

XYZ Corporation: Distribution Center Allocation in Dallas - Fort Worth (Final Report)

Scenario

XYZ Corporation is a delivery service looking to expand in the Dallas-Fort Worth (DFW) market. XYZ corporation specializes in rapid deliveries from online purchase and has modelled their business to deliver parcels in a one-hour standard time frame. This one-hour time frame is further divided into three categories: *pick*, *pack* and *delivery*. The *pick* and *pack* portion of this process have been perfected in previous forms of testing to a maximum of forty minutes. This leaves XYZ Corporation only twenty minutes to deliver a parcel and keep their one-hour timeframe for their customers. While the goal for XYZ Corporation is to be able to deliver to everyone within the DFW market, only so many delivery centers can be established and picking optimal locations for each to maximize coverage of the area is essential.

Question To Be Solved

With the aim of establishing a foothold for XYZ Corporation in the Dallas-Fort Worth metroplex: where should distribution centers be established, how many distribution centers should be considered, and under what parameters should potential customers be evaluated to find efficient locations?

These are the question we are constantly asking in order to find the best facility location for XYZ Corp. in order to properly serve the customer base in the DFW Metroplex. We purposely are leaving out questions such as future population growth within the DFW area as well as shifting demographics. We believe implementing these variables would take away from the true focus of our analysis.

Analytical Approaches Used

Designating Key Customer Locations

While we would like to have XYZ Corporation be able to serve every single person within the DFW Metroplex, we understand that not everyone can be delivered to upon immediate setup of XYZ's distribution centers -- but the majority of the population can be. As such, we are aiming to cater to a few majority groups within the metroplex. First, we are looking for households between the ages of 35 and 65 that make over \$100,000 annually. This will be our priority market and we would like to find possible distribution centers as close to these neighborhoods as possible. Second, we would like to locate families within the same age group but making between \$50,000 and just under \$100,000 annually. This demographic will make up most of the neighborhoods we are delivering to and will be most widespread throughout the area. Lastly, we would like to deliver to actively enrolled college students (roughly between the ages of 18 to 25) that are within proximity to major colleges such as University of North Texas, Texas Christian University, University of Texas at Arlington, and Southern Methodist University. Please see Figure 1 for a map of these key areas. .

In addition to these age and income demographics, we are also looking for customers that are more likely to order a personal product online within the next 30 days to get a better idea of who will be ordering more products at a more frequent rate. Once we have found these key areas of customers (designated by census tracts), we would aim to find an optimal number of distribution centers to provide maximum coverage to key neighborhoods.

Building Parameters

Once customer parameters have been established, we started to look for the best locations in the DFW area to set up XYZ distribution centers. As stated previously, we were looking for a twenty-minute drive time window from the distribution centers to our key neighborhoods to match the one-hour time frame as promised for delivery. To match these drive time windows, we wanted to look for industrial type buildings that were within half a mile of any major road or highway to increase the possible distance travelled. Also, we wanted to find buildings that had docks for loading and off-loading packages to make for smoother transitions on delivery (assuming delivery trucks are vans and not large delivery trucks). Also, these buildings needed to be sized between 50,000 and 100,000 square feet to allow for proper picking and packaging operations to occur. Lastly, we wanted to find locations that would have some overlap between each other in order to account for traffic during rush hour and to minimize gaps in coverage. This allows XYZ to hold true to its one-hour delivery method and provide support to sister centers in times of need.

Providing Optimal Coverage

When we used the above building specifications, we found approximately twelve buildings that suited or needs for distribution. Many of these locations had areas of overlap within the heart of the Metroplex in areas such as Grapevine, Coppell, and Carrollton. While our primary goal is to be able to deliver faster service to customers in these central locations, we were also trying to consider areas further on the outskirts of DFW such as McKinney, western Fort Worth, and northern Denton. During this process, we tried to find distribution centers that could serve two or three key areas at a time. Doing so would keep a steady flow of work, growth, sales, and productivity to these covered areas. Having a one-to-one relation (one distribution center to one key neighborhood) isn't always negative if the area being served is large enough, and we took that into consideration for customers in Collin County with cities such as McKinney, Allen, and Plano. We also wanted to be able to better serve the customers in the high income neighborhoods (\$100,000+ annually) as mentioned previously, so we tried to find centers within shorter drive times of these areas which includes Southlake, Trophy Club, McKinney, and University Park.

