



The economic benefits of Plano's park and recreation system



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The Trust for Public Land
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The Trust for Public Land creates parks
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The Trust for Public Land's Conservation Economics team measures the economic value and fiscal impacts of parks and land conservation. We quantify these impacts using models developed in consultation with leading academics across the country and with our award-winning GIS team.

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Executive summary

MANY PEOPLE UNDERSTAND THAT PUBLIC PARKS ARE A VALUABLE COMPONENT OF HEALTHY CITIES, but this value is rarely quantified. This report analyzes the City of Plano's parks, trails, recreation centers, and sports fields and documents a selection of the significant economic benefits that the park and recreation system provides to area residents. Plano's park and recreation system enhances property values, attracts visitors to the city, provides recreational opportunities for residents, improves human health, and boosts economic development. These amenities support local jobs, increase spending at local businesses, save residents money, and generate local tax revenue. Specifically, the parks and recreation system, as pictured in [Exhibit 1](#)¹, produces the following economic benefits ([Table 1](#)):

- Parks, trails, and open spaces increase the value of nearby homes because people enjoy living close to these amenities and are willing to pay for the proximity. Parks in Plano raise the value of nearby homes by \$337 million and increase property tax revenues by \$6.08 million a year ([see Table 2](#)).
- The City's Department of Parks and Recreation is critical to the local tourism economy because it provides numerous recreation facilities, sports fields, parks, trails, and programming that attract visitors to the city. Sports- and tournament-related tourism alone generates \$39.2 million annually in direct visitor spending ([see Table 3](#)).
- Residents also enjoy Plano's parks, trails, recreation centers, and sports fields. Each year residents of Plano receive a benefit of \$31.8 million for the recreational use of these parks and facilities ([see Table 5](#)).
- Independent research shows that park use translates into increased physical activity, resulting in medical care cost savings. Approximately 16,500 adult residents use the City of Plano's park and recreation system to engage in physical activity at a level sufficient to generate measurable health benefits, yielding an annual medical cost savings of \$21.2 million ([see Table 6](#)).
- Parks, trails, recreation centers, and sports fields contribute to the high quality of life in Plano, which plays an important role in attracting businesses and employees to the city and enhancing Plano's recreation economy. Residents spend \$32.7 million annually on sports, recreation, and exercise equipment. This spending, along with tourist spending, supports 54 sporting goods stores that generate \$109 million in sales and provide 605 jobs ([see page 23](#)).

These benefits are distributed across many sectors of Plano's economy. Each estimate above represents a different type of value, with different time frames, accruing to different beneficiaries such as local businesses, government, and residents, and therefore cannot be summed into a single figure. In order to provide a robust and reliable report, this analysis relied on the most conservative methods supported by existing methodology and literature. For example, in any instance where multiple valuation methods were available, The Trust for Public Land utilized the method that produced the lower bound estimate.

This study illustrates that parks, trails, recreation centers, and sports fields in Plano are key economic drivers that contribute millions in economic benefits annually to the city as a whole ([Table 1](#)).

For more information about these analyses beyond what is included in each of the following sections, please see the appendices that are available at the end of this report.

1 The values of the economic benefits estimated in this analysis are reported in 2016 dollars.

TABLE 1. SUMMARY OF ESTIMATED ECONOMIC BENEFITS PROVIDED BY PARKS, TRAILS, RECREATION CENTERS, AND SPORTS FIELDS²

BENEFIT CATEGORY	VALUE (2016\$)
Enhanced property value	
Total additional property value	\$337,000,000
Additional annual property tax	\$6,080,000
Park tourism	
Direct spending by tournament attendees	\$39,200,000
Recreational use	\$31,800,000
Human health	\$21,200,000
Economic development*	
Annual spending on sports, recreation, and exercise equipment by residents	\$32,700,000
Annual sales generated by sporting goods stores	\$109,000,000

* The economic development values presented here are illustrative of the importance of the recreation economy in Plano. Not all spending and sales in these categories are exclusively generated by parks, trails, recreation centers, and sports fields.

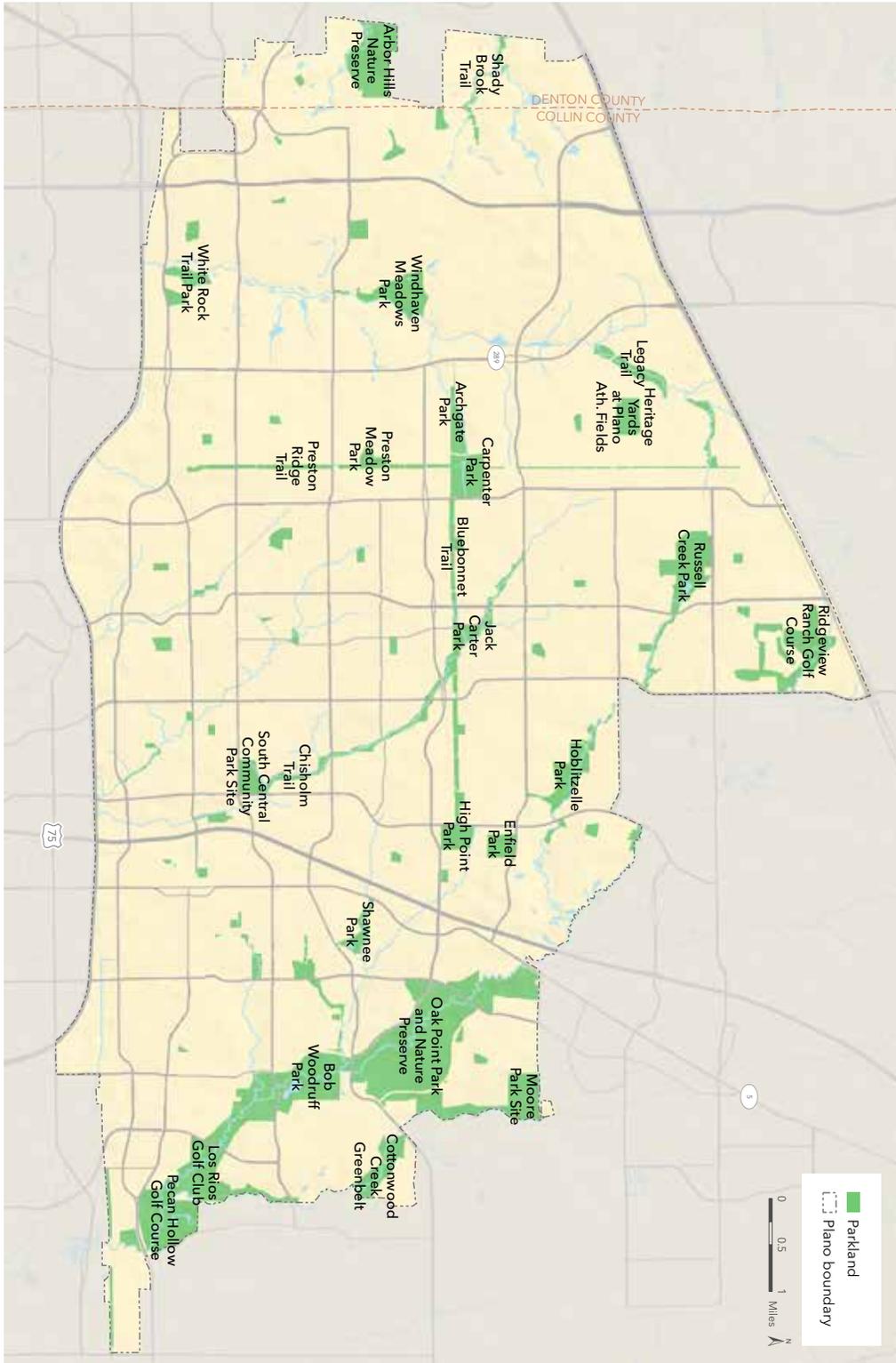


PLANO PARKS AND RECREATION

² All numbers in the text and tables are rounded to three significant digits unless otherwise noted. Because of rounding, some report figures and tables may appear not to sum.

EXHIBIT 1. MAP OF THE PARK AND RECREATION SYSTEM IN PLANO³

Parks, Trails, Recreation Centers, and Sports Fields in Plano



³ This map shows all of the city parks that were included in the data provided by Plano's Parks and Recreation Department in August 2016 and included in the GIS-based property value analysis.

Introduction

MANY PEOPLE UNDERSTAND THAT A VIBRANT PUBLIC PARKS AND RECREATION SYSTEM IS A VALUABLE component of healthy, flourishing neighborhoods. These amenities are public goods that are provided for, and maintained by, local government for residents to access at little or no cost per visit. As such, the actual value of park and recreation amenities is difficult to readily quantify. Unlike selling tickets to a sporting event, a public park does not increase revenues with additional visitors. In fact, the greater the usage of a local park, the greater the costs to clean and maintain it. Parks can even be seen as a drain on limited resources when undefined, vague benefits are compared to the very real costs for maintenance and operations. Yet parks do provide tangible, and measurable, economic benefits to local residents and government. Through economic analysis, it is possible to isolate and quantify many of these benefits and help interested parties gain a fuller understanding of the value of their park system.

This report analyzes the City of Plano’s parks, trails, recreation centers, and sports fields and documents a selection of the significant economic benefits that the park and recreation system provides to the community.⁴ Plano’s park and recreation system includes places like Arbor Hills Nature Preserve, Bob Woodruff Park, Russell Creek Park, Carpenter Park, and Jack Carter Dog Park, as well as numerous playgrounds, picnic pavilions, golf courses, pools, sports fields, courts, facilities, and miles of trails. These amenities enhance property values, attract visitors, provide recreational opportunities, improve human health, and boost economic development. They support local jobs, increase spending at local businesses, and generate local tax revenue. More specifically:

- Parks, trails, and open spaces increase the value of nearby residential properties in Plano because people enjoy living close to these amenities and are willing to pay for this proximity. This is known as a “park premium” and is calculated for all park-proximate homes in the City of Plano in the **ENHANCED PROPERTY VALUE** ➔ section. The park premium represents real, additional property value that exists due to parks and that would be realized when a home is sold. Further, as property tax is based on a home’s value, the increased value of homes proximate to parks leads to additional annual property tax revenue.
- Plano’s park and recreation facilities host numerous sporting tournaments each year. These events draw visitors to the city, who then spend money in the local economy on lodging, food, and entertainment. Further, outdoor and recreation amenities themselves are part of the draw that brings visitors to Plano. Through analyzing tourist visits for tournaments, the economic impact in Plano is calculated in the **TOURISM** ➔ section of this report.
- Plano generates economic benefits within the local community by providing parks, playgrounds, trails, open spaces, recreation centers, and access to an array of recreational activities for free or at lower cost than through private venues. These activities include hiking, walking, using recreation center amenities, running, jogging, playing in playgrounds, picnicking, reading, relaxing, and biking. The millions of dollars saved by residents each year through access to these activities can be calculated by investigating the cost of pursuing these activities in the private market and is documented in the **RECREATIONAL USE** ➔ section of the report.
- Independent research shows that park use translates into increased physical activity, resulting in medical care cost savings. Although all Plano residents who visit the city’s parks, trails, open spaces, and recreation centers improve their health by visiting, this report calculates the number of adult residents who use the park and recreation system to engage in physical activity at a level

⁴ The report specifically analyzes the value of the park and recreation system that is owned and managed by the City of Plano’s Parks and Recreation Department.

sufficient to generate measurable health benefits. In the **HEALTH CARE COST SAVINGS** section, national health guidelines are used to translate these benefits into their equivalent health care savings value.

- The park and recreation system contributes to the high quality of life in Plano, which plays an important role in attracting businesses and employees to the city. These amenities are assets that also support the robust recreation economy. Annual spending by residents on recreation and other, more qualitative benefits of Plano’s Parks and Recreation system are documented in the **ECONOMIC DEVELOPMENT** section of the report.

This report brings to light many of these previously intangible benefits of Plano’s park and recreation system. Each of these economic benefits is described in detail and valued in the following report. In order to provide robust and grounded economic estimates, this analysis relied on the most conservative methods supported by comparable economic valuation studies. In any instance where multiple valuation methods were supported, or where a range of values were available for analysis, The Trust for Public Land selected the method or values producing the lower bound estimate. As such, it is likely that the actual benefits are higher than what is reported in the following pages.

