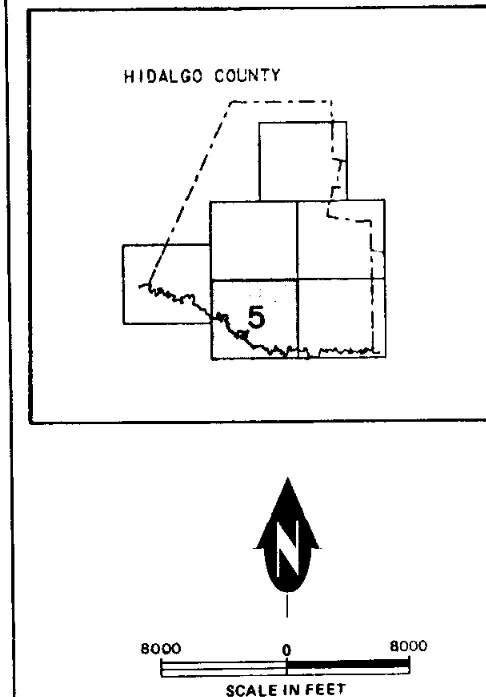
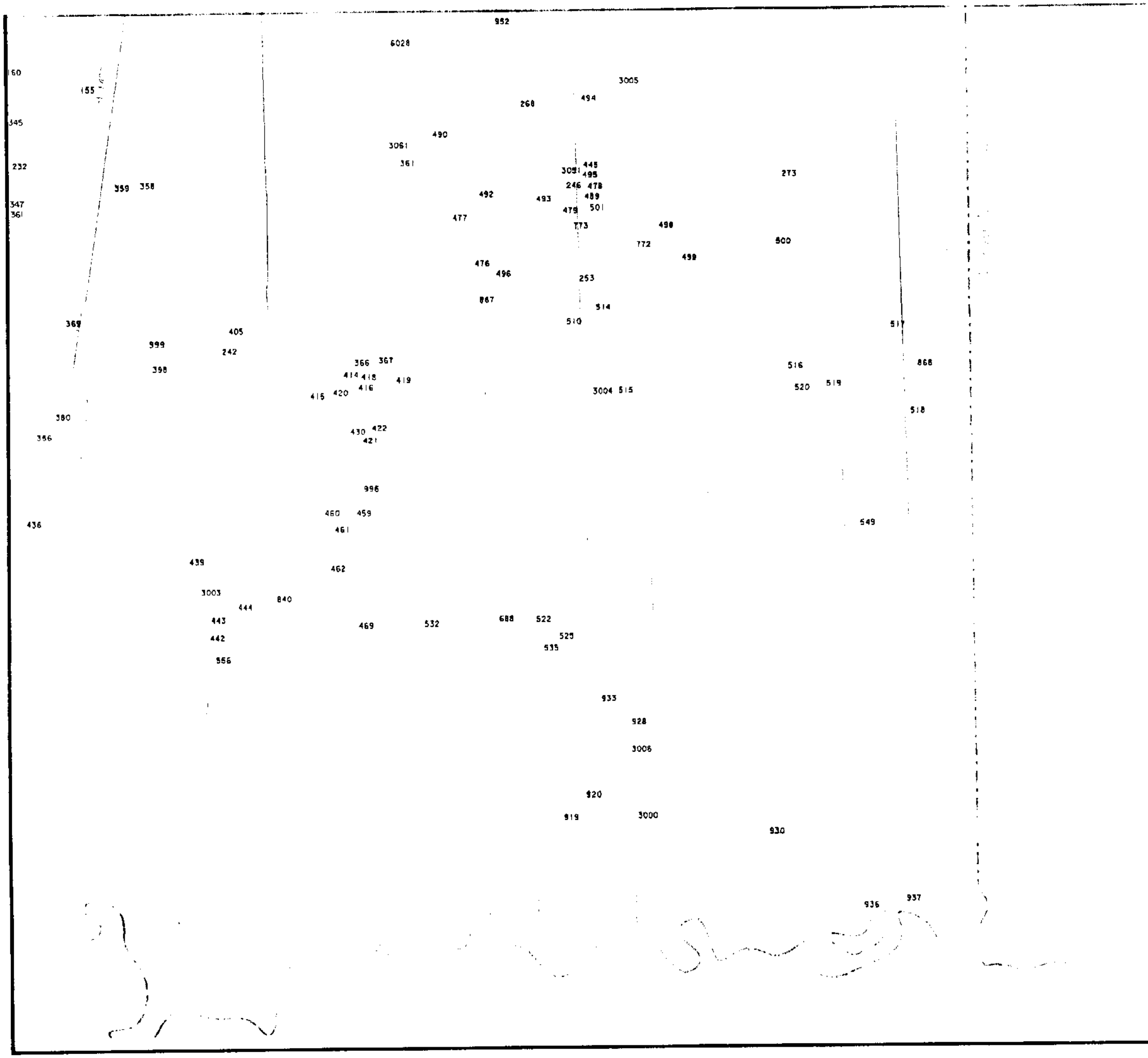


