

Item 11

**WINDOVER COMMUNITIES
ADDITIONAL APPLICATION DOCUMENTS**

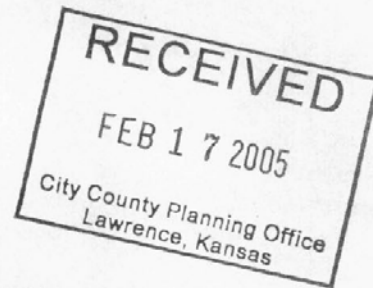
AFFORDABLE HOUSING

WORKFORCE / AFFORDABLE HOUSING REPORT

WINDOVER AT LAWRENCE – PORPOSED PRICING POINTS

**WINDOVER AT LAWRENCE – SITE PLAN DEVELOPMENT
REPORT**

PUBLIC SYSTEM UTILITY STUDY



AFFORDABLE HOUSING

APPLICATION FOR REZONING AND ANNEXATION

February 17, 2005

Windover Communities, LLC
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Affordable Housing

WINDOVER COMMUNITIES APPLICATION FOR REZONING AND ANNEXATION APPROVAL

INTRODUCTION

The City of Lawrence faces a housing crisis characterized by a limited supply of units, limited choice of housing types and locations, and an increasing lack of affordability. The affordable housing issue has become a pressing issue in the City for reasons of social equity, economic development, and the City's ability to accomplish the "Smart Growth" objectives of its *Horizon 2020* Comprehensive Plan. Housing is a high priority not only for the City, but for civic organizations such as the Chamber of Commerce, the Living Wage Coalition, Tenants to Homeowners, and the city's Housing Trust Fund Advisory Board.¹

The pressing need for affordable housing is recognized by City Policy:

- Policy 4.6 of the *Horizon 2020* Comprehensive Plan requires the City to "provide affordable housing options throughout the city through the adoption of residential zoning classifications with modified minimum lot sizes and setbacks."
- Policy 2.7 of *Horizon 2020* provides that the City will "Provide for a Variety of Housing Types" by interspersing low- to moderate-income housing throughout the city and encouraging the use of a variety of housing types, including townhomes, patio homes, zero lot line homes, cluster housing, garden apartments and retirement housing.
- The City Commission Strategic Goals and Priorities provides for the City to "explore private/public partnerships to provide affordable housing."
- The City has established a Housing Trust Fund and is exploring a land trust to encourage the production of affordable housing.

The average sales price for new homes in Lawrence has more than doubled since 1999, making it difficult for families and workers to find new housing in the City.² Much of the decline in new home sales is attributable to the relative scarcity of new homes that are available.³ While housing needs are expanding, local resources (such as the City's Housing Trust Fund) and federal financial assistance

¹ "Chamber lays out hopes for '05," *Lawrence Journal-World*, Saturday, January 29, 2005 (online at <http://www.ljworld.com/section/citynews/story/194699>); "Rising prices make owning home increasingly difficult," *Lawrence Journal-World*, Saturday, August 17, 2004 (online at <http://www.ljworld.com/section/citynews/story/178748>) (hereinafter "Rising prices").

² The Douglas County Appraiser's Office reported an average sales price of \$125,900 in 1999. "Rising prices," *supra* note 1. Recent multiple listing service data places the average sales price at \$276,054. Lawrence Board of Realtors Multiple Listing Service as of February 8, 2005, provided by Donna Huffman, CMC, CRMS.

³ "Sales of existing homes climb to record high in 2004 - National median sales price jumps to \$184,100," *Lawrence Journal-World*, Wednesday, January 26, 2005 (online at <http://www.ljworld.com/section/citynews/story/19434>).

are declining.⁴ With the average sales price now approaching \$300,000, and City resources for new housing programs strained, new solutions to affordability and homeownership must be found.

In order to accomplish the City's affordable housing objectives, the City must be prepared to approve new affordable housing units. Unreasonable cost or delay in approving new housing communities will inhibit the supply of housing, drive up housing costs, and keep needed housing out of reach for low and moderate income families. This report has been prepared to encourage the City to act as a key partner in the process of delivering affordable housing by providing a fair, predictable, and speedy approval process for communities such as Windover that provide affordable housing.