Plano’s parks and recreation amenities are a key contributor to Plano’s reputation as a city of excellence. While this analysis determined many of the economic benefits of Plano’s parks and recreation system, it does not capture the full value of these spaces for area residents. From having a quiet place to walk and reflect, a trail to bike to work, or a sports field to catch that first ball, the full value of a park system’s greatest assets goes beyond dollars and cents.



PLANO PARKS AND RECREATION

Enhanced property value

PARKS, TRAILS, AND OPEN SPACES HAVE A POSITIVE IMPACT ON NEARBY RESIDENTIAL PROPERTY VALUES.⁵

All other things being equal, people are willing to pay more for a home close to a nice park. Further, as property tax is based on a home's value, the increased value of homes proximate to parks leads to additional property taxes being generated annually. Through economic analysis, it is possible to isolate and estimate the enhanced property value due to parks for all homes in a geographic region as well as the additional property tax revenue generated from this premium.

The benefits of parks on local property value are evident in Plano. Local real estate advertisements, such as for the new Legacy West development, promote parks, trails, and open spaces – which will connect office buildings to new housing developments – as prominent features in their marketing materials.⁶ According to the real estate magazine *The Real Deal*, “the prospect of walkability is drawing corporations like Toyota, FedEx, JPMorgan Chase and Liberty Mutual to Plano.”⁷ Parks and trails are recognized as a critical draw for talented workers who are willing to pay a premium for quality-of-life factors when choosing where to work and live.

Studies across Texas have quantified the positive impact parks and trails have on surrounding residential property values. A 2016 analysis of the Dallas parks system found that parks generate a property premium in the city of \$135 million, based on a national literature review that showed residential property values increased 3 to 12.5 percent up to 750 feet from parks, and 2.75 to 5.75 percent up to a half-mile from parks.⁸ A 2005 study in Austin, Texas, found that being directly adjacent to greenbelts increased homes' average value by 5.7 or 12.2 percent, depending on the greenbelt.⁹ Finally, a 2011 study carried out for the Houston Parks Board found that tax assessments increased 50 percent in properties adjacent to a new park – Discovery Green – from the time the project was announced to when it was completed.¹⁰

This property value added by parks is separate from the value that residents gain from the recreational use of parks; property value goes up even if the resident never visits the park. Rather, property value is affected by two factors: quality of the park and distance from it.

Park quality can affect nearby property values in several ways. Beautiful natural areas with public access, scenic vistas, and bodies of water are markedly valuable. Less attractive or poorly maintained parks may provide only marginal value, and in some cases, these areas may actually reduce nearby property values. When looking at the impact of individual parks, economic analysis is complicated by the subjective nature of park quality and the variation in quality across time. However, variations in individual park premiums can be accounted for when looking at the impact of an entire city's park system. A premium can be calculated that isolates the additional value generated by parks, separate from other locational factors that affect a home's value, such as proximity to transportation networks and central business districts. Using this method, the park premium is not based on any one park, but rather on the entire park system. This makes it possible to generate a reliable estimate of the total impact of parks on property values based on established rates from comparable studies.

5 Virginia McConnell and Margaret Walls, *The Value of Open Space: Evidence from Studies of Nonmarket Benefits* (Washington, DC: Resources for the Future, 2005); John L. Crompton, “The Impact of Parks on Property Values: Empirical Evidence from the Past Two Decades in the United States,” *Managing Leisure* 10, no. 4 (2005): 203-218.

6 “Live,” Legacy West Investors, LP, accessed January 6, 2017, <http://legacywest.com/live/>.

7 Marynia Kruk, “Alexandria Revitalizes Its Waterfront, Plano Promotes Walkable Development, Detroit Imagines a Grand Boulevard, and More . . .,” *The Real Deal*, October 1, 2016, accessed January 6, 2017, http://therealdeal.com/issues_articles/national-market-report-127/.

8 HR&A Advisors, *Economic Value and Benchmarking Study of the Dallas Park System*, 2016. Please note: This report has not been publicly released, but it is open records searchable and quoted in newspapers.

9 Sarah Nicholls and John Crompton, “The Impact of Greenways on Property Values: Evidence from Austin, Texas,” *Journal of Leisure Research* 37 (2005): 321-341.

10 John L. Crompton and Marsh Darcy Partners, Inc., *Benefits Analysis: Bayou Greenways—A Key to a Healthy Houston*. 2011.

Distance from parks is the second factor impacting property values. The premium for park proximity can impact market values up to 2,000 feet from a park.¹¹ For example, a 2001 study in nearby Dallas found that being adjacent to numerous parks increased property values by 22 percent.¹² A 2009 report from the National Association of Realtors found the premium for homes near parks can extend three blocks and start at 20 percent, declining as distance from the park increases.¹³ Another study in Portland, Oregon, found that homes within 1,500 feet of public parks increased their average value by 3.4 percent.¹⁴

Using the most conservative method of analysis supported by these and other studies, The Trust for Public Land analyzed the value premium and increased tax revenue from residences due to public parks in Plano.¹⁵ The Trust for Public Land identified all homes within 500 feet of parks in Plano (see [Exhibit 2](#)) and isolated a value premium of 5 percent from the market value of these dwellings.¹⁶ Appraisal data from Collin and Denton Counties were used to obtain 2016 property value and tax information for all homes. From this information, park-proximate homes were isolated using spatial analysis. In 2016, 17,700 of Plano’s 72,700 homes were located within 500 feet of parks. These park-proximate homes had a total market value of \$6.74 billion, as shown in [Table 2](#).

TABLE 2. ENHANCED RESIDENTIAL PROPERTY VALUE DUE TO PROXIMITY TO CITY OF PLANO PARKS ¹⁷	
CATEGORY	VALUE (2016\$)
Number of homes within 500 feet of parks	17,700
Total market value of homes within 500 feet of parks	\$6,740,000,000
Additional market value due to parks	\$337,000,000
Total annual property tax revenue due to parks	\$6,080,000
City of Plano	\$1,190,000
Collin and Denton Counties	\$636,000
School Districts (Plano, Frisco, and Lewisville)	\$4,020,000
Collin College	\$236,000

11 John L. Crompton, *The Proximate Principle: The Impact of Parks, Open Space and Water Features on Residential Property Values and the Property Tax Base* (Ashburn, VA: National Recreation and Park Association, 2004).

12 Andrew Miller, "Valuing Open Space: Land Economics and Neighborhood Parks" (MSc diss., Massachusetts Institute of Technology, 2001).

13 Brad Broberg, "Everybody Loves a Park: Green Space Is a Premium When Building, Buying, or Selling," National Association of Realtors, *On Common Ground* (2009): 20-25.

14 B. Bolitzer and N. R. Netusil, "The Impact of Open Spaces on Property Values in Portland, Oregon," *Journal of Environmental Management* 59 (2000): 185-193.

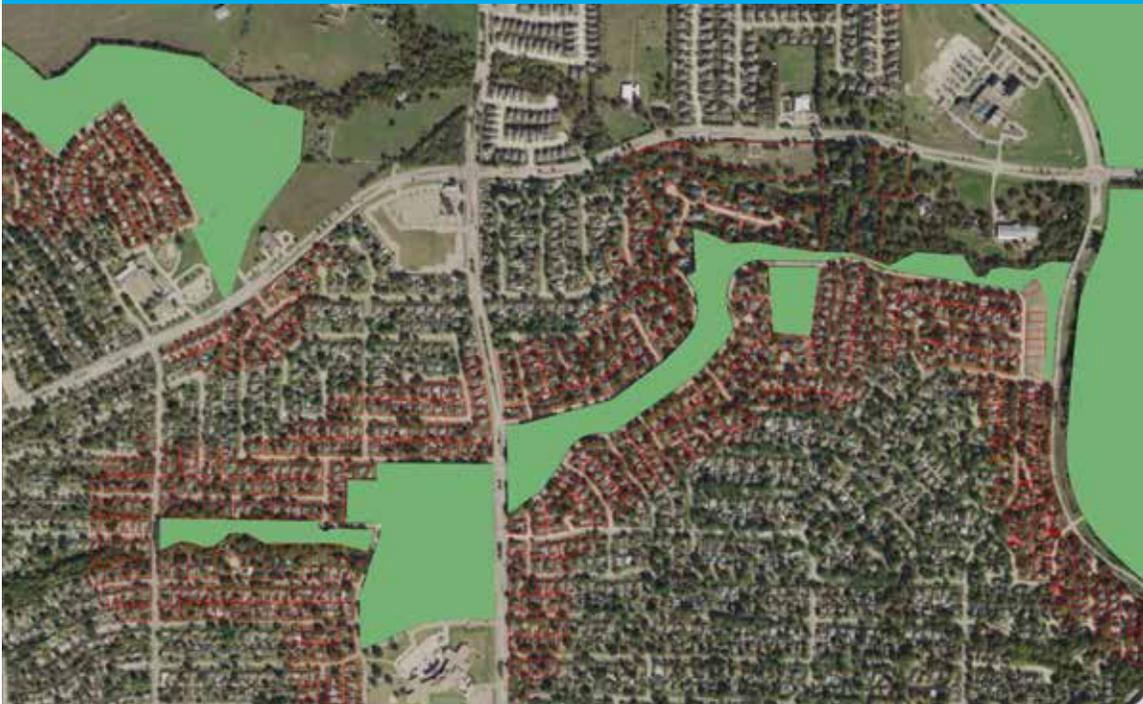
15 For a full discussion of the methodology used in this section, refer to Appendix A.

16 This analysis includes all public parks overseen by Plano Parks and Recreation Department. A home consists of a residential structure that is owned and taxed. This analysis includes single-family homes as well as multiple-unit dwellings (e.g., duplexes and apartments). Other property types were not considered in this analysis because sufficient data were not available to quantify the benefit. Nonresidential property types are rarely studied in the literature as they are much more difficult to statistically analyze; they have more variables that influence value and fewer real estate transactions to compare.

17 All numbers in the text and tables are rounded to three significant digits unless otherwise noted. Because of rounding, some report figures and tables may appear not to sum. The values of the economic benefits estimated in this analysis are reported in 2016 dollars, unless otherwise specified.

In 2016, an added \$337 million in residential property value existed in Plano because of proximity to parks (Table 2 [↗](#)).¹⁸ The residential property tax rates for each parcel were used to determine how much additional tax revenue was raised by local units of government.¹⁹ The total value captured in additional property tax revenue due to parks in Plano is \$6.08 million each year, which includes \$1.19 million in revenue for the City of Plano, \$636,000 for Collin and Denton Counties, \$4.02 million for Plano, Frisco, and Lewisville School Districts, and \$236,000 for Collin College (Table 2 [↗](#)).

**EXHIBIT 2. AERIAL IMAGE SELECTION FROM ENHANCED PROPERTY VALUE ANALYSIS
SHOWING HOMES WITHIN 500 FEET OF SHAWNEE, SCHELL, AND BOB WOODRUFF PARKS,
AND THE SANTA FE TRAIL IN PLANO OUTLINED IN RED**



18 In addition to the literature cited, this estimate relies on geospatial parks data and parcel and tax assessment data obtained from Collin County Central Appraisal District and Denton County Central Appraisal District. This value was obtained by applying the 5 percent park premium to the total market value of homes within 500 feet of parks.

19 Residential property tax rates were determined for each district and adjusted for property tax exemptions in consultation with Collin and Denton Central Appraisal Districts. In Plano, properties are taxed according to taxing entities based on location. This includes school district, county, city, and other, more specialized entities, like Collin College. Each entity has unique exemptions and discount rates available based on owner attributes such as for owner-occupied dwellings, for owners with disabilities, for owners over 65, and other exemptions. In order to account for these exemptions and not overreport tax revenue, a random sample of 60 parcels was selected and the actual property tax reported by the Central Appraisal Districts was referenced. For the sample set, the percent difference between the property tax with and without exemptions applied was used to generate an adjustment rate to account for exemptions in the full parcel set for each taxing entity.