FIGURE A-5

COLONIA LOCATIONS
HIDALGO COUNTY, MAP 5 OF 6

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
TEXAS AUSTIN DALLAS HOUSTON PORT ARTHUR
COLORADO DENVER

Job No 11-00150 001 | Date NOVEMBER 1986



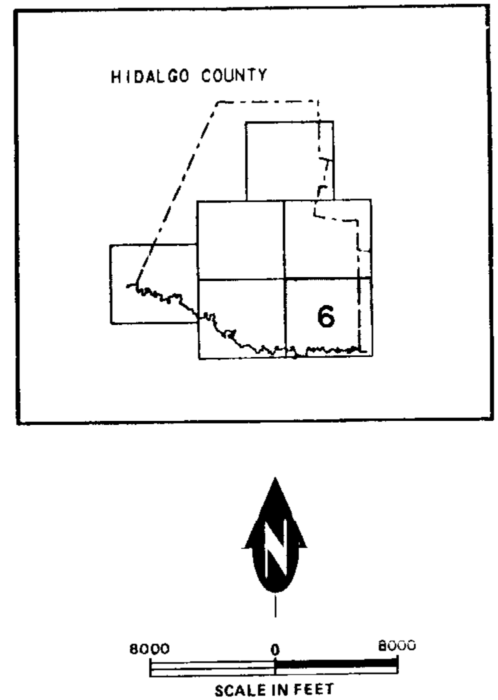
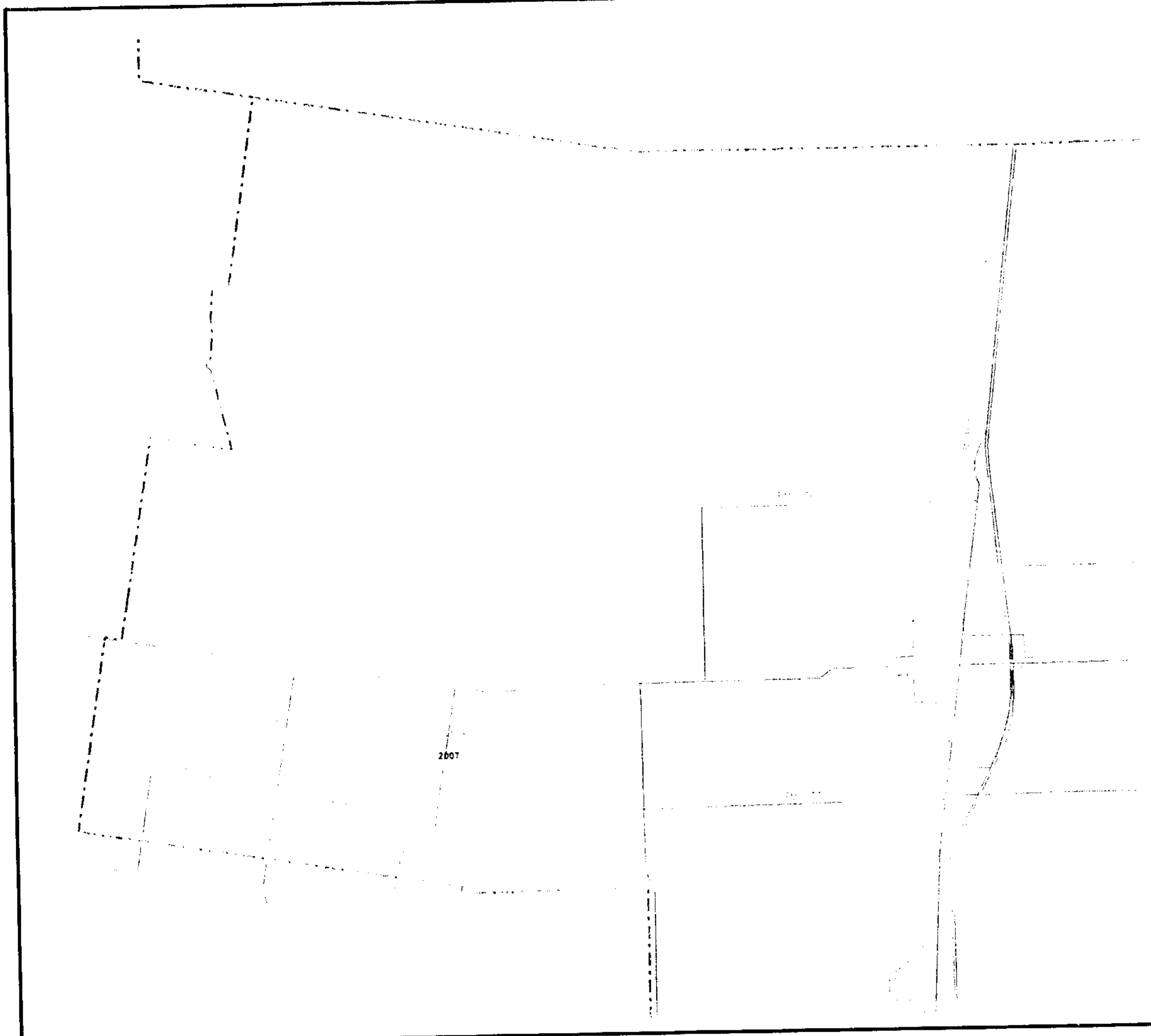