TARGET POPULATION

Affordable housing is typically defined as housing that is leased or sold to certain target populations at no more than a designated percentage of income. Typical target populations are households earning between 80-100% of area median income.⁵

In Lawrence, the median family income identified by the federal Department of Housing and Urban Development for 2004 is **\$62,200**.⁶ Using this figure, housing is affordable if it reaches families earning from **\$49,760** (80% of median family income) per year or below.

Workers in these income categories provide vital functions to the Lawrence community. Following is a partial list of full-time workers who earn less than \$62,200 a year, and are within the income ranges listed above:

Table 1 Occupational Wages

Occupation	Average Salary
Teacher	\$38,440
Police	\$39,700
Nurse (LPN)	\$28,298
EMT	\$25,384

In addition, Lawrence recently became the first city in the State of Kansas to adopt a Living Wage Ordinance.⁷ The Living Wage Ordinance establishes a wage floor of \$9.53 per hour.⁸ Assuming a

⁴ "Rising prices," supra note 1. Federal spending for affordable housing programs is expected to decline by 11% over the next fiscal year. United States Office of Management and Budget, Budget for Fiscal Year 2006, at <http://www.whitehouse.gov/omb/budget/fy2006/pdf/budget/hud.pdf>. The City's Housing Trust Fund Advisory Board is not meeting until further notice. City of Lawrence, Citizen Board Agendas, at www.lawrenceneighres.org/Agendas.shtml#HTTP.

⁵ White, supra note 5.

⁶ HUD User, FY 2004 Income Limits, reported at <http://www.huduser.org/Datasets/IL/IL04/hud04ks.pdf>.

⁷ Chapter 1, Article 21 of the City Code ("Economic Development Incentives and Tax Abatement Policy.")

⁸ City Code § 1-2105. This is a conservative figure, as the Living Wage Ordinance provides for annual adjustment.

40-hour week and two wage earners, this results in a family income of \$39,339. The duplex product offered by the proposed Windover community is affordable to this household income. Housing would also be considered affordable if it is available to families with two wage earners earning the living wage.

HOUSING COSTS

What the target household pays for housing costs is critical to defining affordability. Generally accepted standards for affordable housing are that housing costs should not exceed 30% of the target household income.⁹ For sale units, an initial purchase price that does not exceed 95 percent of the median purchase price for the area is the standard for "modest housing" under the federal HOME program.¹⁰ The modest housing limit for the 2004 HOME Investment Partnerships Program (24 CFR § 92.254) is **\$172,632**.¹¹

By comparison, the

Table 3 Windover Community Price Points

Product type	Concept Plan Designation	Anticipated Sales Price
Single family detached dwellings	RM-2	\$120,750 - \$163,200
Duplex dwellings	RMD	\$103,500 - \$115,500
Large lot single family detached dwellings	RS-2	\$168,000 - \$220,000

These sales prices are affordable to a variety of household categories in Lawrence. In particular, these price points are affordable to low income households, who cannot compete in the housing market as easily as families at the upper end of the income range. Starting at around \$100,000, the duplex dwellings are affordable to families below the low income ranges cited above. In fact, proposed housing will serve families beginning at approximately \$23,000 with maximum allowances.

By comparison, the average sales price of single family homes in Lawrence is far beyond the range of moderate income families. The average price of single family homes presently on the market is \$276,054.¹³ This price level requires a monthly mortgage payment of \$1,825, or an annual income of \$73,037.¹⁴ This price range is beyond the reach of moderate income families in the City of Lawrence.

⁹ Under the federal HOME program, 30% of adjusted income is the standard for assessing affordability for renters (42 U.S.C. § 215).

¹⁰ 42 U.S.C. § 215.b.

¹¹ HUD FHA Mortgage limits, reported at <https://entp.hud.gov/idapp/html/hicost1.cfm> (mortgage maximums as of Saturday February 12, 2005).

¹² HUD FHA Mortgage limits, reported at <https://entp.hud.gov/idapp/html/hicost1.cfm> (mortgage maximums as of Saturday February 12, 2005).

¹³ Lawrence Board of Realtors Multiple Listing Service as of February 8, 2005, provided by Donna Huffman, CMC, CRMS.

¹⁴ These calculations assume a 7% interest rate and a 30-year amortization period.