Tourism

THE CITY'S DEPARTMENT OF PARKS AND RECREATION IS CRITICAL TO THE LOCAL TOURISM ECONOMY BECAUSE it provides numerous recreation facilities, sports fields, parks, trails, and significant programming that attract visitors to the city. Having these amenities strengthens the city's ability to draw visitors – a feature essential in an economy that is deeply impacted by tourism. Visitors to Plano in 2015 spent \$588 million, which when combined with other travel spending in the city, generated 6,270 jobs, an associated \$226 million in earnings, \$21.1 million in local tax revenue, and \$35.9 million in state tax revenue.²⁰ Visitors to the area come for several reasons, including participating in nature or sports activities, attending events, shopping, conducting business, visiting family, enjoying cultural activities, dining, and visiting attractions.²¹ Sports-related tourism is a critical component of the tourism economy in Plano.

The recreation centers and sports fields that are part of the recreation system provide venues for tournaments and sports-related events, which attract out-of-town participants and spectators. Plano is recognized by the Sports Planning Guide as having world-class venues and support for sporting competitions. Some of the most popular parks for sports in the city's park and recreation system are Russell Creek, which is home to Plano Youth Soccer Association, one of the largest soccer programs in the country; Carpenter Park; Heritage Yards; and High Point Park.²²

The City of Plano's park and recreation facilities hosted 77 sporting events in fiscal year 2014–2015, the most recent year for which data are available. These events included corporate and charity team events, as well as competitive sports tournaments. Throughout the year, 5,690 local and travel teams



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20 Dean Runyan Associates, *The Economic Impact of Travel on Texas: 1994-2015p*. Please note: Total travel spending was \$630 million and includes total visitor spending, plus spending on travel agencies and resident air travel. It does not include indirect or induced effects.

21 Jeffrey Eslinger, *2015 Texas Tourism Region and MSA Visitor Profile: Prairies and Lakes Region*, D.K. Shifflet and Associates, 2016.

22 "Plano Is the Place for Sports Events," Sports Planning Guide, accessed January 26, 2017, <http://sportsplanningguide.com/plano-is-the-place-for-sports-events/>.

participated in baseball, basketball, cricket, football, lacrosse, soccer, and tennis competitions. In 2015, the Plano Youth Soccer Association Labor Day Invitational, the Texas Cup, and PrimeTime Sports were the three largest events, by measure of both total attendees and nonlocal attendees. Cumulatively, all 77 sporting events involved 93,800 players and attracted over 572,000 attendees, approximately 39 percent of which came from outside the city (Table 3 )²³

These visitors spend money in the local economy. The most recent visitor intercept interviews in Plano indicate that average daily spending by sports attendees is \$61.50 and the average hotel room rate is \$106 per night, not including rebates and commissions.²⁴ Applying this spending information to the information provided by the City about each event’s number of attendees, tournament length, type of event, and number of room nights generated, The Trust for Public Land estimated that the total economic impact of attendees to tournaments in the park system is \$39.2 million (Table 3 )²⁵ The event with the largest economic impact was the Plano Youth Soccer Association Labor Day Invitational, a four-day event that attracted a large percentage of travel teams that generated 1,650 hotel room nights and a total economic impact of \$15.1 million.²⁶

TABLE 3. SPORTS-RELATED TOURISM IMPACTS IN PLANO, TEXAS²⁷

CATEGORY	FISCAL YEAR 2014-2015 (2016\$)
Number of tournaments hosted in the City of Plano’s parks and recreation facilities	77
Number of participating teams	5,690
Number of participating players	93,800
Total attendance	572,000
Number of hotel nights	12,300
Average spending by attendee	\$66.10
Average hotel room rate	\$106
Economic impact resulting from attendance	\$37,900,000
Economic impact resulting from hotel nights	\$1,300,000
Total direct spending	\$39,200,000

In addition to tournaments, the parks and trails in Plano attract visitors to participate in nature- and outdoor recreation–related activity. In fact, 6.1 percent of visitors to the Dallas-Plano-Irving Metropolitan Statistical Area participate in nature activities, which includes wildlife viewing and 6.9 percent participate in outdoor sports, like biking.²⁸ The parks and trails in Plano play an important role in the economy because they provide opportunities for visitors to engage in these activities.

23 Cissy Aberg, sport sales manager, City of Plano, e-mail message to author, September 1, 2016.

24 According to a 2012 Plano Visitor Intercept Study conducted in partnership with The Atkins Group, the average per-person spending for sports visitors, including food and activities only, was \$58.39 and the average spending on lodging for sports visitors was \$100.34 per travel party. These figures were adjusted to 2016 dollars using the consumer price index (CPI), specifically the 2012 annual average CPI for all urban consumers and all items and the October 2016 CPI for all urban consumers and all items. Source: U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index, accessed January 26, 2017, <https://data.bls.gov/cgi-bin/surveymost?cu>.

25 This figure includes only direct visitor spending on food, activities, and lodging. It does not include the economic impact that is generated by this direct spending as it cycles through the economy, including indirect or induced impacts such as the purchases made by suppliers or employees. The values of the economic benefits estimated in this analysis are reported in 2016 dollars, unless otherwise specified.

26 Cissy Aberg, sport sales manager, City of Plano, e-mail message to author, September 1, 2016.

27 All numbers in the text and tables are rounded to three significant digits unless otherwise noted. Because of rounding, some report figures and tables may appear not to sum. Figures were adjusted to 2016 dollars using the unadjusted consumer price index for all goods and all urban consumers. Source: U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index.

28 Eslinger, *2015 Texas Tourism Region and MSA Visitor Profile: Prairies and Lakes Region*.

Popular destinations include Oak Point Park and Nature Preserve, Arbor Hills Nature Preserve, and the Chisholm and Bluebonnet Trails. As with sports-related tourism, the individuals who come to participate in these activities spend money that supports local employment and generates tax revenue. The Outdoor Industry Association compiles reports on the annual economic impact of outdoor recreation. Although the reports do not analyze the impact of this industry at the city level, they do provide data for the state that suggests that outdoor recreation by visitors and residents generates \$28.7 billion in consumer spending annually, which leads to \$1.9 billion in state and local tax revenue. This spending also supports 277,000 direct Texas jobs with an associated \$8.9 billion in wages and salaries.²⁹

Based on the figures available for the outdoor recreation economy, and the percentage of visitors who indicate participating in outdoor sports and nature activities, it is clear that access to the outdoors is important to the local tourism economy in Plano. Even if tourists use the park and recreation system for free, or spend modestly on recreational activities, they do spend considerable amounts on food, entertainment, lodging, fuel, gifts, and other items during their time in the city. Unfortunately, data are not available on the number of visitors who come to the city to participate in outdoor recreation or on their tourist expenditures, so the impact of outdoor-related tourism cannot be calculated at this time. Therefore, the total tourism impact estimated in this analysis is an underestimate of the true tourism value generated by the park and recreation system in Plano.

This estimate is also conservative because it does not consider the other types of events that are hosted by the City of Plano's Parks and Recreation Department or on its parkland and facilities. While the majority of events are oriented toward the local community, some, like the Balloon Festival, do attract tourist visits.³⁰ In addition, Plano hosts the Plano Aerobats TAAF Qualifying Gymnastics Meet that involves 1,200 to 1,500 attendees each year. While the majority of teams are from the local area, a couple of teams and judges travel from outside the local region and stay in hotels. Local establishments are also utilized to cater food for coaches and judges throughout the weekend.³¹



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29 Outdoor Industry Association, *The Outdoor Recreation Economy: Texas*.

30 Renee Jordan, chief park planner, City of Plano, e-mail message to author, September 12, 2016.

31 Susie Hergenrader, recreation services superintendent, e-mail message to author, February 3, 2017.

Recreational use

IN ADDITION TO BOLSTERING THE TOURISM ECONOMY, the City of Plano’s parks, trails, recreation centers, and sports fields provide substantial economic benefits through their wide use by local residents. These amenities offer direct value to Plano residents by providing access to recreational opportunities such as hiking, walking, using recreation center amenities, running, jogging, playing in playgrounds, picnicking, reading, relaxing, and biking.

Most recreational uses in public parks, such as those in Plano, are available at low or no cost to the public, but economists can calculate their value by determining the consumer’s “willingness-to-pay” for the same experience in the private marketplace. In other words, if these public amenities were not made available by the public park and recreation system in Plano, how much do similar experiences cost at commercial facilities? Rather than income, the recreational use value represents the amount of money that residents save by not having to pay market rates to indulge in the park activities they enjoy. The value from nonresident park use was excluded from this analysis since it is accounted for in the tourism section above (see page 10 ↗).

To calculate the recreational use value to residents of Plano, The Trust for Public Land first determined the number of visits to the City of Plano’s parks, trails, recreation centers, and sports fields through a professionally conducted telephone survey of city residents.³² Respondents provided information about the frequency and duration of their visits to the City of Plano’s parks, trails, recreation centers, and sports fields, as well as detailed information about the types of activities in which they participated.³³

TABLE 4. TOP FIVE ACTIVITIES IN THE CITY OF PLANO’S PARKS, TRAILS, RECREATION CENTERS, AND SPORTS FIELDS ESTIMATED USING SURVEY DATA (2016) ³⁴			
ACTIVITY	PARTICIPATION (ANNUAL VISITS)		TOTAL
	ADULTS	CHILDREN	
Walking or hiking	2,660,000	549,000	3,210,000
Recreation center amenities	1,620,000	399,000	2,020,000
Running or jogging	1,000,000	273,000	1,280,000
General park uses	563,000	529,000	1,090,000
Bicycling	546,000	297,000	843,000

The survey was conducted in December 2016.³⁵ The survey results indicated that 82.2 percent of adults and 90.0 percent of children have visited the City of Plano’s parks, trails, recreation centers, and sports fields in the last 12 months. The results also indicated that the most popular activity for

32 The survey was conducted of a statistically representative sample of 400 residents of Plano and was statistically representative of Plano residents with an accuracy level of plus or minus 4.9 percent. The survey instrument was conducted in English and Spanish, surveying 50 percent of respondents via cellular telephones and 50 percent via landline telephones.

33 Please see Appendix B for more information about the survey questionnaire that was used to estimate the recreational use value.

34 The original participation that survey respondents reported was adjusted to account for overreporting of park use as well as their participation in multiple activities during a single visit. The numbers included in the table reflect these adjustments. All numbers in the text and tables are rounded to three significant digits unless otherwise noted. Because of rounding, some report figures and tables may appear not to sum. The values of the economic benefits estimated in this analysis are reported in 2016 dollars unless otherwise specified.

35 Adults with children under the age of 18 provided information about the visitation and participation of one of their children in order to account for this age group.

adults was walking or hiking, followed by using recreation center amenities,³⁶ running or jogging, general park activities,³⁷ and bicycling. The most popular activity for children was walking or hiking, followed by general park activities, playing sports,³⁸ using recreation center amenities, and bicycling. See Table 4 for a listing of the five most popular activities overall. These results are generally consistent with previous research, including the 2015 Citizen Survey conducted for the City of Plano that indicated the most frequently mentioned facilities that residents have used in the past year were trails, recreation centers, and playgrounds.³⁹ To be conservative for the purposes of the recreational use analysis, the self-reported participation data were adjusted to account for participation in multiple activities during a single visit, as well as overreporting of park use by respondents.⁴⁰ The Trust for Public Land also adjusted weekly reported participation in park and recreation activities to account for seasonality. For example, trail count data indicate that pedestrian and bicycle use drops to lower levels during certain times of year, particularly in the winter months. As such, participation is not included in this analysis for those months.