FIGURE A-6

COLONIA LOCATIONS
HIDALGO COUNTY, MAP 6 OF 6

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
TEXAS AUSTIN DALLAS HOUSTON PORT ARTHUR
COLORADO DENVER

Job No. 11-00150-001 Date NOVEMBER 1986



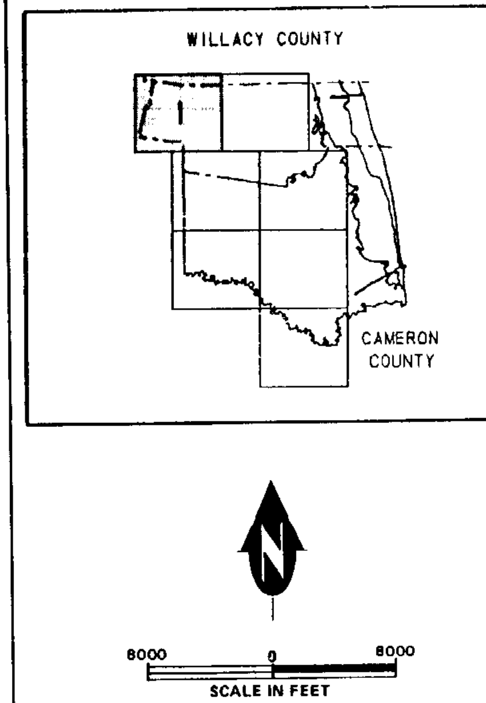


FIGURE A-7

COLONIA LOCATIONS
