4C.31 Growth Management as a Water Management Strategy

As is the case for practically all of the 16 water planning regions of Texas, the South Central Texas Region is projected to have significant population and economic growth during the 2000 to 2060 planning period. For example, population is projected to increase at a compound annual rate of 1.247 percent per year from 2,042,221 in year 2000 to 4,297,786 in 2060 and municipal water demands are projected to increase at a compound annual rate of 1.05 percent per year from 340,030 acft in year 2000 to 637,236 acft in 2060. Projected total water demands increase at a compound annual rate of 0.586 percent per year from 896,353 acft in year 2000 to 1,273,003 acft in 2060.

The population and the economy of the region both need water, with the quantity of water needed depending upon the technologies of municipal living, including commercial activities and services, industrial processes, and agricultural production. The projections that have been made of water demands to meet the projected population and economic growth are based upon trends of water use per unit population and water using industry that are embedded in the water use data that have been reported to the TWDB. For example, effects of low flow plumbing fixtures upon municipal per capita water use, and best management irrigation practices effects upon quantities of water applied per acre irrigated have affected the quantities of water used in these activities, and thereby have positioned the curves and the trends of water use, when viewed through time. Thus, the projections of the number of people who will reside within the region, and the kinds and types of industry, commercial activity, irrigation, and livestock, together with the quantity of water needed per unit population and economic activity determine the quantities of water that are projected to be needed.

In regional water planning, water management strategies are means and/or methods to meet projected water needs (shortages) of water user groups. Such water management strategies have been developed for inclusion in the 2006 Regional Water Plan, and include municipal and irrigation water conservation, as well as water supply projects, such as additional water wells to increase quantities available from aquifers, and additional surface water projects to increase quantities of water available from surface sources. In keeping with this concept of water management strategy, growth management as a water management strategy can perhaps function to allow population and other water using activities to occur within the region at projected rates, but with lower unit requirements of water than has been projected for regional water planning, as

is explained below. Growth management is discussed below, however it is not possible to present estimates of quantities of water, environmental effects, costs, nor implementation issues as has been done for other water management strategies included in the plan, such as water conservation and groundwater and surface water projects.

Growth management, as a water management strategy to meet projected water needs (shortages) involves two major types of activities or procedures, as follows: (1) creation/adoption/use of housing and commercial structures and landscapes for the additional population that is projected for the region of a type(s) that requires less water than the type(s) underlying the projections, and (2) selection of businesses and industries that require/use less water per unit activity than underlies the projections for these water using components of the region. It is emphasized, that growth management is not directed at changing (reducing or increasing) the population and economic projections for which the region is planning. Growth management as a water management strategy is not a strategy to avoid the projected population and economic increases. Instead, growth management as a water management strategy is a set of policies and principals to guide and direct the development of housing and commercial structures into types that use less water per unit population, and to simultaneously guide and direct the location of employers that use less water than the trends that underlie the water demand projections for which the region is planning. For example, the growth management strategy could operate so that new housing subdivisions to accommodate projected population growth over for the period from 2010 to 2060 be designed to use a lower quantity of water per unit than was projected based upon water use data used in making the municipal water demand projections that are to be met via the regional water plan.

Among the factors that influence water use, and through which growth management might be expected to function as a water management strategy in the 2006 Regional Water Plan are the following:

4C.31.1 Housing

- Lot Size/Housing Density
- Landscaping (Types/species of lawn grasses, ornamentals, shade trees)
- Plumbing Fixtures
- Water using appliances

4C.31.2 Industry

- Manufacturing (assembly versus refining and smelting)
- Commercial
- Service
- Warehousing/Trades

4C.31.3 Agriculture

- Efficient irrigation application methods
  - Furrow Dikes
  - Contour farming/Terracing
  - Low energy precision application systems
- Choice of Crops
  - Grazing versus Cultivated Crops
  - Dryland versus Irrigated (crops, vegetables, orchards, and forages)
  - Irrigated Crops (Low water using, drought tolerant strains and varieties)
    - Field Crops versus Vegetables
    - Field Crops versus Orchards
    - Cotton versus Corn
    - Grain Sorghum versus Corn

The water management elements of each of the factors listed above is discussed below. In the case of housing and commercial establishments, growth management could be enlisted to reduce landscape water needs from municipal water systems, by reducing lot sizes, and selecting drought tolerant lawn grasses and landscape plants. In this case, the factors are similar to those of municipal water conservation, however they would be a part of "new" municipal ordinances applicable to new housing and commercial developments chosen for the purpose of reducing overall water needs, as opposed to retrofitting and modifying existing housing and commercial structures (e.g., build less water demanding housing, offices, and commercial structures for new population and business). Rainwater harvesting for water supply and gray water plumbing for landscape irrigation could be included in the design and construction of structures, as a part of the growth management initiative.