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Once participation was determined, The Trust for Public Land assigned dollar values to each park use by each participant in each activity. The methodology applied by The Trust for Public Land was developed using the framework of the Unit Day Value method, which is employed by the U.S. Army Corps of Engineers to count park visits by specific activity, assigning each activity a dollar value.⁴¹ The Trust for Public Land determined the value of recreation activities in Plano utilizing estimates of

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- 36 Recreation center amenities include weights, indoor tracks, racquetball, ping pong, pickleball courts, treadmills, or other exercise equipment.
 - 37 General park activities include using playgrounds, visiting with family or friends, picnicking, reading, and relaxing.
 - 38 Sports include activities such as baseball, basketball, flag football, gymnastics, lacrosse, soccer, softball, swimming, or volleyball and does not include sports that are run by a school district or private facility, such as the PSA1 and PSA2 buildings.
 - 39 ETC Institute, *2015 City of Plano Citizen Survey: Findings Report*, June 2015.
 - 40 Adjusting for overreporting of park use is consistent with the literature. Source: B. Wyker et al., *Self-Reported and Accelerometer-Measured Physical Activity: A Comparison in New York City* (New York: New York City Department of Health and Mental Hygiene, 2013).
 - 41 The unit day values for recreation used by the U.S. Army Corps of Engineers range from \$3.91 to \$11.70 (2015\$) for general park use such as hiking on trails, and from \$15.90 to \$46.40 (2015\$) for specialized activities that require specialized equipment and expertise. Source: Bruce D. Carlson, Memorandum for Planning Community of Practice (Economic Guidance Memorandum, 15-03, Unit Day Values for Recreation for Fiscal Year 2015, U.S. Army Corps of Engineers, October 28, 2014).

outdoor recreation value from Oregon State University’s Recreation Use Values Database and market rates, when available. Oregon State University’s database contains values for more than 20 activities and is based on over 420 economic studies that estimated the use value of recreation activities in the United States and Canada from 1958 to 2015.⁴² In determining which values to use, The Trust for Public Land’s economists applied the values most conservative and relevant to Plano.

In quantifying the benefits of resident use, The Trust for Public Land also recognized that not every visit within a given period has the same value to the visitor. In fact, additional uses of a park are less valuable than the first use. For example, an individual’s first visit of the year to a playground is worth more than that same individual’s tenth visit of the year.⁴³ The Trust for Public Land also takes into account any fees charged by the City of Plano to participate in an activity, such as golfing at a municipal golf course. The per-person fee is subtracted from the imputed value and only the “extra” value is assigned. For example, if playing golf costs \$60 at a public golf course in Plano and \$80 at a private country club, the value of the resident’s first time playing golf at a public course would be \$20.

The average value per visit of \$2.65 is a unique calculation for Plano residents across all activities engaged in for all park visitors (Table 5). The value is calculated based on the frequency and type of park visits engaged in by residents of Plano in the past year. It takes into account the diverse types of activities available to Plano residents, seasonality of park use, individual demand curves for each person for each activity, and varying values by park activity.⁴⁴

This analysis finds the recreational use value for Plano is \$31.8 million for 2016 (see Table 5).

TABLE 5. THE ANNUAL ECONOMIC VALUE OF RECREATIONAL USE IN THE CITY OF PLANO’S PARKS, TRAILS, RECREATION CENTERS, AND SPORTS FIELDS BY RESIDENTS ⁴⁵			
	PERSON VISITS	AVERAGE VALUE PER VISIT	VALUE (2016\$)
Total	12,000,000	\$2.65	\$31,800,000

42 Oregon State University, Recreation Use Values Database, accessed December 1, 2016, <http://recvaluation.forestry.oregonstate.edu/database>.

43 This is consistent with the economic law of diminishing marginal utility, which recognizes that the more of a good one consumes, within a given time and holding all else constant, the smaller the gain in the total utility derived from each additional amount. Utility, in this case, is the amount of satisfaction derived from the consumption of park and trail amenities.

44 Given these factors, it is inappropriate to compare the average value per visit across communities.

45 All numbers in the text and tables are rounded to three significant digits unless otherwise noted. Because of rounding, some report figures and tables may appear not to sum. The values of the economic benefits estimated in this analysis are reported in 2016 dollars unless otherwise specified. This recreational use value represents the value that residents would have to pay to engage in recreational activities if the park system did not provide them at low or no cost.

Health care cost savings

ACCESS TO PARKS AND TRAILS CAN HELP A CITY MEET HEALTH GOALS AND REDUCE MEDICAL COSTS.

The physical benefits of open spaces are well documented. It is well established that increased access to public outdoor spaces encourages people to exercise more, reducing overall health care expenditures.⁴⁶ Physical exercise can reduce the likelihood of illnesses such as obesity, cardiovascular disease, diabetes, or arthritis, and, consequently, it can also reduce the associated medical costs.⁴⁷ Similarly, studies have found that physical inactivity and poor diet are the second leading cause of death in the United States.⁴⁸ Investment in public open space encourages behavioral changes that not only reduce chronic diseases and health care costs, but also improve quality of life.⁴⁹

In addition to physical benefits, research indicates that people who have increased exposure to the outdoors show long-term mental health improvements. Several studies have demonstrated that access to public outdoor spaces can decrease stress, aid in mental fatigue recovery, and reduce levels of depression and anxiety.⁵⁰ Exposure to natural environments or more green areas provides further benefits. Researchers have found that leisurely walks in natural environments lead to a 12 percent decrease in the stress hormone cortisol and are linked to lower depression and perceived stress.⁵¹



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- 46 A. T. Kaczynski and K. A. Henderson, "Parks and Recreation Settings and Active Living: A Review of Associations with Physical Activity Function and Intensity," *Journal of Physical Activity and Health* 5, no. 4 (2008): 619-632; Chenoweth and Associates, *The Economic Costs of Overweight, Obesity, and Physical Inactivity Among California Adults—2006*, California Center for Public Health Advocacy, 2009.
- 47 Kaczynski and Henderson, "Parks and Recreation Settings and Active Living."
- 48 A. H. Mokdad et al., "Actual Causes of Death in the United States, 2000," *Journal of the American Medical Association* 291 (2004): 1238-1245; Centers for Disease Control and Prevention, *The Burden of Chronic Diseases and Their Risk Factors: National and State Perspectives*, 2002, National Center for Chronic Disease Prevention and Health Promotion, 2003.
- 49 P. Veugeliers, F. Sithole, and S. Zhang, "Neighborhood Characteristics in Relation to Diet, Physical Activity and Overweight of Canadian Children," *International Journal of Pediatric Obesity* 3 (2008): 152-159.
- 50 Ibid.; Ian Alcock et al., "Longitudinal Effects on Mental Health of Moving to Greener and Less Green Urban Areas," *Environmental Science and Technology* 48, no. 2 (2014): 1247-1255.
- 51 M. R. Marselle, K. N. Irvine, S. L. Warber, "Examining Group Walks in Nature and Multiple Aspects of Well-Being: A Large-Scale Study," *Ecopsychology* 6, no. 3 (2014): 134-147; Claude Bouchard, Steven N. Blair, and William Haskell, *Physical Activity and Health* (Human Kinetics, 2012); Ronald Sturm and Deborah Cohen, "Proximity to Urban Parks and Mental Health," *Journal of Mental Health Policy and Economics* 17, no. 1 (2014): 19-24.

In this analysis, The Trust for Public Land measured the collective economic savings realized on an annual basis by residents of Plano who use the city's parks, trails, recreation centers, and sports fields to exercise. The Centers for Disease Control and Prevention (CDC) recognizes that physical activity helps improve overall health and reduces the risk for chronic diseases. As such, the CDC promotes physical activity guidelines, defining sufficient activity as at least 150 minutes of moderate-intensity activity per week or at least 75 minutes of vigorous-intensity activity per week, along with muscle-strengthening activities at least two days per week. For seniors, the thresholds of moderate-intensity and vigorous-intensity physical activity are higher: 300 and 150 minutes, respectively.⁵²

Having access to places to walk can help individuals meet recommendations for regular physical activity.⁵³ Parks have been found to be some of the most commonly reported convenient places for improved physical and mental health, especially if the space is well maintained, safe, and accessible.⁵⁴ From a public health perspective, parks provide low-cost, high-yield wellness opportunities.⁵⁵

Based on the CDC's guidelines for physical activity, The Trust for Public Land used the results of a professionally conducted telephone survey (see page 32 ) to determine how many adults were using the park and recreation system at a frequency and intensity that would result in medical care cost savings.⁵⁶ The Trust for Public Land conservatively defines vigorous- and moderate-intensity physical activity according to the guidelines developed by the CDC⁵⁷ and assumed the lowest level of intensity possible for each activity. That is, if the respondent reported bicycling, it was assumed he or she did so at a leisurely pace on level terrain, which qualifies as a moderate activity, rather than bicycling at a brisk pace or on steep uphill terrain, which qualifies as a vigorous activity. The Trust for Public Land limited vigorous-intensity activity to running or jogging. Moderate-intensity activities included walking, hiking, biking, swimming, exercising in a pool, playing tennis, using recreation center amenities, and participating in adult sports programs, exercise classes, or other types of physical activity or exercise in parks, trails, recreation centers, or sports fields. The health analysis does not include sedentary or low-heart-rate activities, such as picnicking, birdwatching, fishing, or golf. In addition, individuals must utilize the City of Plano's parks, trails, recreation centers, and sports fields exclusively to an extent that is sufficient to meet the CDC's physical activity guidelines. This analysis does not include individuals who use private facilities in conjunction with the City's park and recreation system to meet the CDC's physical activity thresholds.

This analysis finds that 16,500 adult residents in Plano improve their health to a degree that meets the CDC's physical activity guidelines by using the City of Plano's parks, trails, recreation centers, and sports fields exclusively.⁵⁸

52 Centers for Disease Control and Prevention, "How Much Physical Activity Do Adults Need?," accessed January 26, 2016, <http://www.cdc.gov/physicalactivity/everyone/guidelines/adults.html>.

53 B. Giles-Corti and R. J. Donovan, "The Relative Influence of Individual, Social, and Physical Environment Determinants of Physical Activity," *Social Science and Medicine* 54 (2002): 1793-1812.

54 K. E. Powell, L. M. Martin, and P. P. Chowdhury, "Places to Walk: Convenience and Regular Physical Activity," *American Journal of Public Health* 93, no. 9 (2003): 1519-1521.

55 M. A. Barrett and Daphne Miller, "Parks and Health: Aligning Incentives to Create Innovations in Chronic Disease Prevention," *Preventing Chronic Disease* (2014).

56 Please see Appendix B for more information about the survey questionnaire that was used to estimate the health care cost savings.

57 Centers for Disease Control and Prevention, *General Physical Activities Defined by Level of Intensity*.

58 This analysis does not include individuals who use the park system fewer than two times per week or 104 times per year.

Based on previous work in health care economics, The Trust for Public Land assigned a value of \$1,190 as the annual medical cost savings between those in Plano who exercise regularly and those who do not. This value was chosen based on a careful review of health care economics literature that focuses on the cost difference between physically active and inactive persons. The cost savings was based on the National Medical Expenditures Survey and has been widely cited in similar studies.⁵⁹ The medical care cost savings were adjusted for inflation and brought to 2016 dollars.⁶⁰ For persons over the age of 65, health care cost savings are doubled because seniors typically incur two or more times the medical care costs of younger adults.⁶¹ This doubling of health care cost savings is conservative. For example, one study found that average health care expenses for adults over 65 were over three times those of working-age people.⁶²

In 2016, the combined health savings gained by residents of Plano who were physically active in the City of Plano’s parks, trails, recreation centers, and sports fields was \$21.2 million (Table 6).

TABLE 6. ESTIMATED HEALTH BENEFITS OF PHYSICAL ACTIVITY IN THE CITY OF PLANO’S PARKS, TRAILS, RECREATION CENTERS, AND SPORTS FIELDS ⁶³	
CATEGORY	VALUE (2016\$)
Adults 18–64 years of age	
Number of adults (18–64) physically active in parks*	15,100
Average annual medical care cost difference between active and inactive persons between 18 and 64 years old	\$1,190
Subtotal of health care benefits (18–64)	\$18,000,000
Adults 65 years of age and older	
Number of adults (65+) physically active in parks*	1,380
Average annual medical care cost difference between active and inactive persons over 65 years old	\$2,380
Subtotal of health care benefits (65+)	\$3,280,000
Total adults physically active in parks*	16,500
Total annual value of health benefits from parks	\$21,200,000

*Calculations are based on persons using the City of Plano’s parks, trails, recreation centers, and sports fields exclusively to engage in sufficient levels of moderate- and/or vigorous-intensity activity that meet the CDC’s physical activity guidelines.

This estimate is conservative because it does not include health care cost savings that result when children use these resources to an extent that makes them healthier; however, it has been shown that public outdoor spaces also provide important benefits to children and childhood development.⁶⁴

59 M. Pratt, C. A. Macera, and G. Wang, “Higher Direct Medical Costs Associated with Physical Inactivity,” *Physician and Sports Medicine* 28, no. 10 (2000): 63–70.