CAMERON AND WILLACY COUNTIES,
MAP 1 OF 7

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
TEXAS AUSTIN DALLAS HOUSTON PORT ARTHUR
COLORADO DENVER

Job No. 11-00150-001 Date NOVEMBER 1986

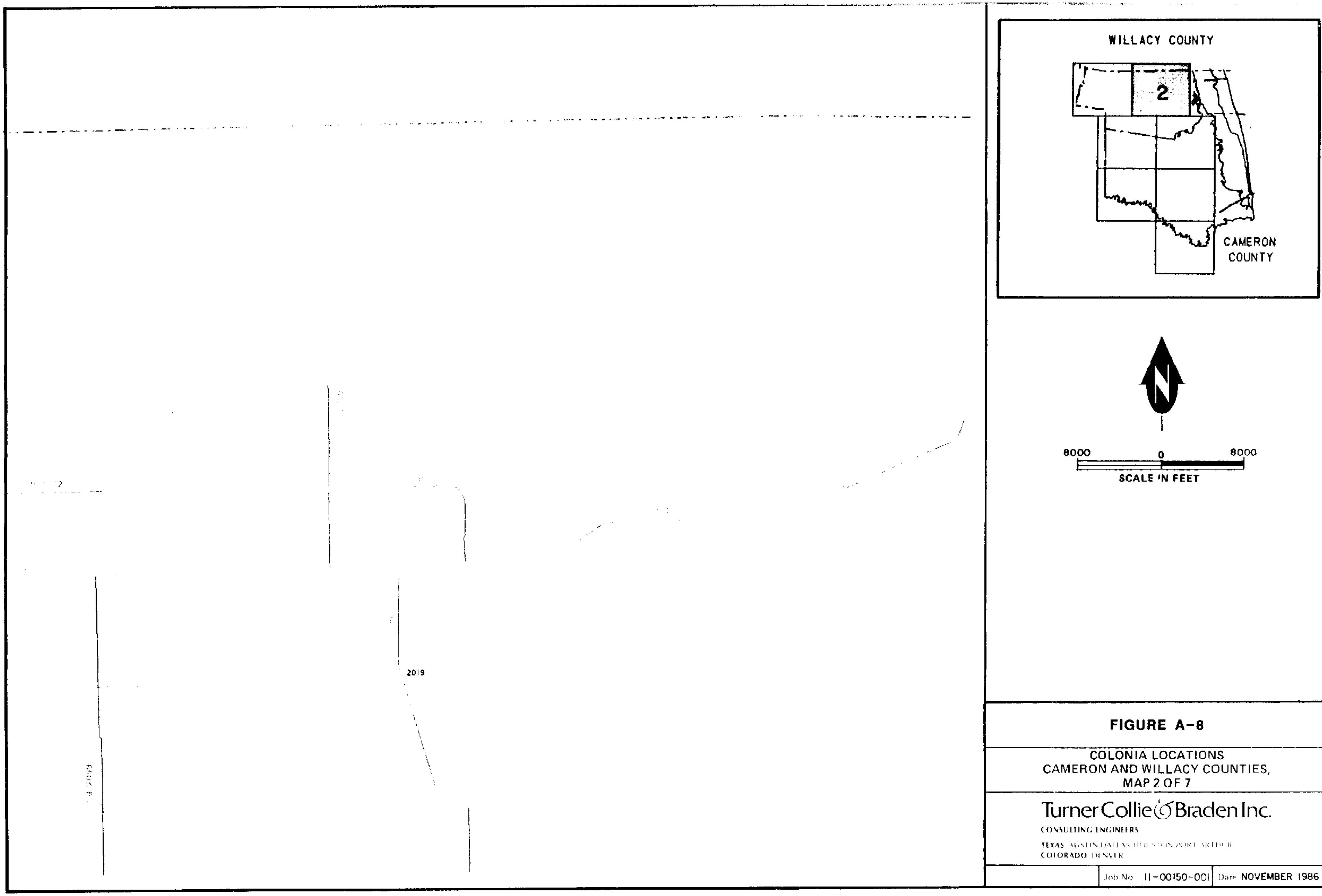
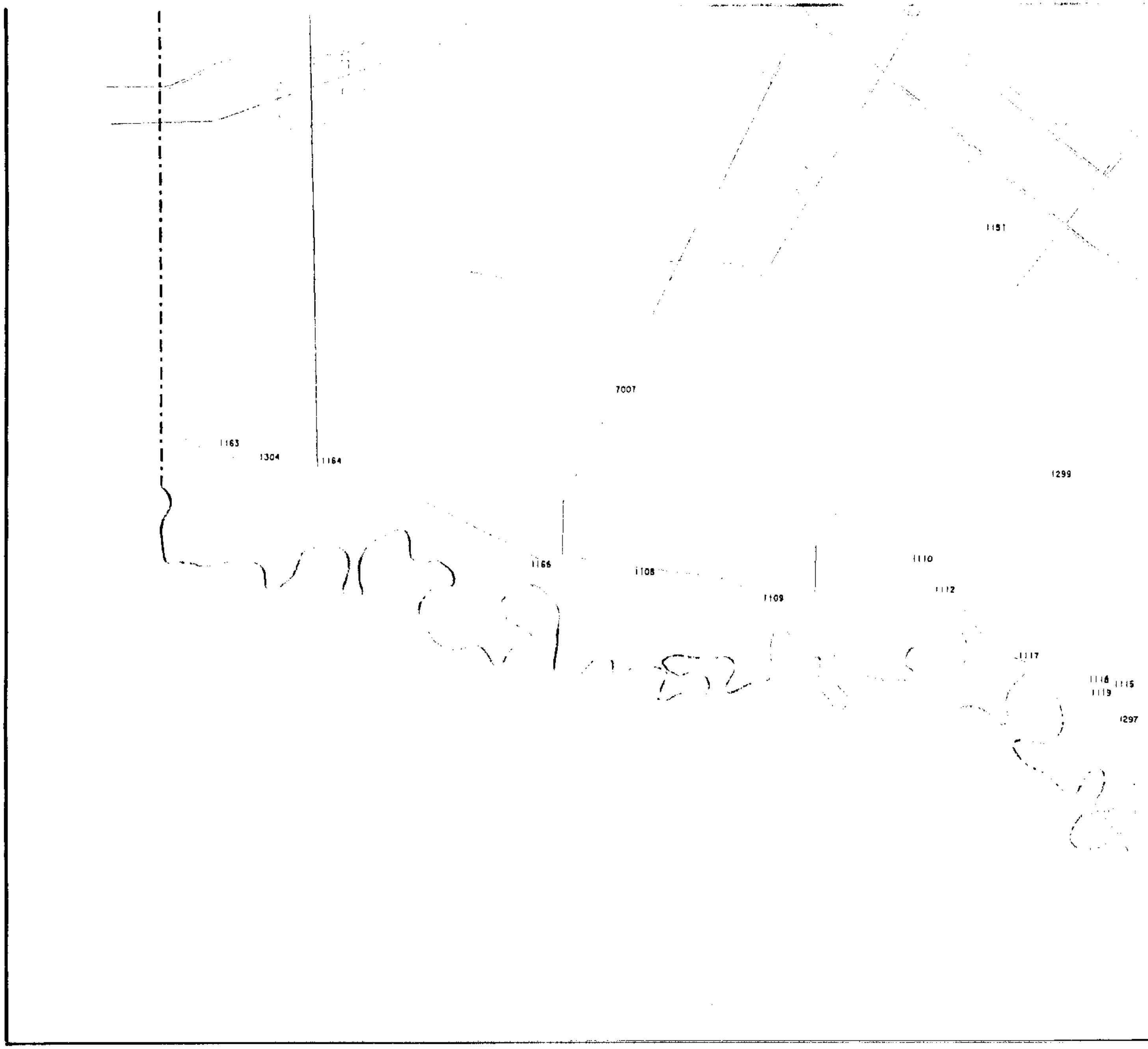