POLICY ISSUES

The City should encourage affordable, single-family housing in new communities. While the City can proactively use annexation and rezoning to approve affordable housing communities, a number of regulatory barriers are currently impeding the production of housing in the City. These include:

- Excessive minimum lot sizes in the City's fringe areas, and in particular the high growth areas to the west of the City. The 3-acre minimum lot size in the County's existing zoning classification add excessive land cost costs and directly limit the supply of affordable housing. Only expensive, estate style housing can be produced with this restriction.
- Regulatory delays, such as the area plan process. Regulatory delay, along with associated holding costs for land, are regularly cited in the professional literature as an obstacle to the production of affordable housing.¹⁵ The area plan process is time consuming, and has no set deadlines. Requiring developers to await the completion of an area plan before approving rezoning or annexation requests drives up production costs and directly impedes the supply of new affordable housing for the City.
- The City's growth management policies. Requiring Service Area 1 to build out before permitting development in Service Areas 3a and 3b imposes additional delays and uncertainty. The City's policy assumes that there is a supply of land at acceptable sizes and prices in Service Area 1 to accomplish the goals of affordable housing. In fact, this is not the case based on the experience of the applicant.

The City has the ability to selectively approve rezoning and annexation requests for new communities that meet its affordable housing objectives. Because most new communities in the City do not provide housing at this range, approving limited rezoning requests such as the Windover applications will not impede the City's normal growth management policies. We urge the City to approve the annexation and rezoning requests to provide a much needed supply of affordable housing for the City.

CONCLUSION

Windover Communities provides a mechanism for the City of Lawrence to meet its affordable/workforce housing objectives without violating the city's *Horizon 2020* Comprehensive Plan. By approving the rezoning and annexation proposals for this community, the City would authorize the applicant to commence detailed platting and site planning for the property. We urge the city to approve the annexation and rezoning application in order to provide a source of affordable housing for city residents.

¹⁵ United States Department of Housing and Urban Development, HUD's Office of Policy Development and Research, "Why Not In Our Community?": Removing Barriers to Affordable Housing (Feb. 2005); S. Mark White, Affordable Housing: Proactive and Reactive Regulatory Strategies (American Planning Association, Planning Advisory Service Report No. 441, 1992).

