

5. INFRASTRUCTURE CAPACITY ASSESSMENT

Water Consumption Background

The Town of Westlake purchases its potable water from the City of Fort Worth. The agreement states that the Town of Westlake can increase its water consumption by no more than 1.35 times the maximum day demand of the previous year in any one day. The Town of Westlake is responsible for the distribution of potable water while its purveyor responsibility is to deliver the treated potable water via their transmission system.

The Town's current average daily use is reportedly about 1,200 gals per day per person, with a consumption break down of about 70% residential use and 30% non-residential. By comparison, Southlake's consumption is in the neighborhood of 600 gallons per day per person, while the Town of Highland Park's consumption is approximately 400 gallons per day per person. Historical consumption rates for the Town of Westlake from 2009 to 2013 are shown in Figure 82 and Figure 83.

Average Daily Use

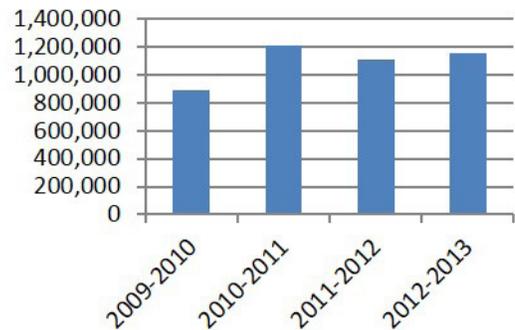


Figure 82: Westlake Average Daily Water Use

Maximum Day Demand

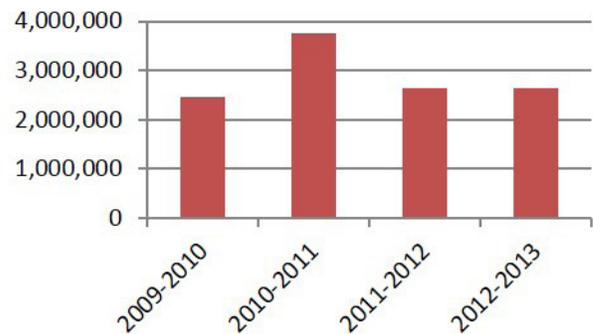


Figure 83: Westlake Maximum Day Water Demand

Estimating Future Water Consumption

The cost of developing new water infrastructure will be directly related to water demand and water availability. A prudent water demand projection is necessary in order to set capital outlays that can be met by the Town, its purveyors, and the development community. Based on zoning and PDs, the future population for the Town could reach around 7,750 at built-out. At the current average daily demand in the vicinity of 1,200 gallons per day per person, the average daily demand could be about 9.3 million gallons, a very high and unlikely sustainable rate.

A more reasonable approach to estimating future water consumption, based on commonly accepted standards for water consumption rates, can be used to set a more sustainable rate. The means to estimate those would be:

- 350 gallons per single-family dwelling unit (3.3 persons per unit based on Census data)
- 250 gallons per multi-family dwelling unit (2.1 persons per unit based on Census data)
- 20 gallons per office employee
- 25 gallons per industrial employee
- 150 gallons per 1,000 square feet of retail space
- 150 gallons per 1,000 square feet of mall space
- 200 gallons per hotel unit

Based on these rates, the resulting water consumption on a per land use basis at built-out would yield the average daily consumption rates shown in Figure 84.

Land Use	Gallons Per Day
Single Family Residential	760,043
Multi-Family Residential	74,250
Office	972,920
Industrial	0
Retail	202,145
Mall	220,050
Hotel	635,940
Open Space	0
Total	2,865,348

Figure 84: Yield at Build-Out Table

The above future demand analysis amounts to 29.12% residential and 70.88% non-residential, an inverse of the current 70% residential to 30% non-residential. Current residential water use may include substantial irrigation to support lush landscaping, high water use fixtures, other amenities, and the like that contribute to high water demand relative to total population, which results in high water use on a per capita basis.

The Town's 2012-2013 daily average water use was 1,159,871 gallons with approximately 811,910 gallons being residential use. At build-out, based on the above methodology, the average daily water demand is 2,865,348 gallons; if the residential use is to be at roughly 29%, the residential average daily use would be 834,293 gallons. However, the population served would be 7,750 versus today's roughly 1,000. Therefore, the challenge for the future is to understand how to reduce high residential water use and how to maintain such reduction. Water conservation, in combination with other best management practices, should be a high priority for the Town.