Results Obtained

After running an analysis with the use of drive time rings and minimizing overlap between these rings, we found the best number of distribution centers for XYZ Corporation to establish would be **six**. We deemed six locations to be the best way to provide coverage to the key neighborhoods designated earlier as we want XYZ to be able to make their presence known sooner rather than later. In this case, we went with quantity over quality, as we decided to have slightly more locations running at cheaper rent prices than most high end distribution centers. Listed below are the six locations and their attributes that we found to best suit the needs of the delivery window provided to us and promised to the customers (see Figure 2 for map):

Location 1: 2126 Hamilton Dr, Argyle TX 76226
Bldg type: Light Distribution
Square Footage: 53200, 8400 Available

Rent Price: \$9.5 - \$10.5 / SF

Location 2: 1300 N Central Expy, Allen, TX 75013
Bldg type: Light Manufacturing
Square Footage: 70145, 20280 Available
Rent Price: \$7.25 / SF
Number of Docks: 4

Location 3: 1061 Texan Trl, Grapevine, TX 76051
Bldg Type: Distribution
Square Footage: 76715, 21015 Available
Rent Price: CoStar Estimated \$7 - 9 / SF
Number of Docks: 48

Location 4: 11937 Denton Dr, Dallas, TX 75234
Bldg Type: Distribution
Square Footage: 57056, 51000 Available
Rent Price: \$5.50 / SF
Number of Docks: 8

Location 5: 4901 Esco Dr - Building 1, Fort Worth, TX 76140
Bldg Type: Manufacturing
Square Footage: 72900, 67081 Available
Rent Price: \$5.25 / SF
Number of Docks: 8

Location 6: 2602 E Pioneer Pkwy, Grand Prairie, TX 75051
Building Type: Distribution
Square Footage: 66330, 39600 Available
Rent Price: CoStar Estimated \$3 / SF

Looking Forward

XYZ Corporation has the potential to stand out in the DFW market. While our analytics produced six new facility locations, we believe this gives XYZ an opportunity to make its name known throughout the many suburban areas within DFW, while simultaneously leaving space for future growth. While certain areas of the metroplex are out of range of optimal delivery time, the majority of the metroplex will be covered by our choice of distribution centers. The areas that are not covered are not fully developed yet, such as the area north of US Highway 380 (includes towns of Celina, Prosper, Pilot Point and Little Elm). This is predominantly a rural area of the metroplex that has seen little development and does not hold specific criteria set for our analysis. Other areas outside of our coverage include cities west of Fort Worth (cities such as Saginaw, Azle and White Settlement). These are also rural areas where the criteria for our analysis do not fit. Lastly, areas east of the City of Dallas (cities such as Garland and Mesquite) which are not quite rural areas, as they have seen some development, but do not hold the specific demographic

for XYZ's customer base due to lower incomes. Future development and population growth of these areas would one day allow them to be included. As for now, they do not meet the requirements set for XYZ Corporation.

Attached Figures

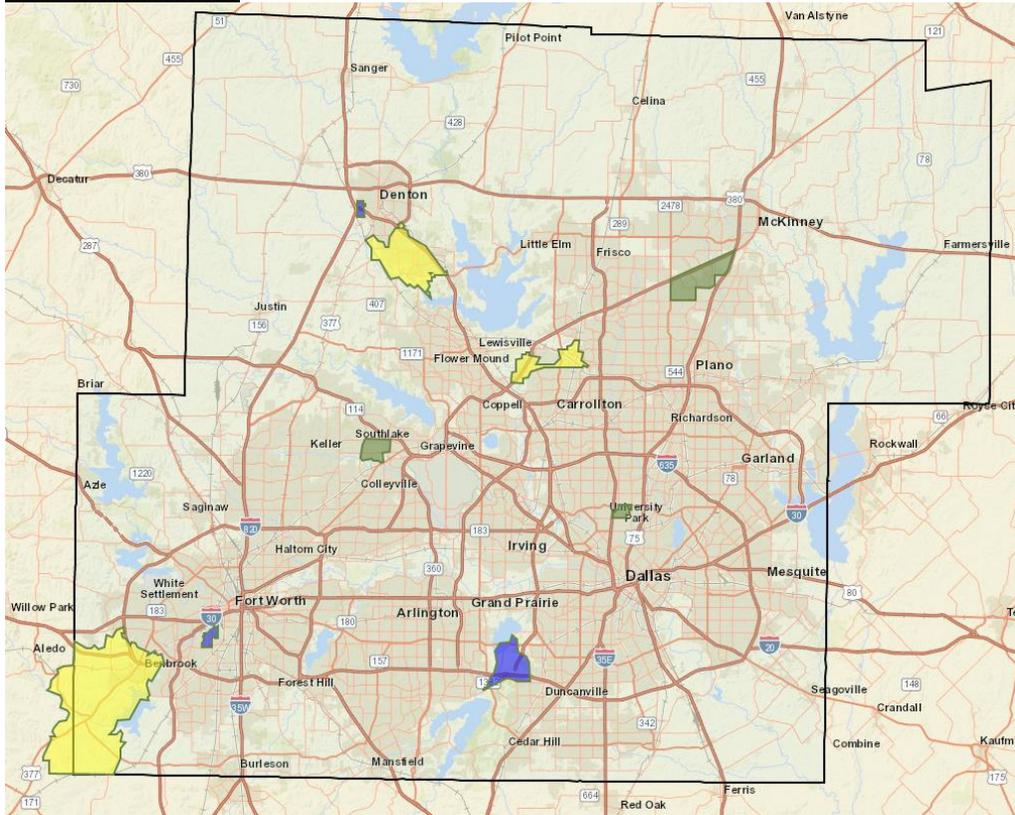


Figure 1. Designated key neighborhoods within the Metroplex. Areas in green are high income census tracts (income = \$100,000+ annually), areas in yellow are medium income (50-99k/year), and blue is college students close to a major university. We chose census tracts in the middle of areas that share the same attributes.