60 The unadjusted medical cost consumer price index was used to account for inflation. Source: U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers, Not Seasonally Adjusted, U.S. City Average for Medical Care, accessed September 16, 2016, <http://data.bls.gov/>.

61 Roland D. McDevitt and Sylvester J. Schieber, *From Baby Boom to Elder Boom: Providing Health Care for an Aging Population* (Washington, DC: Watson Wyatt Worldwide, 1996).

62 U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality, “The High Concentration of U.S. Health Care Expenditures,” accessed September 16, 2016, <http://www.ahrq.gov/research/findings/factsheets/costs/expriach/index.html#HowAre>.

63 All numbers in the text and tables are rounded to three significant digits unless otherwise noted. Because of rounding, some report figures and tables may appear not to sum. The values of the economic benefits estimated in this analysis are reported in 2016 dollars unless otherwise specified.

64 J. Eccles and J. Gootman, *Community Programs to Promote Youth Development* (Washington, DC: National Academy Press, 2002).

Multidisciplinary research has consistently shown that child’s play, playgrounds, and parks are linked to positive development of neural pathways for large and small motor skills, and social skills.⁶⁵

Parks and the outdoors can also provide additional benefits to children with developmental disorders. For example, one study on the effects of outdoor playtime on children with attention-deficit/hyperactivity disorder (ADHD) showed that a 20-minute exposure to outdoors, such as walking in the park, improved concentration just as effectively as common prescription medications.⁶⁶ Similarly, other studies have found that limited to no access to nature leads to higher rates of ADHD and other mental disorders.⁶⁷



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65 Duerr Evaluation Resources, *The Benefits of Playgrounds for Children Aged 0-5*, Shasta Children and Families First Commission; S. Hudson and D. Thompson, "Are Playgrounds Still Viable in the 21st Century?," *Parks & Recreation* 36 (2001); L. Palmer, *Developmental Brain Stimulation in School and Day Care Settings: SMART Overview* (Winona, MN: Office of Accelerated Learning, Winona State University, 2003); Mary S. Rivkin, "Outdoor Experiences for Young Children" *ERIC Digest* (December 2000); Bruce Perry, Lea Hogan, and Sarah J. Marlin, "Curiosity, Pleasure and Play: A Neurodevelopmental Perspective," *Haaeyc Advocate* (June 2000).

66 A. F. Taylor and F. E. Kuo, "Children with Attention Deficits Concentrate Better After Walk in the Park," *Journal of Attention Disorder* 12, no. 5 (2009): 402-409.

67 A. F. Taylor, F. E. Kuo, and W. Sullivan, "Coping with ADD: The Surprising Connection to Green Play Settings," *Environment and Behavior* 33 (2001): 54-77.

Economic development

PARKS, TRAILS, RECREATION CENTERS, AND SPORTS FIELDS SUPPORT ECONOMIC DEVELOPMENT IN PLANO IN SEVERAL WAYS. First, parks and trails are scenic amenities that provide diverse leisure opportunities for residents and visitors and enhance quality of life in Plano. The high quality of life, in turn, attracts talent, employers, and investment to the city. Second, residents take advantage of the city's plentiful indoor and outdoor recreation opportunities. By purchasing equipment and gear to use while participating in those activities, residents boost local businesses and contribute to Plano's recreation economy. Third, sports tournaments that take place in Plano recreation centers and on sports fields draw visitors who stay in local accommodations and spend money at local businesses.

This section explores economic development in Plano as related to parks, trails, recreation centers, and sports fields by examining how these amenities enhance quality of life, boost the recreation economy, and support local businesses. The expanded economic development section in Appendix C includes in-depth statistics on participation in recreation and annual household spending on sports and recreation equipment, economic analysis of market potential index and spending potential index, and a comparison of Plano with five cities that are used across Plano departments for benchmarking exercises. The section also explores common household types using Esri Tapestry Segmentation to shed light on residents' recreation and purchasing habits.

Enhancing quality of life

Plano is an attractive area for businesses and employees. The city has a robust business community: five Fortune 1000 companies have corporate headquarters currently located in Plano, and the city also hosts over a dozen major private companies with over 1,000 employees.⁶⁸ In 2016, *WalletHub* ranked Plano number one on its list of the best and worst cities to find a job based on the job market and the socioeconomic environment.⁶⁹ Although generous tax incentives and abatements play a role in attracting and retaining businesses and encouraging redevelopment,⁷⁰ park and recreation opportunities play into the equation as well. Monico Shortino, senior manager of social innovation at CapitalOne, commented that "as one of Plano's largest employers, the quality of life for our associates and customers is of critical importance to our company. In recruiting top talent from around the world, community amenities including parks and recreation, education, access to arts and culture, affordable housing are a few of the major considerations."⁷¹ In a 2016 survey, 71 percent of Plano businesses rated the availability of parks and open space as "extremely important," "very important," or "important" in their decision to locate to Plano. About 26 percent of these businesses said that the availability of parks and open space was "extremely important" in their decision.⁷²

Plano is attractive to employees as well. *WalletHub* ranked Plano number three on its list of the best and worst cities for families in 2016 based on family fun (including parks, walkability, and recreation), health and safety (including air and water quality), and more.⁷³ Mild winters combined with high-quality parks, trails, recreational facilities, and programming make Plano attractive to individuals and families looking for indoor and outdoor recreation opportunities. Jamee Jolly, president and CEO of the Plano Chamber of Commerce, explained that senior programming has been a particular

68 "Leading Employers," Plano Economic Development, accessed December 12, 2016, <http://www.planotexas.org/133/Leading-Employers>.

69 Richie Bernardo, "2016's Best and Worst Cities to Find a Job," *WalletHub*, accessed December 15, 2016, <https://wallethub.com/edu/best-cities-for-jobs/2173/#main-findings>.

70 "Incentives," Plano Economic Development, accessed December 12, 2016, <http://www.planotexas.org/153/Incentives>.

71 Monica Shortino, senior manager of social innovation, CapitalOne, e-mail message to author, December 1, 2016.

72 ETC Institute, *City of Plano 2016 Business Survey*, June 2016.

73 John S. Kiernan, "2016's Best and Worst Cities for Families," *WalletHub*, accessed December 15, 2016, <https://wallethub.com/edu/best-cities-for-families/4435/>.

attraction for families relocating to Plano and bringing grandparents or elder family members. She noted that “Plano is home to a global business community and new residents are often impressed with Plano’s public parks and fantastic recreation facilities. Having the recreation and trail system is essential to the high quality of life that has drawn businesses to relocate here over the last 10–15 years. And, in mixed-use neighborhoods you now see people out walking to stores or with their dogs – formerly rare activities in car-centric Texas.”⁷⁴ In 2015, Plano was formally recognized for its high-quality parks and recreation facilities when it received the Gold Medal for Excellence in Parks and Recreation from the National Recreation and Parks Association.⁷⁵ Plano’s highly ranked public school system, relatively low cost of living, low crime rate, and access to multiple hospitals also help make the city attractive to many individuals and families.



PLANO PARKS AND RECREATION

Boosting the recreation economy

The City of Plano’s park and recreation system is used for many types of activities. These activities generate economic activity and support businesses, including those that sell recreation-related equipment. Esri Business Analyst was used to examine and better understand the recreation-related economic activity occurring in Plano.⁷⁶

Recreation activities are important to the residents of Plano. According to Esri Business Analyst, many households in Plano recreate at recreation centers, parks, trails, and sports fields. In the last 12 months, 31.1 percent of households reported walking for exercise, the highest-reported activity. In addition, greater than 10 percent of households reported participating in outdoor recreation

74 Jamee Jolly, president and CEO, Plano Chamber of Commerce, e-mail message to author, January 9, 2017.

75 For Class II cities (population of 150,001–400,000). Source: “Gold Medal Awards,” National Recreation and Park Association, accessed January 26, 2017, <http://www.nrpa.org/About-National-Recreation-and-Park-Association/press-room/2015-gold-medal-award-grand-plaque-award-recipients-announced/>.

76 Esri Business Analyst is a tool that allows users to perform detailed geospatial analyses of customer and sales information in combination with demographic, consumer spending, market segmentation, and business data. Typically used to support and recommend business decisions, Business Analyst also provides valuable insight into consumer spending for activities and equipment related to recreation and parks, and enables comparison among peer cities as in this report.

activities, including jogging or running, hiking, road bicycling, and golf.⁷⁷ Greater than 10 percent of Plano residents also participated in activities that are more likely to occur in recreation centers, sports facilities, or fields, including swimming, weight lifting, and aerobics. Individuals who participate in these recreation activities purchase products to enhance their experience, such as exercise clothing, footwear, and bicycles, and thereby contribute to the local economy.

For more information on Plano households' participation in recreation activities, see [Table C1 in Appendix C](#).⁷⁸ Also see Appendix C for an exploration of top Plano household types through Esri Tapestry Segmentation, including the relationship of these groups to fitness, recreation, and sports activities.

There is a strong market for recreation goods and services in Plano. Market potential index (MPI) measures the likely demand for a good or service in an area compared to the U.S. average.⁷⁸ Business Analyst estimates that for outdoor recreation activities in Plano, the MPI is higher than the national average for many activities, including backpacking, canoeing or kayaking, hiking, jogging or running, mountain bicycling, road bicycling, and walking for exercise. The MPI is higher than the national average for many recreation center and sports field activities as well, including swimming, weight lifting, aerobics, and yoga (see [Table C1 in Appendix C](#)).⁷⁹ These data demonstrate how residents of Plano are significantly more likely than households nationally to spend money on gear and equipment related to recreational activities. Plano residents who spend money on sports and recreation equipment are likely to spend a significant amount: of the 22.9 percent of Plano households that purchased sports and recreation equipment in the last 12 months, 8.8 percent spent \$250 or more on sports and recreation equipment; 7.7 percent spent \$100–\$249; and 6.4 percent spent \$1–\$99 (see [Table C2 in Appendix C](#)). Market potential for parks and recreation spending, and spending levels in Plano are relatively consistent with the five comparison cities: Arlington, Virginia; Chandler, Arizona; Frisco, Texas; Henderson, Nevada; and Naperville, Illinois (see [Table C4 in Appendix C](#)).

Plano residents spend a total of \$32.7 million annually on sports, recreation, and exercise equipment, or an average of \$313 per year. For example, this includes average household spending of \$53.50 on bicycles per year. For a complete listing of the sports, recreation, and exercise equipment spending categories, please see [Table C3 in Appendix C](#).⁸⁰ Esri Business Analyst compiles estimates of recreation expenditures and calculates a spending potential index (SPI) that represents the amount spent for a product or service relative to the national average.⁸¹ The SPI for sports, recreation, and

77 Participation includes recreational activity by households occurring inside and outside the City of Plano. Esri, *Business Analyst Tool—Sports and Leisure Market Potential*, accessed for the City of Plano by The Trust for Public Land, October 30, 2016.

78 The MPI is tabulated to represent a value of 100 as the overall demand for the United States. An MPI of more than 100 represents high demand; a value of less than 100 represents low demand. For example, a MPI of 120 implies that demand is likely to be 20 percent higher than the national average. MPI is computed by Esri, using tapestry segmentation data with consumer survey data compiled by GfK MRI. Each respondent is identified by a tapestry segment, so a rate of consumption by tapestry segment can be determined for a product or service for any area. The consumption rate is then multiplied by the number of households belonging to a tapestry segment in an area and summed across all segments. This expected number of consumers is then divided by the total households in an area to obtain the local consumption rate. The MPI is the ratio of local consumption rate divided by national consumption rate, multiplied by 100. Source: Esri, *Methodology Statement: Esri US—Market Potential Database*, June 2016.

79 The full list in Appendix C includes recreation activities with at least 4 percent of households participating in the last 12 months.

80 Sports, recreation, and exercise equipment spending includes some categories that include purchases unrelated to the park and recreation system (e.g., game tables) and purchases of outdoor recreation-related equipment for activities of limited availability in Plano (e.g., camping, hunting, fishing). For example, most fishing activity by residents is likely to occur outside the city boundary. Bicycle sales, however, make up a substantial portion of total spending on sports, recreation, and exercise equipment, and the public park, trails, and recreation system in Plano offers numerous opportunities for bicycle riding. The values of the economic benefits estimated in this analysis are reported in 2016 dollars, unless otherwise specified. All numbers in the text and tables are rounded to three significant digits unless otherwise noted. Because of rounding, some report figures and tables may appear not to sum.