AFFORDABLE HOUSING

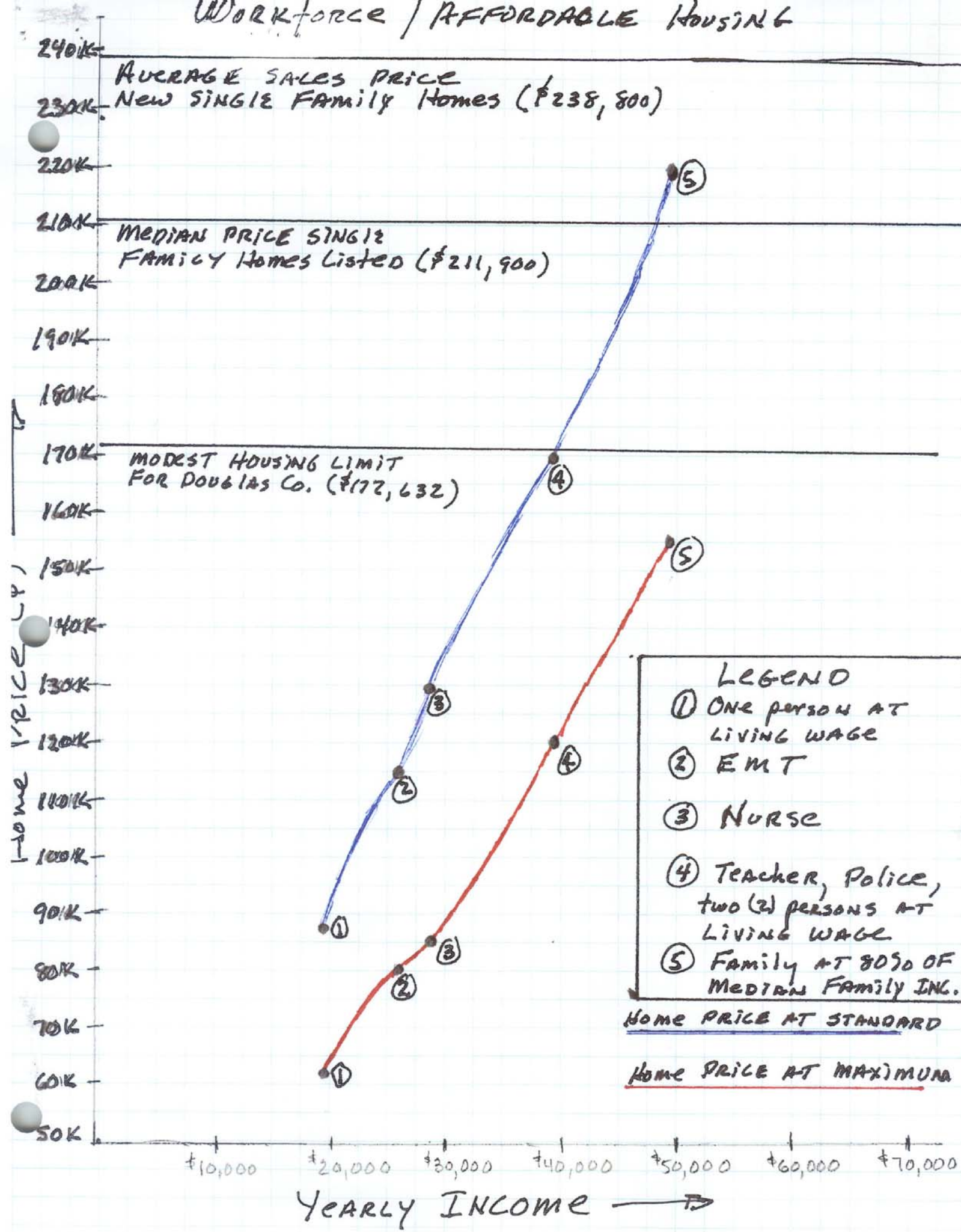
APPLICATION FOR REZONING AND ANNEXATION

WORKFORCE / AFFORDABLE HOUSING
REPORT

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WORKFORCE / AFFORDABLE HOUSING



This analysis is prepared for the use of Windover Communities, Inc.

The information in this report is based on established norms, statistical data, printed generalities and rules.

Figures for taxes and insurance are estimates based on examples of closed loans for average customers within a six month period. These figures range greatly and are assumptions used for illustration purposes only to aid in determining an anticipated total housing expense monthly.

Taxes:

estimated at \$9.74 per month per 10K
\$974.00 per \$100,000 annually
\$1461.00 per \$150,000 annually

Insurance:

estimated at \$5.56 per month per 10K
\$556.00 per \$100,000 annually
\$843.00 per \$150,000 annually

Donna L. Huffman CMC, CRMS

Modest Housing
Limit for Douglas County

\$172,632

HUD
updated as of 2-5-05

Lawrence Housing Availability

Single Family Homes Listed:
280 For Sale

Average Price	\$276,054
Median Price	\$211,900

Currently Availability:

68 homes listed for sale between \$50,000 - \$150,000 range in Lawrence

89 homes listed for sale between \$50,000 - \$150,000 range in Douglas County

*These figures are based on the Lawrence Board of Realtor's MLS as of 2-8-05.

Chart of Estimated Payments For Your Use & Analysis Based On The Anticipated Range

	escrows	6%/30yrs	7%/30yrs	8%/30yrs
\$70,000	\$124	<u>\$419</u> Total: \$543	<u>\$465</u> \$589	<u>\$513</u> \$637
\$80,000	\$142	<u>\$479</u> Total: \$621	<u>\$532</u> \$674	<u>\$587</u> \$739
\$90,000	\$160	<u>\$539</u> Total: \$699	<u>\$598</u> \$758	<u>\$660</u> \$820
\$100,000	\$176	<u>\$599</u> Total: \$775	<u>\$665</u> \$841	<u>\$733</u> \$909
\$110,000	\$196	<u>\$659</u> Total: \$855	<u>\$731</u> \$927	<u>\$807</u> \$1003
\$120,000	\$214	<u>\$719</u> Total: \$933	<u>\$798</u> \$1012	<u>\$880</u> \$1094
\$130,000	\$232	<u>\$779</u> Total: \$1011	<u>\$864</u> \$1096	<u>\$953</u> \$1185
\$140,000	\$249	<u>\$839</u> Total: \$1088	<u>\$931</u> \$1180	<u>\$1027</u> \$1276
\$150,000	\$267	<u>\$899</u> Total: \$1166	<u>\$997</u> \$1264	<u>\$1100</u> \$1367
\$160,000	\$285	<u>\$959</u> Total: \$1244	<u>\$1064</u> \$1349	<u>\$1174</u> \$1459
\$170,000	\$303	<u>\$1019</u> Total: \$1322	<u>\$1131</u> \$1434	<u>\$1247</u> \$1550