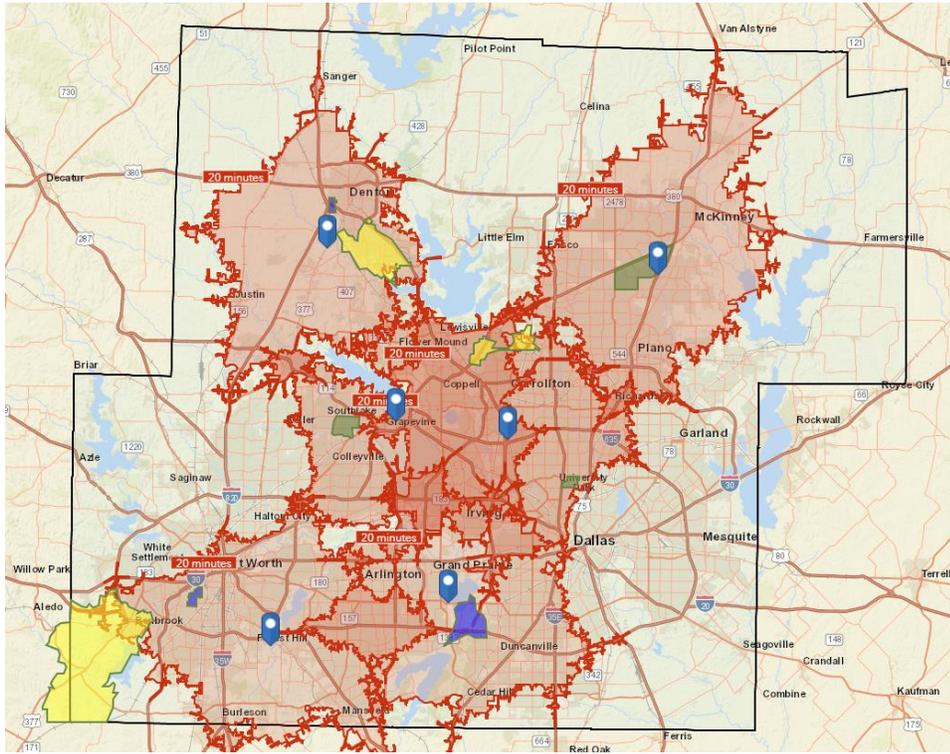


Figure 2. Chosen distribution centers post analysis. Locations are as follows: 1 is the top left, 2 is the top right, 3 is middle left, 4 is middle right, 5 is bottom left, and 6 is bottom right.

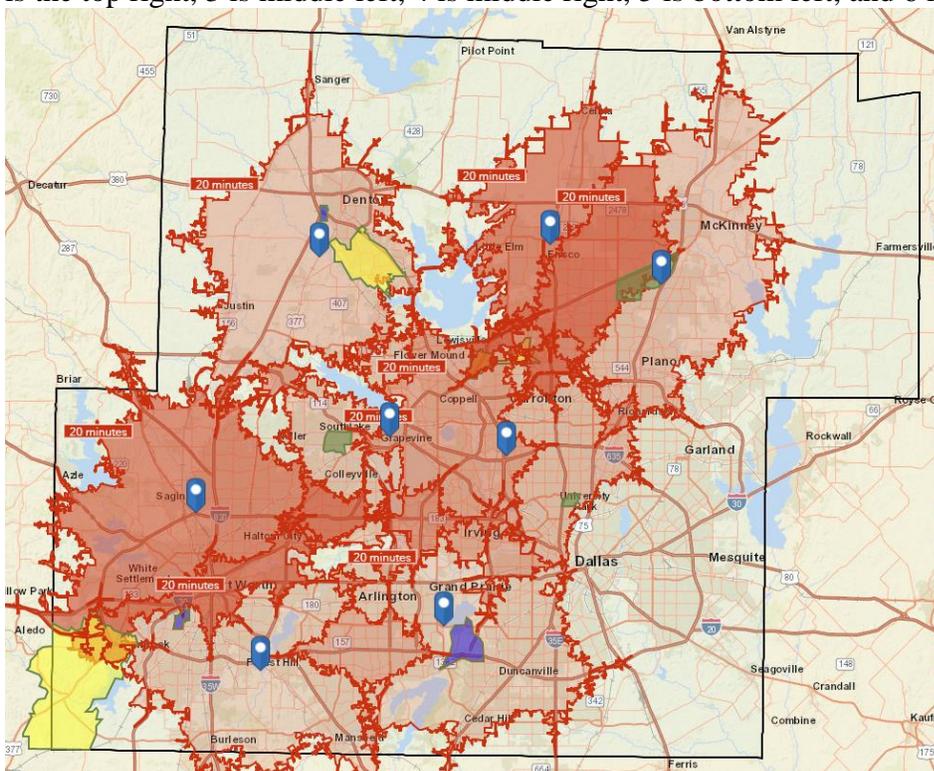


Figure 3. Proposed future sights with coverage (in dark red).