Housing — In the region, both single family and multiple family housing structures are in existence, and have been selected by the private sector subject to municipal and county zoning ordinances and/or density regulations. The resulting densities, landscaping choices, and practices have established a municipal water demand condition; i.e.; per capita water use datum that is similar among the cities of the region, but is somewhat unique among cities. The

important point to be considered in terms of future water requirements is the selection of ordinances and regulations that will result in desirable living conditions for individuals and the community, in general, but will require less water per unit than the existing set of regulations and ordinances has established. For example, in growth management terms, modification of existing ordinances regarding platting of lot sizes to require that lots for new homes and apartments be only XX percent (XX to be determined by each jurisdiction via public process used in ordinance adoption by the jurisdiction) the size previously specified. Such modifications could reduce the quantity of water needed for lawn watering by YY percent (Again, the percentage to be determined as a part of the ordinance making process).

In the case of landscaping of new housing subdivisions and commercial complexes, it would be necessary for each jurisdiction to follow its respective ordinance making procedures, and through the public process reach decisions about goals and methods for use in adopting low water requiring landscape designs and plants. The possibilities reside with goals and objectives of the community, technical capabilities, public health and safety, and tastes and preferences of those involved.

In the case of plumbing fixtures for residential, commercial, institutional, public places, low-flow types were specified by both State and Federal law several years ago, and are therefore not expected to exhibit potential for further reductions in municipal water demands. However, in the case of water using appliances, such as clothes and dish washers, water-efficient types are available, and could be considered through ordinance making processes. State and Federal laws have not mandated that only the water-efficient types be manufactured and sold, as in the case of low-flow plumbing fixtures.

Industry — In the case of projected growth in the manufacturing and business services sectors that are expected to be attracted to the labor force and the markets of the projected growing population, the economic development organizations could focus upon recruiting and encouraging only low water using establishments to locate within the region; (e.g., do not recruit manufacturing concerns that require water in the production process, such as petroleum refining and metals smelting). It is important to note that heavy water using industries have located and may continue to be attracted to coastal areas of Region L, whereas the types of industries that have located in the interior areas of Region L have been the product assembly and personal services types that do not require significant quantities of water in the production processes. Thus, attention to these factors may not offer much promise for the interior areas of Region L,

since these factors appear to have been and continue to be major considerations in business location decisions affecting growth and expansion within these parts of the Region L.

Agriculture — In Region L, both dryland and irrigated production methods are used. Irrigation using available groundwater and surface water locally is supplemental to precipitation in the western part of the region, and has developed over time in response to weather cycles (e.g., during settlement of the area, farming and ranching was undertaken based upon observed precipitation, but as time passed, and dry weather cycles appeared, farmers and ranchers turned to use of locally available water to save crops from failure due to lack of rain). There were not many readily available sources of flowing surface water, but the discovery and pumpage of water from large deposits of groundwater in the Edwards, Carrizo and Gulf Coast Aquifers lying beneath land which could be tilled proved to be economically feasible, and irrigated agriculture was developed extensively in Uvalde, Medina, Bexar, Zavala, Frio, and Atascosa Counties, and to a lesser extent in Dimmit, Wilson, and LaSalle Counties. Irrigated production included(s) vegetables, grains, cotton, forage, and orchard crops in these counties, while in Calhoun and Victoria Counties in the coastal areas, irrigation from both surface and ground sources was developed, with the main crop being rice.

With respect to growth management in the existing agricultural sectors of the region, given that water supplies available are declining due to mining of supplies from the Carrizo Aquifer in the western counties of the region, declining water levels in local areas of the Gulf Coast Aquifer, and limits upon pumping from the Edwards Aquifer, management decisions should always be focused upon use of efficient cultivation and irrigation application techniques such as contour cultivation and furrow dikes to hold precipitation on the fields, low energy precision application of available irrigation water (See Section 4C.1.2 for description of efficient irrigation application methods). In addition, consideration could be given to shifting from traditional irrigated crops to others that require less water. For example, grow field crops, such as grains, which require 12 to 15 inches of water per acre, instead of vegetables that require 24 to 36 inches of water per acre. Or, in the case of grains, grow grain sorghum, which requires about 12 inches of supplemental water per acre to be successful, instead of corn which requires more than 40 inches per acre. However, suggesting that crop mixes be changed as a water management strategy must be carefully evaluated, since those in existence have been selected by farmers on the basis of technical and economic factors, personal expertise and preferences, and perhaps cultural and sociological considerations. Obviously, the choice of crops produced

determines the profitability of farming and the level of farm income. Producing high value crops, such as vegetables and orchard crops, if successful, usually results in higher farm incomes per acre than does grains and cotton, and rice. Thus, the choice of crops to produce determines the level of living and welfare of the producer and the producer's families, and must be carefully considered. Nevertheless, if water is not available, and can not be made available in sufficient quantities at acceptable costs, as is the case in Region L, then some of the elements of efficiency and crop mix mentioned above may need to be considered within the context of growth management for the irrigation water user group of the region.

In summary and conclusion, it is reemphasized, that growth management would not be directed at changing (reducing or increasing) the population and economic projections for which the region is planning, nor would growth management be a strategy to avoid the projected population and economic increases. Instead, growth management, as a water management strategy, would be: (1) the development and adoption of policies and principals to guide and direct the development of housing and commercial structures into types that use less water per unit population, (2) encouragement of the location of industries to the region that use less water than the industries included in the trends that underlie the water demand projections for which the region is planning, and (3) guidance for large water using sectors, such as irrigated agriculture, to improve technical water use efficiencies, and consider shifting into other, less water demanding types of production.