FIGURE A-8

COLONIA LOCATIONS
CAMERON AND WILLACY COUNTIES,
MAP 2 OF 7

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
TEXAS AUSTIN DALLAS HOUSTON PORT ARTHUR
COLORADO DENVER

Job No 11-00150-001 Date NOVEMBER 1986



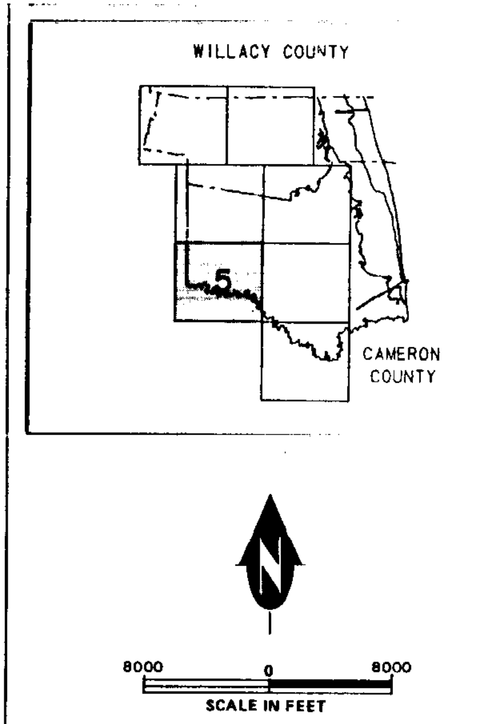
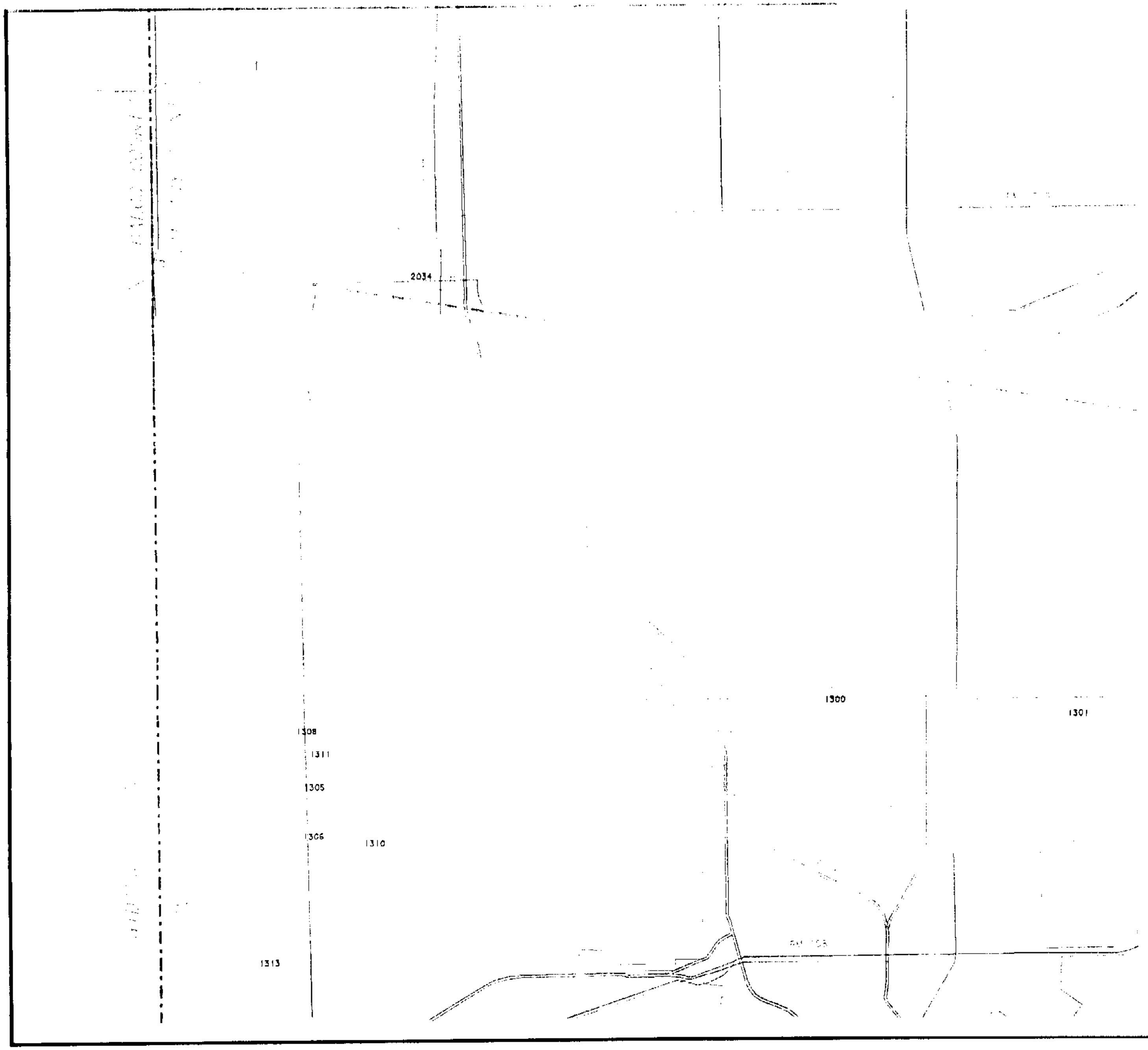