81 The SPI is an indicator of the level of discretionary income consumers are willing to devote to a particular good or service. SPI is tabulated to represent a value of 100 as the overall spending for the United States; therefore, when the SPI is equal to 100 for a specific type of merchandise, consumers are spending at a rate equal to the national average. To calculate the SPI, Esri combines information from the latest Bureau of Labor Statistics Consumer Expenditure Surveys, which include a diary survey for daily purchases and an interview survey for general purposes. Consumer spending is influenced by market conditions and trends and reflects economic and demographic change. Source: Esri, *Esri Consumer Spending Methodology 2016*, June 2016.

exercise equipment and the categories within is quite high in Plano compared to the national average. The likelihood that Plano households will spend money on any type of sports, recreation, and exercise equipment is therefore at least 45 percent higher than the likelihood of households nationally. Spending potential for parks and recreation in Plano is again consistent with that in the five comparison cities (see [Table C4 in Appendix C](#)).

Supporting local businesses

Parks, trails, open spaces, and recreation facilities in Plano are used for multiple types of activities that generate economic activity and support businesses, including those that sell related equipment and provide food and accommodations for visitors participating in sports tournaments in the city. Residents and tourists support Plano businesses in the recreation economy by purchasing sports equipment and gear from local stores. According to Esri Business Analyst, 54 establishments are identified as sporting goods stores in Plano, and together these businesses generate \$109 million in sales and support 605 employees.⁸² Sporting goods stores account for 0.41 percent of all businesses, 0.28 percent of the total sales volume, and 0.33 percent of all employees in Plano.⁸³ Another category of businesses, sporting and recreational goods and supplies merchant wholesalers, supports these sporting goods stores. In Plano, eight of these businesses supply billiard equipment, fishing tackle, swimming pool equipment and enclosures, tennis court supplies, and other wholesale sporting goods. They employ a total of 56 employees and have annual sales of \$154 million.⁸⁴

Local businesses participate in the recreation economy indirectly as well. Plano is a popular location for local and regional sports tournaments for both child and adult teams, and while local teams participate, tournaments also bring visitors to the area to recreate in facilities and on fields. In addition to paying tournament fees, these visitors often purchase sports-related products, eat in local restaurants, rent hotel rooms, and otherwise contribute to Plano's economy. Mike Hill, assistant manager of sales for Hilton hotels, indicated that "the City of Plano actively promotes its sports fields and sports facilities as venues for tournaments. Hotels are a necessary component of these events because the people who visit Plano to participate and spectate will seek accommodations."⁸⁵ The city's sports venues and hotels work closely together to coordinate these events, which have a huge economic impact on the local economy. In Plano there are 51 hotels and motels, and one hotel and motel management business, employing a total of 1,430 employees. These businesses account for \$131 million in sales annually, or 0.33 percent of total sales in Plano. For more information on the impact of sports tourism, see [the tourism section on page 10](#).

82 The number of sporting goods stores was determined based on NAICS code 451110, which is defined as "sporting goods stores" by the U.S. Census Bureau. An establishment is classified by NAICS code according to the primary business activity. Primary business activity is ideally determined by the relative share of production costs and/or capital investment, but in practice, other variables, such as revenue, value of shipments, or employment, are used as proxies. The U.S. Census Bureau generally uses revenue or value of shipments to determine an establishment's primary business activity. Sources: "Frequently Asked Questions (FAQs)," U.S. Department of Commerce, Census Bureau, accessed February 6, 2017, <https://www.census.gov/eos/www/naics/faqs/faqs.html>; "Industry Statistics Portal: Business Data from the U.S. Census Bureau," U.S. Department of Commerce, Census Bureau, accessed February 6, 2017, <https://www.census.gov/econ/isp/sampler.php?naicscode=451110&naicslevel=6#>.

83 Esri, *Business Analyst—All Businesses Report*, accessed for the City of Plano by The Trust for Public Land, October 30, 2016.

84 This spending includes some categories that include purchases unrelated to the park and recreation system, and purchases of outdoor recreation-related equipment for activities of limited availability in Plano.

85 Mike Hill, assistant manager of sales, Hilton, e-mail message to author, December 21, 2016.

Conclusion

THIS IS THE FIRST TIME THE ECONOMIC CONTRIBUTIONS OF THE CITY OF PLANO'S PARK AND RECREATION SYSTEM HAVE BEEN MEASURED. This study illustrates that the City of Plano's parks, trails, recreation centers, and sports fields are key economic drivers that contribute hundreds of millions annually in economic benefits.

The park and recreation system increases the value of nearby residential properties by \$337 million, which results in an additional \$6.08 million in property tax revenue each year.

The City's Department of Parks and Recreation supports the local tourism economy by providing numerous recreation facilities, sports fields, parks, trails, and significant programming that attract visitors to the city. Sports- and tournament-related tourism alone generates \$39.2 million annually in direct visitor spending.

People who live Plano also gain from the use of their parks. Each year, residents receive a benefit of \$31.8 million from the recreational use of the parks. And approximately 16,500 adult residents of Plano engage in physical activity at a level sufficient to generate measurable health benefits, yielding annual medical cost savings of \$21.2 million.

Finally, the City of Plano's parks, trails, recreation centers, and sports fields contribute to the high quality of life in Plano, which plays an important role in attracting businesses and employees to the city and supporting a robust recreation economy. Plano residents spend a total of \$32.7 million annually on sports, recreation, and exercise equipment, or an average of \$313 per year. For example, this includes average household spending of \$53.50 on bicycles per year. This spending, along with other spending by tourists and residents on sports, recreation, and exercise equipment, supports 54 sporting goods stores that generate \$109 million in sales and provide 605 jobs, further demonstrating that the City's parks, trails, recreation centers, and sports fields are significant contributors to the Plano economy.

This analysis does not capture the complete value of Plano's park and recreation system. Measuring increases in property values does not fully capture the value parks play in creating a neighborhood that residents are proud to call home, nor does measuring recreation benefits fully capture the value of nearby parks in providing a place for a family picnic or that first game of catch. Yet, understanding the tangible economic benefits in addition to these less definable values is an important part of the full story that makes up a city's park and recreation system. Such an understanding can help stakeholders ranging from city planners and elected officials to business leaders and park advocates gain a broader understanding of their park and recreation system and how it supports their local economy.

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Appendix A. Enhanced property value methodology

THE METHODOLOGY FOR THIS ENHANCED PROPERTY VALUE ANALYSIS WAS DEVELOPED for The Trust for Public Land by John Crompton of Texas A&M University. In each enhanced property value analysis completed by The Trust for Public Land, the research team combs through the recent and geographically relevant literature to ensure that this methodology is reliable and conservative.

The premise that parks and open space have a positive impact on proximate property values derives from the observation that people frequently are willing to pay a larger amount of money for a home close to these types of areas than they are for a comparable home that is not proximate to such amenities. This observation has been empirically validated in over 30 studies whose results have been reported in the literature.¹ In effect, this represents a “capitalization” of park and open space land into increased property values for proximate landowners. It adopts the mechanism of market pricing to assess the value of parks. This process of capitalization is termed “the proximate principle.” Conceptually, it is argued that the competitive market will bid up the value of property just equal to the capitalized value of the benefits that property owners perceive they receive from the presence of the park or open space. Economists refer to this approach as “hedonic pricing.” It is a means of inferring the value of a nonmarket resource (e.g., a greenway) from the prices of goods actually traded in the marketplace (e.g., surrounding residential properties).

An implication of the proximate principle is that impacted homeowners are likely to pay higher property taxes to government entities. The overall tax base can be substantially enhanced by the incremental increase in the amount of taxes paid by each home that is attributable to the presence of the park. If related either to the cost of acquisition and development of a park or open space or to the annual maintenance and operating expenses, the annual increments of proximate value may be sufficient to meet or exceed either of those costs.

Diversity of proximate impacts

It is important to recognize that some parks and open spaces are more desirable than others to live near. Some spaces are flat, sterile green fields; others have become irrelevant as they have not changed in design or intended use even though the demographics of proximate populations have changed; others embrace nuisances such as traffic congestion, noise, litter, vandalism, or ball field lights intruding into adjacent residences; others are poorly maintained; others have dispirited, blighted, derelict facilities; and others attract socially unacceptable behavior. It is unlikely that such parks and open spaces will add proximate value. Indeed, it is likely that some of these cases would actually reduce property values.

Challenges in deriving an estimate of proximate impact

To undertake hedonic studies that calculate the impact of parks and open spaces on property taxes and the property tax base requires a significant number of arm’s-length sales transactions² within the housing market, detailed attribute data for each parcel, the use of statistical techniques, and a substantial amount of time. It is likely impractical for most park agencies to replicate studies of this nature, given their limited budgets and time frames. Nevertheless, many agencies seek a method of applying a valuation to parks that they can adapt for use in their own communities. The approach

1 Crompton, *The Proximate Principle*; McConnell and Walls, *The Value of Open Space*.

2 An arm’s-length transaction is one in which both parties to the transaction are independent and on equal footing.

offered here is one that generates a more rudimentary estimate. This is due to the difficulty of interpreting the results of empirical studies and adapting them to parks in different contexts. There are three challenges in making such adaptations.

The first challenge lies in the diversity of areas that are described as “parks.” A park may be a one-tenth-acre brick plaza with minimal planting, subjected to the noise and pollution of a large city center, or it may consist of several million acres of mountainous wilderness in Alaska; even within the 50 largest cities in the United States, parks that are beloved by their residents range in size from the jewel-like 1.7-acre Post Office Square in Boston to the 16,283-acre South Mountain Preserve in Phoenix.³ A park may be designed for recreational use with multiple floodlit athletic facilities, an array of cultural buildings and large paved parking lots, or a tranquil natural resource oasis with no improvements. A park may be a blighted eyesore or a breathtakingly beautiful spectacle. In short, a park is a nebulous concept that defies standardization. For this reason, it is likely that the proximate impact of selected parks within the same community will be different, and it is unlikely that a selected park in one community will have the same proximate impact of another park in a different context.

A second challenge relates to the nature of the results reported in the empirical studies. It is difficult to directly compare these results because they have been obtained in a variety of manners and have used a number of different measures of value.⁴ Among the variations are the measure of property value, the measure of distance, and the comparison criterion.

Many of the studies, especially those completed before 1980, used assessed valuation rather than sales price as their measure of property value. Assessed values are doubtful surrogates for sales price in these kinds of studies because most tax assessors are unlikely to consider park proximity in their valuations. Assessed valuations tend to be rather gross measures that ignore subtleties like the proximate principle. They also tend to be lower than sales price as tax assessors seek to avoid appeals from homeowners challenging their assessments.

To measure distance from a property to a park, some of the studies used a straight line from the property to the park, whereas others measured the distance people would have to travel along roads or paths to access the park. The latter street network approach is more accurate and has been more frequently used in recent years since the widespread adoption of GIS mapping has made it easier. The distances over which impact was measured also varied from two or three blocks to half a mile or more.

Premiums associated with the proximate principle were presented in a variety of forms. Some were presented in absolute terms without a comparison criterion. For example, a study in Leon County, Florida,⁵ reported an average premium across the county of \$6,015 for homes within 200 feet of a park compared to a similar home outside the influence of the park’s proximity. However, the proportionate magnitude of this premium is unclear because the mean value of homes in the area is not reported. If these were \$75,000 homes, then the premium would be 8 percent, but if they were \$300,000 homes, it would be 2 percent. The absence of an indicator of the proportionate magnitude of the premium makes it impossible to meaningfully transfer these data to other contexts.

The most useful information for transferability purposes is offered by studies such as one of Portland, Oregon, that based proportionate property premiums on comparisons with similar properties outside the proximate impact area.⁶ In other cases, for example, a study in Austin, Texas, the premiums

3 Peter Harnik, *Inside City Parks* (Washington, DC: The Urban Land Institute, 2000).

4 Sarah Nicholls, “Does Open Space Pay? Measuring the Impacts of Green Spaces on Property Values and the Property Tax Base” (PhD diss., Texas A&M University, Department of Recreation, Park and Tourism Sciences, 2002).