*escrows include estimated taxes, insurance, and MIP

*all figures rounded to a dollar

Average Income for Lawrence Kansas

By Target Occupation

Income		Standard Allowance For Housing	6%	Top Price Range	7%	8%
80% MFI	\$49,760	\$1202	\$155,000	\$140,000		\$126,000
Teacher	\$38,440	\$929	\$120,000	\$110,000		\$100,000
Nurse (LPN)	\$28,298	\$684	\$85,000	\$80,000		\$70,000
EMT	\$25,384	\$613	\$80,000	\$70,000		\$65,000
Police	\$39,700	\$959	\$120,000	\$110,000		\$100,000
Couple on Living Wage	\$39,339	\$950	\$122,000	\$110,000		\$99,700
Single Living Wage	\$19,669	\$475	\$61,000	\$55,000		\$50,000

*This model assumes that the other debts are within the allowable guidelines for standard underwriting.

2004 Median Income for Lawrence Kansas

\$62,200

	Income	Maximum Allowance For Housing	6%	Top Price Range 7%	8%
80%	\$49,760	\$1700	\$220,000	\$196,800	\$178,500
Teacher	\$38,440	\$1313	\$170,000	\$160,000	\$150,000
Police	\$39,700	\$1356	\$170,000	\$160,000	\$150,000
Nurse(LPN)	\$28,298	\$967	\$130,000	\$120,000	\$110,000
EMT	\$25,384	\$867	\$115,000	\$110,000	\$100,000
Food Service Worker	\$15,652	\$535	\$70,000	\$62,500	\$55000
Couple on Living Wage	\$39,339	\$1344	\$172,000	\$155,000	\$140,000
Single Living Wage	\$19,669	\$672	\$86,500	\$77,800	\$70,500

*This model allows the borrower to obtain financing up to his/her total monthly payment allowance in housing without restriction.

*This is a special (no down payment) government program that allows a higher percentage of the monthly income to be used for housing and does not require a monthly MIP therefore reducing the escrow figure.

*This product requires that the home meet specific inspection standards for condition and utility cost efficiency.

Affordability Factors

Total Housing Payment to Income

Total Other Debts

Personal Spending & Savings Factors

Quality of Home / Energy Efficiency

Quality of Home / Reduced Cost to Improve & Maintain

Cost of Commute

Insurance Discounts For New & Newer Construction

Income Tax Deductions For Home Owners Increasing Net Pay

Property Tax Issues

Entry Barrier

Down Payment Availability Through Seller Concessions & Other Means
Length of Time to Save a Down Payment & Maintain Rental Household

WINDOVER AT LAWRENCE PROPOSED PRICE POINTS

A variety of housing options will be available at Windover at Lawrence. The following lot configurations will be available:

Windover at Lawrence Lot Configurations		
RM-2 Lots	Standard Lots	Minimum 6,000 square feet
RS-2 Lots	Large Lots	Minimum 7,000 square feet
RMD Lots	Duplex Lots	Minimum 3,500 square feet Per unit

Typical homes will be 3 bedroom, 2 bath homes on a crawl-space foundation and a garage. Basements will be optional on standard lots and will be included on large lots. Duplexes will be 3 bedroom, 2 bath on a crawl-space foundation and a garage.

Projected pricing points will be as follows:

STANDARD LOTS (RM-2)	
1150 sq.ft.	Price \$120,750
1400 sq. ft.	Price \$142,800
1600 Sq. ft.	Price \$163,200

LARGE LOTS (RS-2)	
1400 sq. ft.	\$168,000
1600 sq.ft.	\$192,000
2000 sq.ft.	\$220,000

DUPLEX LOTS (RMD)	
900 sq.ft.	\$103,500
1100 sq.ft.	\$115,500

***Windover at Lawrence
Site Plan Development Report***

Prepared by:

***Gould Evans Goodman
Kansas City, Missouri***

February 10, 2005

Windover at Lawrence Site Plan Development Report

The site plan for the Windover Community at Lawrence has been developed through an assessment of the physical characteristics of the site and the findings from a series of interviews and a meeting with residents and property owners near the proposed development site.