FIGURE A-11

COLONIA LOCATIONS
CAMERON AND WILLACY COUNTIES,
MAP 5 OF 7

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
TEXAS AUSTIN DALLAS HOUSTON PORT ARTHUR
COLORADO DENVER

11 00150 001 NOVEMBER 1986



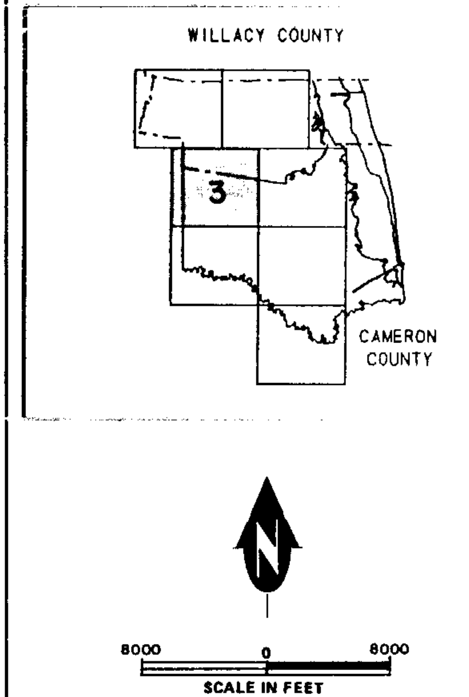
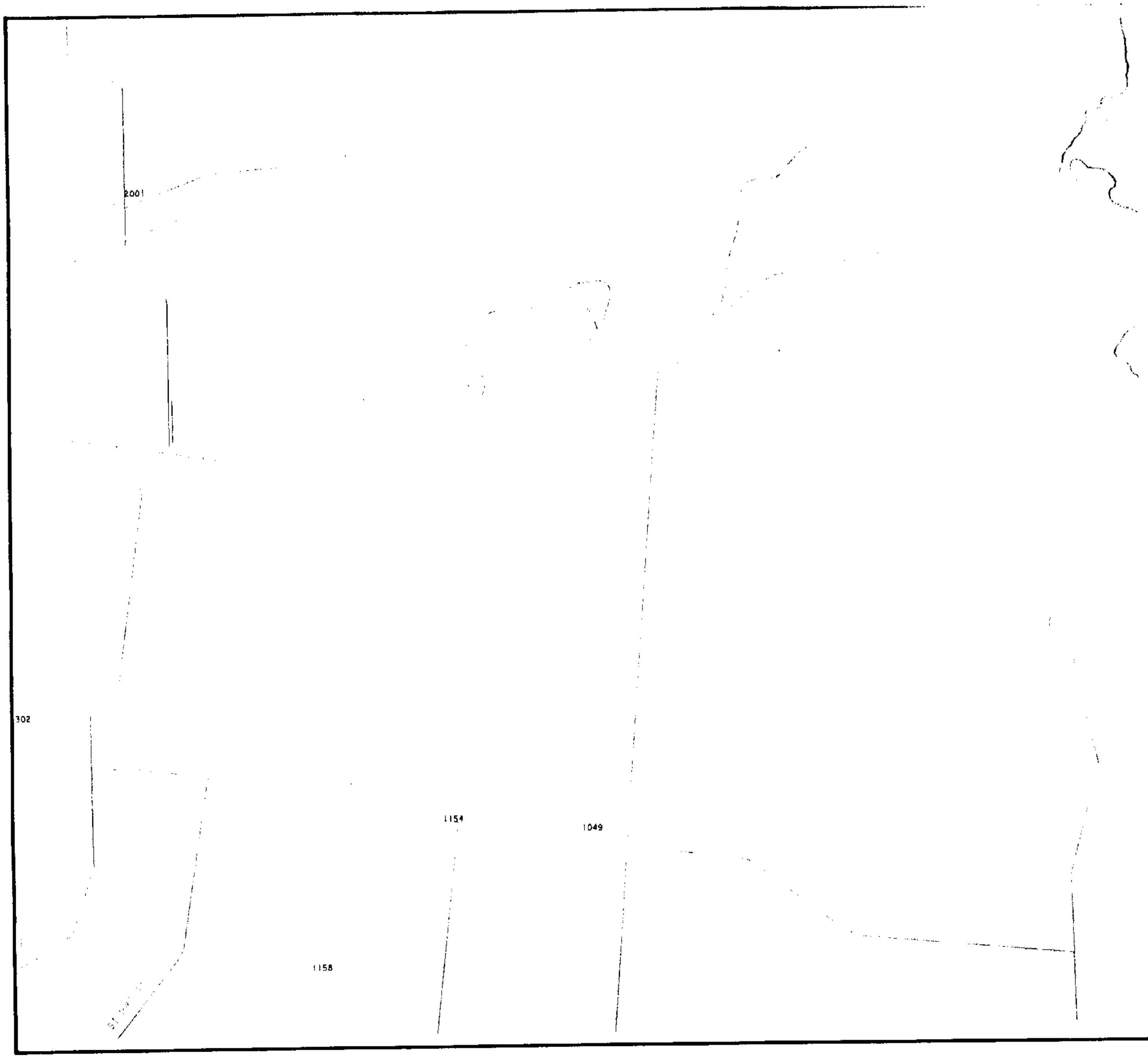