Wastewater

The Town of Westlake has an agreement in place with the Trinity River Authority (TRA) in which TRA receives the Town's wastewater and conveys it to TRA's wastewater treatment facilities. The Town is responsible for collecting the wastewater in collection mains within the Town limits. The Town's topography does not always accommodate gravity flow through its wastewater collection mains, so pumping of wastewater to overcome topographic obstacles is required. The Town owns and operates three lift stations: the Deloitte Lift Station, Fidelity Lift Station, and Carroll Lift Station that are utilized for pumping wastewater. The Deloitte and Fidelity Lift Stations are expandable and capacity can be added as the Town grows. The wastewater from Westlake ultimately flows into another lift station owned by TRA, the Kirkwood Lift Station, located in Southlake on North White Chapel Boulevard north of Wingate Lane. From there it is conveyed to TRA's Denton Creek Regional Wastewater System treatment plant in Roanoke.



Figure 85: Town of Westlake's Deloitte Lift Station



Figure 86: TRA's Kirkwood Lift Station, located in Southlake

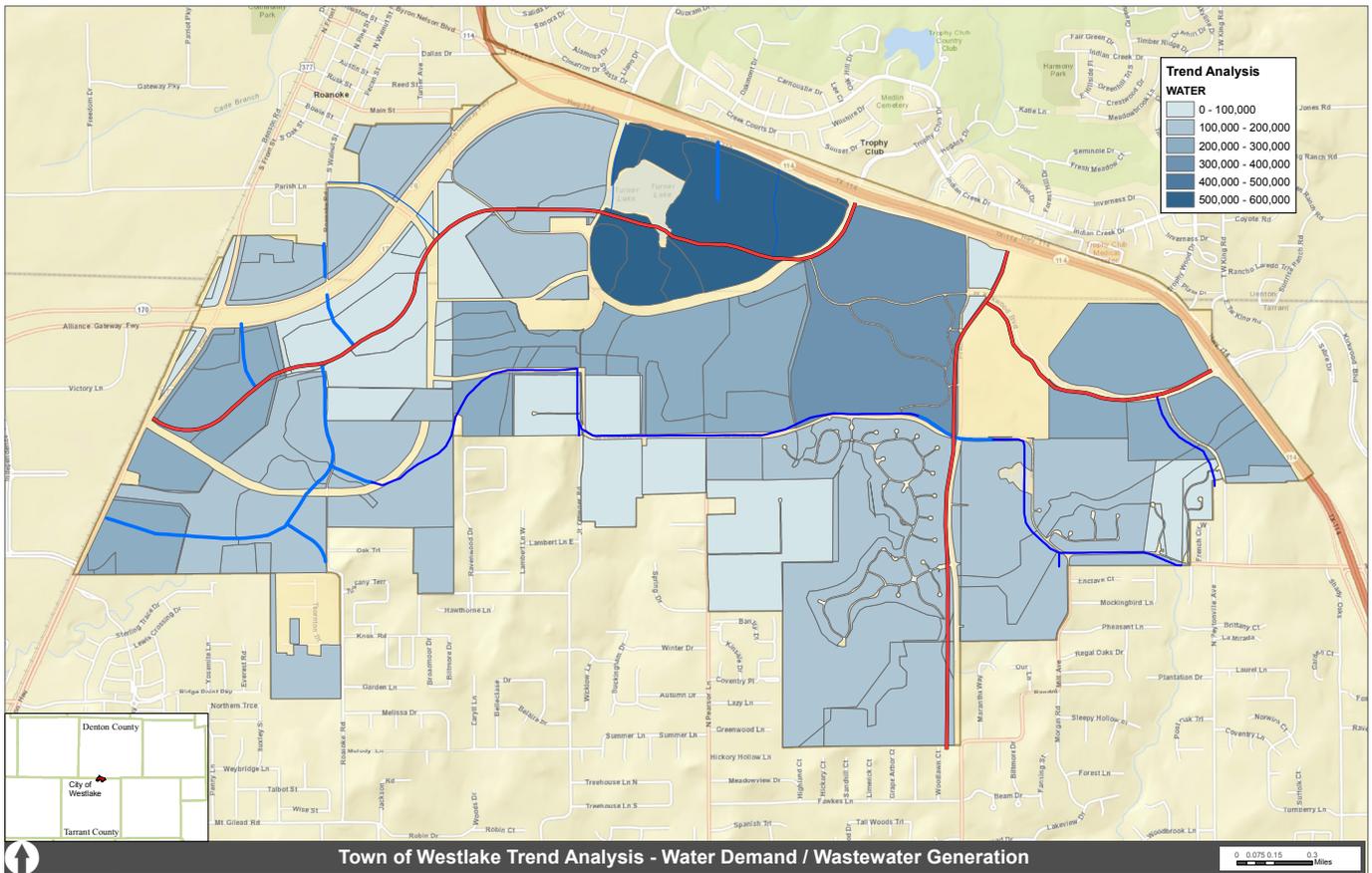


Figure 87: Water Demand and Wastewater Generation Map

An approximate distribution of water demand at build-out across the Town is shown in Figure 87.

The generation of wastewater will closely follow where the water demand is shown in Figure 87. Current wastewater flows are indicative of high irrigation use as water usage (70% residential, 30% non-residential) is much greater than wastewater flows. Historical wastewater flows for the Town have normally been less than 150,000 gallons per day (while 2012-2013 average water consumption was 1,159,871 gallons per day) with the highest wastewater flows recorded occurring during July and August

of 2011 at only around 211,000 gallons per day. However, if in the future, non-residential water use is 70%, wastewater flows will increase. Westlake's growth impact on the TRA system may be less than that of other communities that are served by the same system. At any rate, TRA must have time to expand their system, if required. Based on the Town's agreement with TRA, Westlake's wastewater flows shall not exceed 3.5 times the Town's estimated average daily flow for more than a 24-hour period. Therefore, it is key that the Town report its estimated average daily flow and estimated growth projections to TRA in a timely manner.