Public Input, December, 2004

A series of interviews and a property owner meeting was held at the Windover Communities and Commercial Title offices in Lawrence on December 15, 2004. These meetings opened up a line of communication between the developer and near-by property owners of the proposed Windover at Lawrence development site. The property owner meeting involved soliciting issues and comments related to the Windover Community proposal, as well as a brief visual preference exercise. The results of the visual preference exercise conducted at the property owner meeting are provided in the attached Appendix A.

The developer and Gould Evans Goodman have utilized the input from these citizens during the conceptualization of the proposed site plan.

Windover Community Site Plan, February 2005

The Windover Community Site Plan is an initial concept related to the layout of streets, open space, and private parcels. This site plan is the result of the desire to create a neighborhood with a number of "traditional" amenities, as well as respond to the concerns and ideas raised by neighbors, residents or property owners in the immediate area of the Windover Community site that were part of the interviews and meetings outlined in December.

While several of the issues and concerns raised are outside the purview of the developer, several concepts within this site plan are responsive to the input of the interview and meeting participants.

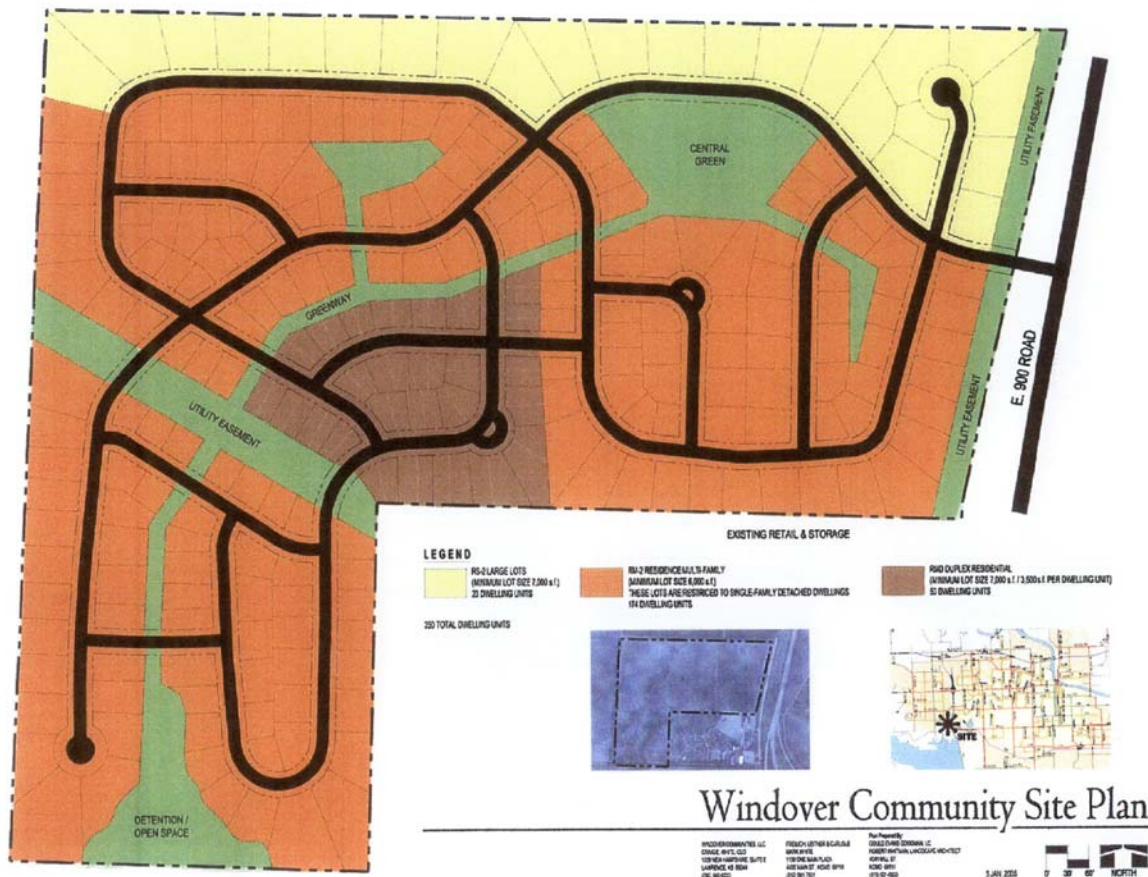
1. The development is proposed as a "traditional" neighborhood incorporating many of the amenities and the character items that participants found desirable as part of the visual preference exercise - sidewalks, street trees, open space / natural features.
2. An open space / landscaped buffer is proposed along the eastern edge of the development.
3. The open space connection to the south may accommodate a pedestrian trail connection to the State Park.
4. The 23 RS-2 large lot parcels are responsive to anticipated residential density levels that may occur as part of development to the north of this site and internalize the transition of residential density to the site itself.