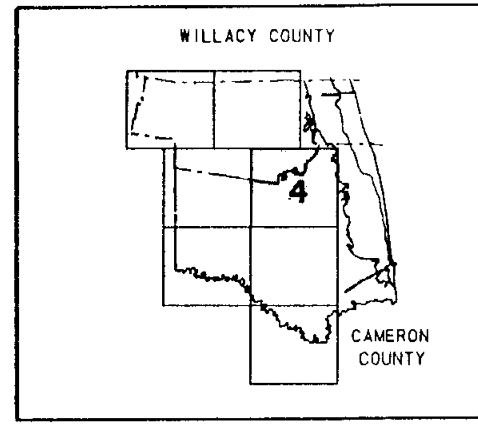
FIGURE A-9

COLONIA LOCATIONS
CAMERON AND WILLACY COUNTIES,
MAP 3 OF 7

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
TEXAS AUSTIN DALLAS HOUSTON PORT ARTHUR
COLORADO DENVER

Job No. 11-00150-001 Date NOVEMBER 1981





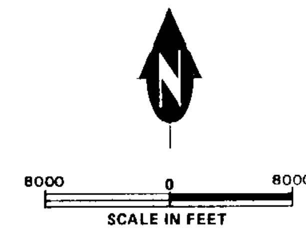
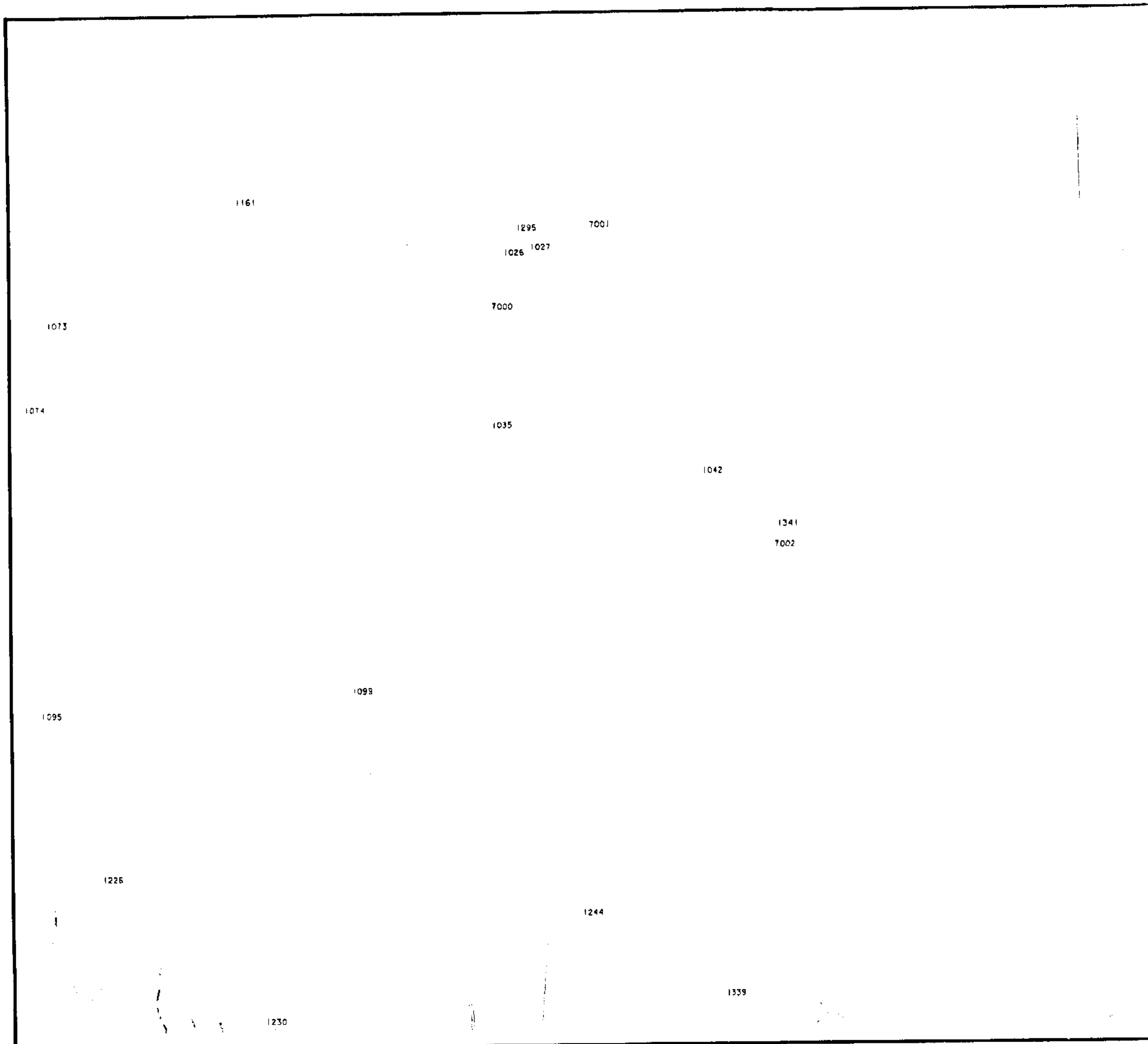