5 Cape Ann Economics, *Land Values and Open Space—Leon County* (San Francisco: The Trust for Public Land, 2003).

6 Margot Lutzenhiser and Noelwah R. Netusil, “The Effect of Open Spaces on a Home’s Sale Price,” *Contemporary Economic Policy* 19, no. 3 (2001): 291–298.

are based on average home prices within the impacted area, which means they are likely to be substantially lower than if the same houses were located outside the impact area.⁷

A third challenge in identifying a premium value that may be transferable to park sites in other communities from the results of the empirical studies may be termed “the aggregation problem.” A number of studies, for example, the Leon County⁸ and Portland⁹ articles, reported proximate premiums that were derived by averaging the impact across a large number of parks in a jurisdiction. Thus, in the Portland case, the premiums of \$1,214 and \$10,648 were averages derived from 115 urban parks and 34 natural parks, respectively. It was emphasized in the previous section that there are many situations in which the proximate premium may be negative, reflecting the undesirable nature of the open space. When premiums are derived from averages across multiple parks, it is likely that results will be self-canceling to some extent, since the impacts at individual parks may range from high positive to high negative. From a transferability perspective, premiums derived from case studies of individual parks whose attributes are carefully described are more useful than those derived from averages across multiple parks.

The calculation parameters

The goal for this methodology was to develop a relatively simple formulary approach that could be used to derive an estimate of the proximate premium in a community. It is assumed that there will be electronic access to the assessed values of property assigned by the tax assessor’s office and that the community has a GIS mapping system. It was noted earlier that market values are preferred to assessed values, but in some cases only assessed values will be available. If assessed values are used, and assessed values are invariably lower than market values, the resulting estimates should be viewed as “conservative.”

The following parameters are suggested as reasonable points of departure for deriving these premiums based on the empirical results reported in the literature.¹⁰

The area of proximate impact of a park should be limited to 500 feet, or three blocks. The empirical results suggest that this is likely to capture almost all the premium from small neighborhood parks and 75 percent of the premium from relatively large parks. The remaining 25 percent is likely to be dissipated over properties between 500 and 2,000 feet. Disregarding this will lead to an underestimate of the proximate impact of large parks, which may be substantial because while the premiums at these distances are relatively low, the number of properties within these parameters is relatively high. However, adopting this 500-foot parameter substantially simplifies the estimation task.

Use all the parks in the city of one-half acre or more. It is not practical to carry out the hedonic analysis for parks of less than one-half acre in size. It is sufficient to note that the final calculation is conservative because it omits the many tiny park fragments that exist in every city.

Based on the literature, good parks are associated with a 15 percent premium. Average parks are associated with a 5 percent premium, and bad parks have a premium of -5 percent.

These premiums may appear low to some readers after reviewing the literature.¹¹ Several technically strong studies (e.g., Portland,¹² the Barton neighborhood in Austin,¹³ and the Dallas–Fort Worth metroplex¹⁴) reported premiums in the range of 16 to 22 percent. However, these studies were

7 Nicholls and Crompton, “The Impact of Greenways on Property Values: Evidence from Austin, Texas.”

8 Cape Ann Economics, *Land Values and Open Space—Leon County*.

9 Lutzenhiser and Netusil, “The Effect of Open Spaces on a Home’s Sale Price.”

10 Crompton, *The Proximate Principle*.

11 Ibid.

12 Cape Ann Economics, *Land Values and Open Space—Leon County*.

13 Nicholls and Crompton, “The Impact of Greenways on Property Values: Evidence from Austin, Texas.”

14 Miller, “Valuing Open Space.”

measuring the impact within the first block immediately adjacent to the park and the premiums declined for properties in the second and third blocks. The proportionate premiums suggested here are averages to be used for all properties within the 500-foot (three-block) radius. Furthermore, the average for all parks is 5 percent.

STEPS IN CALCULATING AN ESTIMATE OF THE IMPACT OF PARKS ON THE PROPERTY TAX BASE

1. Identify all parks of one-half acre or more.
2. Draw a 500-foot buffer around each park.
3. Aggregate the market value of all homes within each of the 500-foot buffers, using data from Collin and Denton Central Appraisal Districts.
4. Aggregate the assessed value of all homes within each of the 500-foot buffers, using data from Collin and Denton Central Appraisal Districts.
5. Apply the percentage premium suggested above (5 percent) to the market value of all homes within each of the 500-foot buffers. This figure represents an estimate of the overall change in property value attributable to the parks examined.
6. Multiply the aggregated premiums calculated in Step 4 by the effective local property tax rates imposed by all taxing entities to estimate the total positive impact of parks on the property tax base.

Appendix B. Recreational use and health care cost savings questionnaire

THE ANALYSES OF RECREATIONAL USE AND HEALTH CARE COST SAVINGS WERE CONDUCTED using the results of a professionally conducted telephone survey. The survey of 400 Plano residents was conducted in December 2016 and was statistically representative with an accuracy level of plus or minus 4.9 percent. The survey instrument was conducted in English and Spanish, surveying 50 percent of respondents via cellular telephones and 50 percent landline telephones.

THE FOLLOWING PAGES CONTAIN THE SURVEY INSTRUMENT THAT WAS IMPLEMENTED IN THE FIELD.

For the purposes of our study, please consider the City of Plano's parks, trails, recreation centers, and sports fields ONLY. This includes places like Arbor Hills Nature Preserve, Bob Woodruff Park, Russell Creek Park, Carpenter Park, and Jack Carter Dog Park. It DOES NOT include private clubs or gyms, school properties, the PSA1 and PSA2 buildings, or regular streets.

1. Do you use the City of Plano's parks, trails, recreation centers, or sports fields?
2. Do you have any children 18 years or under living at home?
3. Does your child use the City of Plano's parks, trails, recreation centers, or sports fields?
4. How many times in the last 12 months have YOU used the City of Plano's parks, trails, recreation centers, or sports fields?
5. How many times in the last 12 months has YOUR CHILD used the City of Plano's parks, trails, recreation centers, or sports fields?
6. Approximately how much time do you spend during a typical visit to the City of Plano's parks, trails, recreation centers, or sports fields?

The following series of questions will ask you about YOUR use of the City of Plano's parks, trails, recreation centers, and sports fields.

7. During a typical week's time, on how many days do you
 - a. Walk or hike on trails, including dog walking?
 - b. Run or jog on trails?
 - c. Ride a bike on trails?
 - d. Exercise in a pool, such as swimming laps or participating in water aerobics?
 - e. Play tennis?
 - f. Use recreation center amenities, such as weights, indoor tracks, racquetball, ping pong and pickleball courts, treadmills, or exercise equipment?
 - g. Participate in an adult sports program, such as flag football, softball, or baseball, or use athletic facilities and fields to informally practice?
 - h. Participate in exercise classes, boot camps, aerobics, stroller workouts, tai chi, yoga, or other exercise-related programming provided by the Parks and Recreation Department?
 - i. Participate in any other types of physical activity or exercise in parks, trails, recreation centers, or sports fields not mentioned above?

8. During the past twelve (12) months, on how many days did you
 - a. Use playgrounds, visit with friends or family, picnic, read, or relax?
 - b. Go birding or observe wildlife?
 - c. Visit nature preserves or participate in guided walks?
 - d. Use the dog park?
 - e. Go fishing?
 - f. Golf at Pecan Hollow, Ridgeview Ranch, or Los Rios?
 - g. Play disc golf?
 - h. Attend concerts, festivals, or special events, such as Balloon Fest, All-American Fourth Fireworks, or International Fest?
 - i. Use the Senior Center or a recreation center for non-exercise-related activities, including educational classes or arts and crafts?

The following series of questions will ask you about YOUR CHILD'S use of the City of Plano's parks, trails, recreation centers, and sports fields.

9. During a typical week's time, on how many days does your child
 - a. Walk or hike on trails, including dog walking?
 - b. Run or jog on trails?
 - c. Ride a bike on trails?
 - d. Exercise in a pool, such as swimming laps or participating in water aerobics?
 - e. Play tennis?
 - f. Use recreation center amenities, such as weights, indoor tracks, racquetball, ping pong and pickleball courts, treadmills, or exercise equipment?
 - g. Participate in sports such as baseball, basketball, flag football, gymnastics, lacrosse, soccer, softball, swimming, or volleyball? This does not include sports that are run by a school district or private facility, such as the PSA1 and PSA2 buildings.
 - h. Participate in any other types of physical activity or exercise in the City of Plano's parks, trails, recreation centers, or sports fields not mentioned above?
10. During the past twelve (12) months, on how many days did your child
 - a. Use playgrounds, visit with friends or family, picnic, read, or relax?
 - b. Go birding or observe wildlife?
 - c. Visit nature preserves or participate in guided walks?
 - d. Use the dog park?
 - e. Go fishing?
 - f. Golf at Pecan Hollow, Ridgeview Ranch, or Los Rios?
 - g. Play disc golf?
 - h. Attend concerts, festivals, or special events, such as Balloon Fest, All-American Fourth Fireworks, or International Fest?
 - i. Use the Senior Center or a recreation center for non-exercise-related activities, including educational classes or arts and crafts?

Finally, I have a just a few questions for statistical purposes.

- D1. Record gender based on observation
- D2. In what year were you born?

- D3. For statistical purposes only, which of these categories best describes your total household income last year:
- a. Less than \$10,000
 - b. \$10,000 to less than \$15,000
 - c. \$15,000 to less than \$25,000
 - d. \$25,000 to less than \$35,000
 - e. \$35,000 to less than \$50,000
 - f. \$50,000 to less than \$75,000
 - g. \$75,000 to less than \$100,000
 - h. \$100,000 to less than \$150,000
 - i. \$150,000 to less than \$200,000
 - j. \$200,000 or more
- D4. What is the last year of schooling that you have completed?
- a. 1st through 11th grade
 - b. High school graduate
 - c. Some college/associate's degree
 - d. Bachelor's degree/master's degree/etc.
- D5. And finally, what is your race?
- a. White
 - b. African American or Black
 - c. Hispanic or Latino
 - d. Asian or Pacific Islander
 - e. American Indian or Native American
 - f. Other

Appendix C. Expanded economic development analysis

THE ECONOMIC DEVELOPMENT SECTION OF THIS REPORT, BEGINNING ON PAGE 20, DESCRIBES THE MULTIPLE ways that parks, trails, recreation centers, and sports fields support economic development in Plano. The text explains how, by providing diverse leisure and recreation opportunities, these amenities enhance quality of life for visitors and residents, help generate economic activity, and encourage support of local businesses.

A variety of factors contribute to a high quality of life in Plano, including a robust business community, active job market, and attractive socioeconomic environment, together with a mild climate and high quality of parks, trails, recreational facilities, and recreation programming. In addition, the park and recreation system in Plano is used for multiple types of activities that generate economic activity and support businesses. Visitors and residents support the recreation economy directly by purchasing gear from businesses that sell sports-related equipment, and indirectly by purchasing food and accommodations during trips for sports tournaments or other events.

Read more about how parks, trails, recreation centers, and sports fields enhance quality of life on page 20 and support local businesses [on page 23](#).

Parks and recreation amenities also help to boost the recreation economy in Plano. The section that follows provides more details on Plano households' participation in recreation activities. It also uses Esri Business Analyst and Tapestry Segmentation to explore top Plano household types and the relationship of these groups to fitness, recreation, and sports activities.¹⁵

Boosting the recreation economy

The City of Plano's park and recreation system is used for many types of activities that generate economic activity and support businesses, including those that sell recreation-related equipment.

Plano households

It is important to understand the preferences and consumer behavior of Plano residents because the activities in which residents participate and the associated purchases they make will determine the impact on the local economy. Esri Tapestry Segmentation allows us to understand the lifestyle choices of households in Plano, how they spend their free time, and how they behave as consumers. Tapestry classifies U.S. residential neighborhoods into 67 unique segments based on demographic and socioeconomic characteristics and characterizes these households according to their preferences.