Stormwater

The stormwater runoff within the Town of Westlake drains within two major watersheds: the Marshall Branch watershed and the Kirkwood Branch watershed. Each of the watersheds' main branches also has a natural system of tributaries. Marshall Branch and its three major tributaries, MB-3, Paigebrook Creek, and Golf Course Creek drain the western and central portions of the Town. Kirkwood Branch and its tributary, Higgins Branch, drain the eastern portion of the Town.

Marshall Branch has a wetland complex in its upper reach west and upstream of Roanoke Road. Marshall Branch is also wooded downstream of Ottinger Road and upstream of Lake Turner. Lake Turner is on Marshall Branch and is located between SH 114 and Ottinger Road. Some erosion of the natural banks has occurred on Marshall Branch downstream of the spillway. Both Tributary MB-3 and Paigebrook have some jurisdictional ponds. Paigebrook Creek also includes a wooded stream corridor south and upstream of Dove Road. Golf Course Creek has three jurisdictional ponds. It also includes a hardwood forest downstream and north of Dove Road (a distinct and diverse wetland along and within the Fidelity Investment tract, to the north of a pond). There are also other isolated and fringe wetlands associated with the ponds.

Kirkwood Branch is heavily wooded from SH 114 upstream to Dove Road. Higgins Branch's entire reach within the Town, from its confluence with Kirkwood Branch to upstream and south of Dove Road, is also heavily wooded. Kirkwood Branch also has jurisdictional ponds on its upstream reaches. A fringe wetland is located on the most southern pond of Kirkwood Branch.



Figure 88: Lake Turner Spillway



Figure 89: Marshall Branch Erosion

Floodplains

The flood zones mapped in the 2000 Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps include approximately 563.3 acres in the 100 year flood plain within Westlake. When the Marshall and Kirkwood Watersheds become fully developed, stormwater flows will increase by about 30%. Development that occurs in communities upstream of Westlake will also increase the flooding potential.