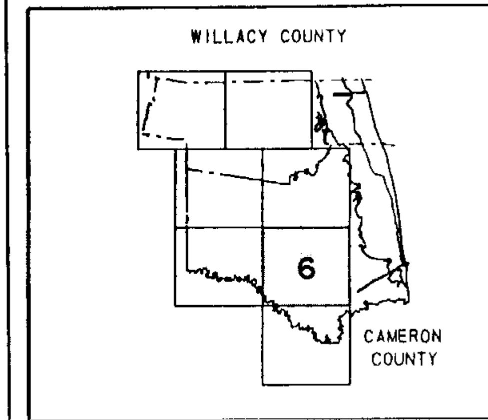
FIGURE A-10

COLONIA LOCATIONS
CAMERON AND WILLACY COUNTIES,
MAP 4 OF 7

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
TEXAS AUSTIN DALLAS HOUSTON PORT ARTHUR
COLORADO DENVER

Job No. 11-00150-001 | Date NOVEMBER 1986





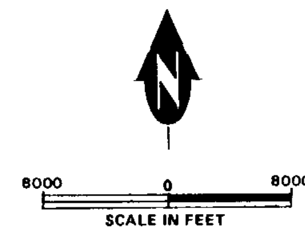
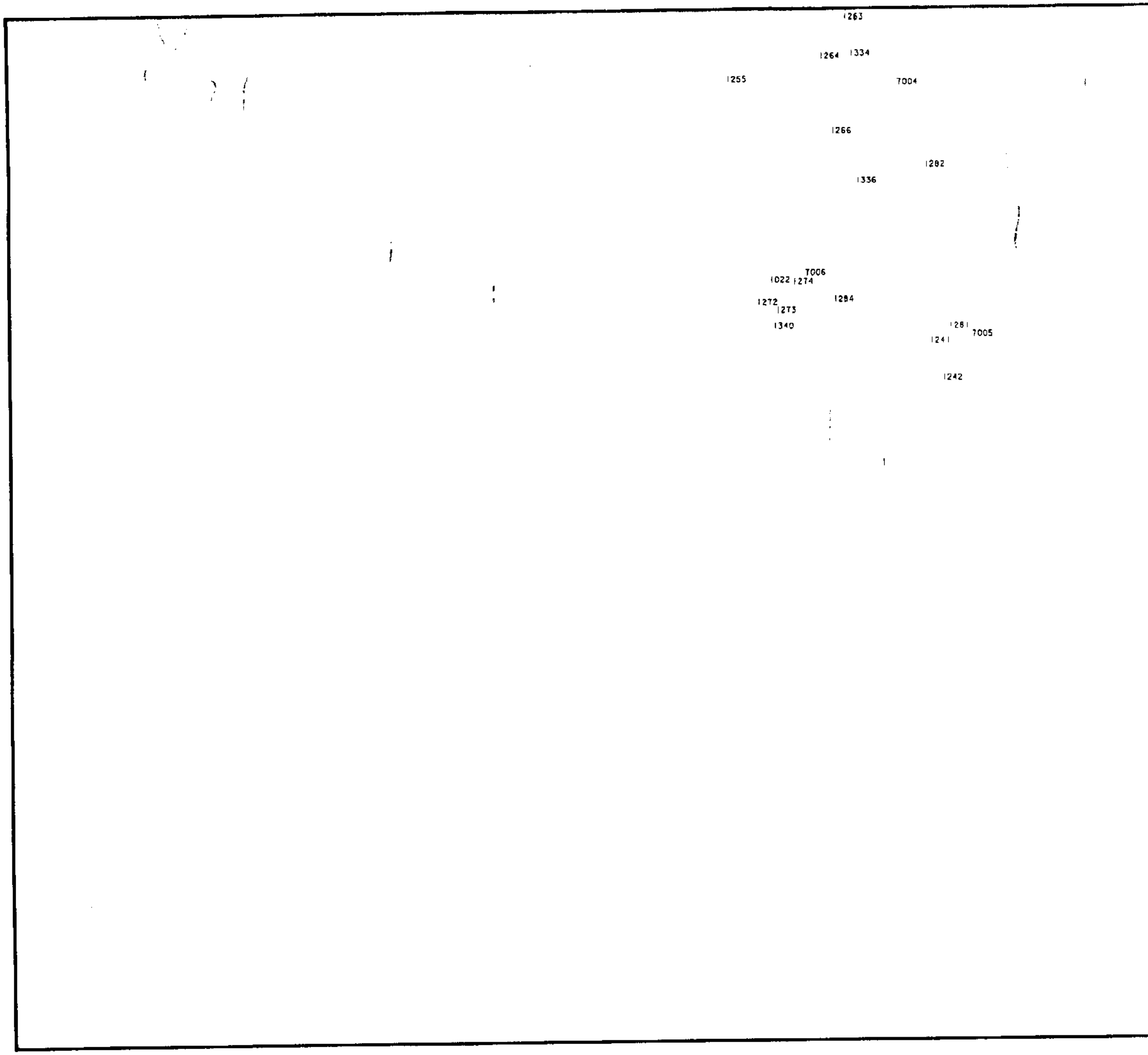


FIGURE A-12

COLONIA LOCATIONS
CAMERON AND WILLACY COUNTIES,
MAP 6 OF 7

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
TEXAS AUSTIN DALLAS HOUSTON PORT ARTHUR
COLORADO DENVER

Job No. 11-00150-001 Date NOVEMBER 19



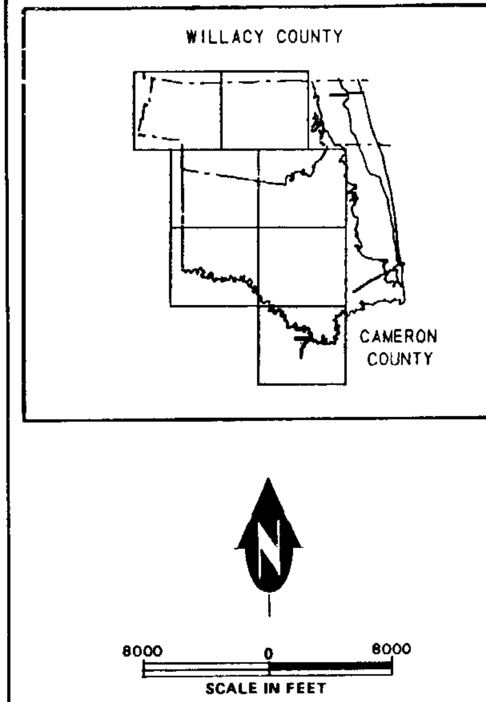


FIGURE A-13

COLONIA LOCATIONS
CAMERON AND WILLACY COUNTIES,
MAP 7 OF 7

Turner Collie & Braden Inc.
CONSULTING ENGINEERS
TEXAS AUSTIN DALLAS HOUSTON PORT ARTHUR
COLORADO DENVER

Job No. 11-00150-001 Date NOVEMBER 1986