In Plano, the top five Tapestry segments include *Professional Pride* (16 percent), *Savvy Suburbanites* (11.1 percent), *Enterprising Professionals* (10.5 percent), *Home Improvement* (9 percent), and *Boomburbs* (8.9 percent). Cumulatively, these market segments account for 55.5 percent of Plano households. Each of these top market segments is significantly more prevalent in Plano than in the United States as a whole: cumulatively these five segments make up only 9.2 percent of U.S. households.¹⁶

Digging further into the characteristics of these Tapestry segments shows us how the majority of households in Plano engage with the park and recreation system. Three of Plano's top tapestry

15 Esri Business Analyst is a tool that allows users to perform detailed geospatial analyses of customer and sales information in combination with demographic, consumer spending, market segmentation, and business data. Typically used to support and recommend business decisions, Business Analyst also provides valuable insight into consumer spending for activities and equipment related to recreation and parks, and enables comparison among peer cities as in this report.

16 Esri, *Business Analyst–Tapestry Segmentation Area Profile*, accessed for the City of Plano by The Trust for Public Land, October 30, 2016.

segments, Professional Pride, Boomburbs, and Savvy Suburbanites, include generally home-owning households with moderate to high wealth whose members participate actively in their communities, are active in sports, and are enthusiastic travelers.¹⁷ For Boomburbs, “physical fitness is a priority, including club memberships and home equipment,” and leisure includes hiking, bicycling, swimming, and golf.¹⁸ Savvy Suburbanites are “physically fit, residents [who] actively pursue a number of sports, from skiing to golf, and invest heavily in sports gear and exercise equipment.”¹⁹ Enterprising Professionals include typically younger households that own or rent, shop online for name brands, and “strive to stay youthful and healthy, eat organic and natural foods, run, and do yoga.”²⁰ Home Improvement is a group of primarily home-owning middle-income families who live in suburban neighborhoods and dedicate time to improving their homes, lawns, and gardens.²¹

Participation in recreation

Recreation activities are important to the residents of Plano. According to Esri Business Analyst, many households in Plano recreate at recreation centers, parks, trails, and sports fields. In the last 12 months, 31.1 percent of households reported walking for exercise, the highest-reported activity. See [Table C1](#) for a detailed breakdown of participation in recreation activities.

Individuals who participate in recreation activities purchase products to enhance their experience, such as exercise clothing, footwear, and bicycles, and thereby contribute to the local economy.

Market potential

There is a strong market for recreation goods and services in Plano. Information from Tapestry profiles is used to estimate the likely demand for recreation goods and services in the area. Esri Business Analyst is used to estimate the expected number of local consumers, then to calculate the local consumption rate and market potential index (MPI), which measures the likely demand for a good or service in an area compared to the U.S. average.²² This demonstrates the strength of the sports and recreation market in Plano compared to the national average and five comparison cities with which the city often compares itself: Arlington, Virginia; Chandler, Arizona; Frisco, Texas; Henderson, Nevada; and Naperville, Illinois.²³ Comparing Plano to other communities allows us to understand the relative demand for recreation services and related products.

Business Analyst estimates that for outdoor recreation activities in Plano, the market potential index is higher than the national average (MPI >100) for many activities (see [Table C1](#)).²⁴ Plano households participate in these activities on a level consistent with households in the comparison cities. Again, these figures include recreational activity by households occurring inside and outside the city of Plano.

17 Esri, “Tapestry Segment summaries,” accessed December 28, 2016, https://doc.arcgis.com/en/esri-demographics/data/tapestry-segmentation.htm#ESRI_SECTION1_87F5D845F8E04723AE1F4F502FF3B636.

18 Esri, *Boomburbs*, 2014.

19 Esri, *Savvy Suburbanites*, 2014.

20 Esri, *Enterprising Professionals*, 2014.

21 Esri, *Home Improvement*, 2014.

22 The MPI is tabulated to represent a value of 100 as the overall demand for the United States. An MPI of more than 100 represents high demand; a value of less than 100 represents low demand. For example, a MPI of 120 implies that demand is likely to be 20 percent higher than the national average. MPI is computed by Esri, using tapestry segmentation data with consumer survey data compiled by GfK MRI. Each respondent is identified by a tapestry segment, so a rate of consumption by tapestry segment can be determined for a product or service for any area. The consumption rate is then multiplied by the number of households belonging to a tapestry segment in an area and summed across all segments. This expected number of consumers is then divided by the total households in an area to obtain the local consumption rate. The MPI is the ratio of local consumption rate divided by national consumption rate, multiplied by 100. Source: Esri, *Methodology Statement: Esri US—Market Potential Database*.

23 These comparison cities have been used consistently by the City of Plano’s Economic Development, Parks and Recreation, and Planning Departments over time to compare the city’s success.

24 This list includes recreation activities with at least 4 percent of households participating in the last 12 months.

The MPI is higher than the national average for many recreation center and sports field activities (see Table C1). These data demonstrate how residents of Plano are significantly more likely than households nationally to spend money on gear and equipment related to recreational activities.

TABLE C1. PARTICIPATION IN RECREATION AND MARKET POTENTIAL		
RECREATION ACTIVITY	PERCENT OF HOUSEHOLDS THAT PARTICIPATED IN LAST 12 MONTHS	MARKET POTENTIAL INDEX
Walking for exercise	31.1%	111
Swimming	19.4%	122
Jogging/running	16.8%	132
Weight lifting	13.4%	126
Hiking	12.9%	129
Road bicycling	12.4%	126
Golf	12.2%	129
Aerobics	11.4%	128
Bowling	11.0%	113
Freshwater fishing	11.0%	88
Yoga	9.8%	137
Basketball	8.4%	101
Canoeing/kayaking	6.0%	112
Tennis	5.6%	130
Frisbee	5.1%	112
Mountain bicycling	4.9%	122
Football	4.8%	97
Baseball	4.6%	102
Soccer	4.4%	118
Target shooting	4.2%	92
Skiing	4.1%	142
Saltwater fishing	4.0%	100

Looking more in-depth into the spending habits of Plano residents helps us understand how much households are spending annually for sports and recreation equipment. Table C2 shows that a total of 22.9 percent of Plano households purchased sports and recreation equipment in the last 12 months. It also breaks spending into categories by amount and shows the percent of Plano households that spent that amount over the last 12 months. That the highest spending category is the most common and has the highest MPI suggests that Plano households may purchase expensive sports and recreation equipment, such as bicycles, or a high number of lower-priced items.

TABLE C2. ANNUAL HOUSEHOLD SPENDING ON SPORTS AND RECREATION EQUIPMENT IN PLANO		
TYPE OF SPENDING	PERCENT OF HOUSEHOLDS THAT SPENT IN LAST 12 MONTHS	MARKET POTENTIAL INDEX
Sports and recreation equipment, \$1-\$99	6.4%	108
Sports and recreation equipment, \$100-\$249	7.7%	118
Sports and recreation equipment, \$250+	8.8%	126

Recreation expenditures and spending potential

Plano residents spend money on sports and recreation equipment. Table C3 shows the average amount per year spent by Plano households on sports, recreation, and exercise equipment (\$313), then breaks total spending out by category (e.g., exercise equipment and gear, bicycles).²⁵ It also includes the spending potential index (SPI) for each spending category. SPI is compiled using Esri Business Analyst estimates of recreation expenditures and represents the amount spent for a product or service relative to the national average.²⁶ The SPI for sports, recreation, and exercise equipment and the categories within is quite high in Plano compared to the national average, ranging from 182 for camping equipment to 145 for other sports equipment. Overall, the likelihood that Plano households will spend money on sports, recreation, and exercise equipment is 65 percent higher than the likelihood of households nationally.

TABLE C3. ANNUAL HOUSEHOLD SPENDING ON SPORTS, RECREATION, AND EXERCISE EQUIPMENT IN PLANO²⁷

SPENDING CATEGORY	AVERAGE AMOUNT SPENT PER HOUSEHOLD	TOTAL SPENDING	SPENDING POTENTIAL INDEX
Sports, recreation, and exercise equipment	\$313	\$32,700,000	165
Exercise equipment and gear, game tables	\$129	\$13,500,000	168
Bicycles	\$53.50	\$5,600,000	179
Camping equipment	\$30.90	\$3,240,000	182
Hunting and fishing equipment	\$62.70	\$6,560,000	149
Winter sports equipment	\$9.63	\$1,010,000	161
Water sports equipment	\$10.60	\$1,110,000	163
Other sports equipment	\$11.60	\$1,210,000	145
Rental and repair of sports, recreation, and exercise equipment	\$4.97	\$521,000	162

The average household spending in Plano of \$313 is consistent with that of average spending in comparison cities. Interestingly though, Plano's total spending of \$32.7 million ranks highest overall among comparison cities. Plano also ranks highest or near-highest in total spending for each category of sports and recreation equipment despite ranking fourth (of five cities) in median household income among comparison cities.²⁸ For Plano and comparison cities, with the exception of Arlington, Virginia, the SPI is above the national average for all categories of recreation equipment spending. Esri also calculates the MPI for categories of spending, \$1–\$99, \$100–\$249, and \$250 or more, and reports the percent of households that spent these amounts over the preceding 12 months. Market potential for Plano is above the U.S. average and relatively consistent with that of the five comparison cities for all spending tiers. Remarkably, for each of the six cities, the highest spending tier, \$250

25 This spending includes some categories that include purchases unrelated to the park and recreation system (e.g., game tables) and purchases of outdoor recreation-related equipment for activities of limited availability in Plano (e.g., camping, hunting, fishing). That is, most fishing activity by residents is likely to occur outside the city boundary. Bicycle sales, however, make up a substantial portion of total spending on sports, recreation, and exercise equipment, and the public park, trails, and recreation system in Plano offers numerous opportunities for bicycle riding.

26 The SPI is an indicator of what level of discretionary income consumers are willing to devote to a particular good or service. SPI is tabulated to represent a value of 100 as the overall spending for the United States; therefore, when the SPI is equal to 100 for a specific type of merchandise, consumers are spending at a rate equal to the national average. To calculate the SPI, Esri combines information from the latest Bureau of Labor Statistics Consumer Expenditure Surveys, which include a diary survey for daily purchases and an interview survey for general purposes. Consumer spending is influenced by market conditions and trends and reflects economic and demographic change. Source: Esri, *Esri Consumer Spending Methodology 2016*.

27 Esri, *Business Analyst Tool—Recreation Expenditures*, accessed for the City of Plano by The Trust for Public Land, October 30, 2016.

28 Esri, *Business Analyst Tool—Sports and Leisure Market Potential*, accessed for the cities of Arlington, VA; Chandler, AZ; Frisco, TX; Henderson, NV; Naperville, IL; and Plano, TX, by The Trust for Public Land, October 30, 2016.

or more, also had the highest MPI and the greatest percent of households that spent in the last 12 months. This indicates that households in each of these cities are more likely to spend a significant amount on recreation and sports equipment than they are likely to spend a modest amount on these items.

TABLE C4. ANNUAL HOUSEHOLD SPENDING ON SPORTS AND RECREATION EQUIPMENT IN PLANO AND COMPARISON CITIES²⁹

	ARLINGTON, VIRGINIA	CHANDLER, ARIZONA	FRISCO, TEXAS	HENDERSON, NEVADA	NAPERVILLE, ILLINOIS	PLANO, TEXAS
Average annual household spending on sports, recreation, and exercise equipment (2016)	\$304	\$241	\$381	\$215	\$355	\$313
Total spending on sports, recreation, and exercise equipment (2016)	\$32,000,000	\$23,100,000	\$19,000,000	\$23,100,000	\$18,100,000	\$32,700,000
Spending potential index	161	128	201	114	188	165
Median household income (adjusted to 2016\$)	\$106,000	\$74,900	\$113,000	\$65,000	\$111,000	\$92,900
Market potential index for sports and recreation equipment spending (\$1-\$99)	91	102	108	101	115	108
Percent of households that spent in last 12 months	5.5%	6.1%	6.5%	6.0%	6.9%	6.4%
Market potential index for sports and recreation equipment spending (\$100-\$249)	89	114	140	113	125	118
Percent of households that spent in last 12 months	5.8%	7.4%	9.1%	7.4%	8.2%	7.7%
Market potential index for sports and recreation equipment spending (\$250+)	110	115	150	113	142	126
Percent of households that spent in last 12 months	7.7%	8.0%	10.5%	7.9%	9.9%	8.8%

²⁹ Esri, *Business Analyst Tool—Recreation Expenditures*; Esri, *Business Analyst—Sports and Leisure Market Potential*.



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