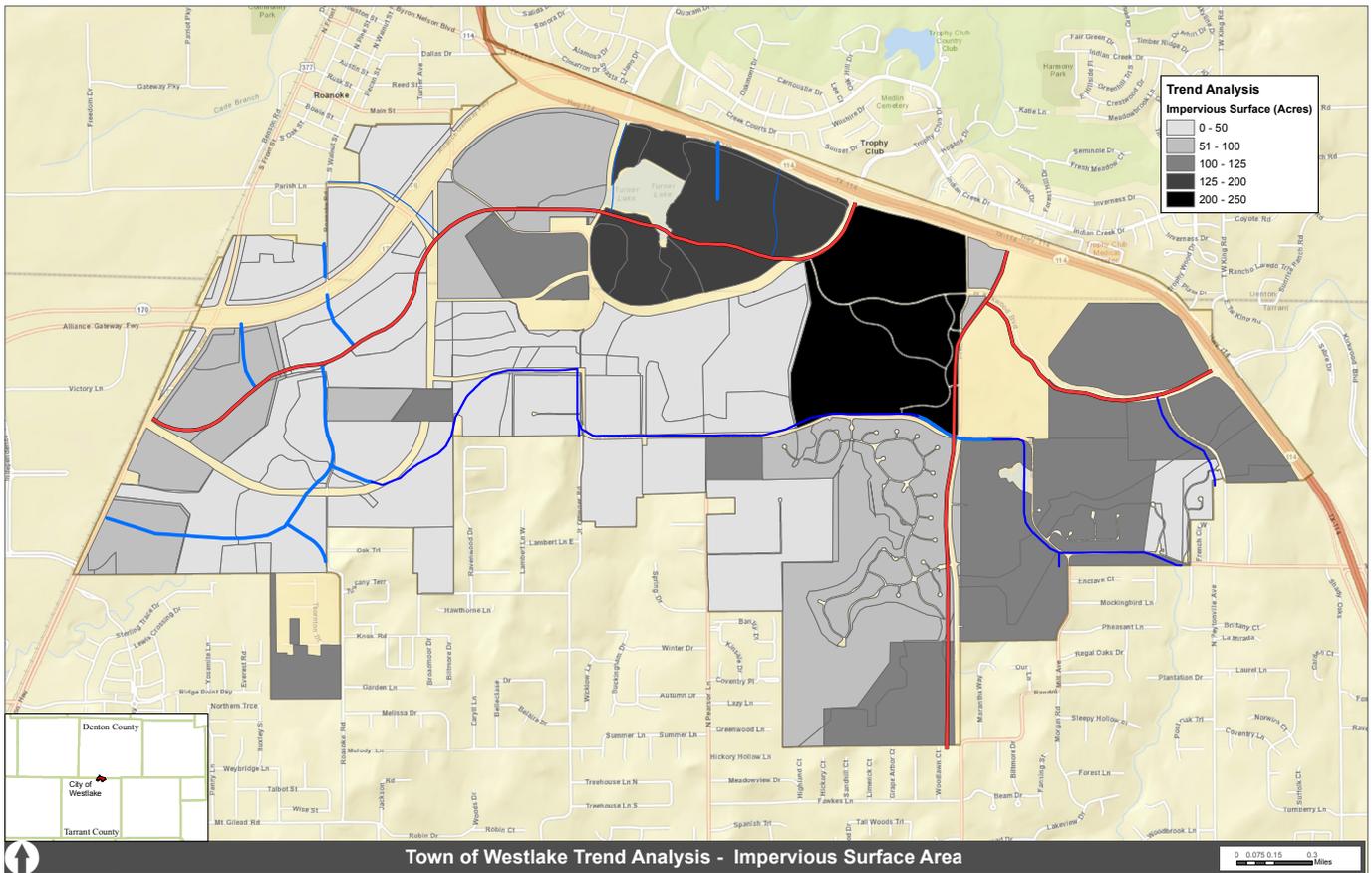


Figure 90: Impervious Surface Area Map

Stormwater Runoff Management

Future development will increase impervious areas that will contribute to increased stormwater runoff. Based on land uses allowed by zoning and PDs entitlements, the intensities of impervious areas are shown in Figure 90.

Although the Town of Westlake has man-made ponds on its natural creeks, as well as other urban type storm drainage infrastructure within the Town, such as spillways, culverts and storm drain inlets, it enjoys a picturesque and seemingly dominant natural system for managing stormwater runoff. Initially, ranch management practices, and now more current land development, have altered the native Cross Timbers and Prairies forestation and vegetation in some

areas. Turner Lake's dam configuration has been modified from its original form and now has an emergency spillway for larger flows. Golf Course Creek currently has attenuation via two large existing stock tanks, as well. Therefore, similar and even more aggressive detention practices should be implemented in the future that will be in concert with upstream development and development within the Town. Such practices should be used to mitigate flooding without increasing flood plain areas, flood elevation, and the erosion of natural stream banks.