Windover at Lawrence
Site Plan Development Report

5. The 174 RM-2 parcels are single family detached dwellings at a density that is equivalent to many developed areas in Lawrence. The density level was seen as acceptable by many participants based on the neighborhood and housing character pictures that participants preferred as part of a visual preference exercise.
6. While the participants were sensitive to densities that exceeded typical single family housing styles, the developer has balanced that sensitivity with the need to achieve a desired mix of dwelling styles. Therefore, the proposed 53 RMD duplex attached units have been placed in a manner that internalizes the transition of density and minimizes visual / physical exposure of this dwelling style to the outside of the development site.

A copy of the proposed site plan is provided on the following page.

Windover at Lawrence Site Plan Development Report



Windover at Lawrence
Appendix A – Visual Preference Exercise
December 15, 2004

Visual Preferences –

A brief exercise was conducted to identify some of the likes and dislikes the property owners have in regard to the potential housing and neighborhood character of the potential development. A series of 24 photos were displayed and participants were given three green dots and three red dots to identify the photos they liked the most or the least respectively. The pictures depicted housing in developed and developing areas of Lawrence and other locations of a style or character that the developer would be proposing. The following photos and text reflect the primary results of this exercise.

Most Liked Images (receiving 2 or more green votes):



(5 green)



(4 green) – Liked the overall character



(3green)



(2 green)



(2 green)



(2 green)

Windover at Lawrence
Appendix A – Visual Preference Exercise
December 15, 2004

Least Liked Images (receiving 2 or more red votes):



(7 red) – Too dense



(4 red)



(3 red)



(2 red)

Visual Preference Comments:

Other photos also received one vote a piece. Participants tended to dislike more dense housing forms (duplex, town home and patio home types were of concern), residential design that appeared to be dominated by the presence of garage doors, and where portions seemed different or unusual when compared to the perceived norm.

Preferences of the participants leaned toward more traditional residential design forms in typical neighborhood settings (with sidewalks and street trees), and where small architectural details or articulated facades provided visual interest avoiding mundane repetitiveness and flat front facades.

INTRODUCTION

This Public Utility System study was performed to show how the City of Lawrence water and sanitary sewer connections could be brought to the proposed 240 unit Windover Communities. This development is located in Douglas County adjacent to the western incorporated limits of Lawrence north of Clinton Lake in Section 6 Township 13S Range 19E.

Water service for this development will be delivered by extending the existing 12" line running along the north side of Clinton Parkway approximately 1300 feet within the South Lawrence Traffic way right of way. This follows the City of Lawrence Master Plan recommendations for the development of municipal water distribution.

The Sanitary sewage will be accomplished initially by placing a sanitary lift station at the south west corner of the site where the grade naturally is lower. The lift station have a 4" force main which will connect into the City of Lawrence Yankee Tank sanitary sewer lines approximately 2200 feet North of the Windover Communities site. The Lawrence Master plan for the sanitary sewer system describes a proposed lift station (#YCT4PS1) near the Windover Communities site. When this station is built it will be possible to remove the lift station on the Windover Communities site and gravity feed the sanitary waste into the new lift station. This will allow the sanitary system to operate without adding an extra lift station over the master plan recommendations.

The utility improvements required for the development of Windover Communities would require the permission of the State of Kansas, Douglas County, and the City of Lawrence to place the sanitary and water lines within their right of way.



WATER DISTRIBUTION SYSTEM

The pipeline network must have the capacity to deliver required flows at acceptable pressures under even the highest demands.

Delivering required fire-fighting flows is another critical function of the distribution network. The ISO (International Organization for Standards) requires a needed fire flow not less than 500 gpm in all parts of the system. In residential areas the following demands are generally required:

1- and 2- family dwellings less than 2 stories high <u>Dist. Btwn. Bldgs.</u>	<u>Fire Flow Required</u>
Over 100'	500 gpm
31'-100'	750 gpm
11'-30'*	1000 gpm
10' or less	1500 gpm

* The vast majority of dwellings fall into this category.

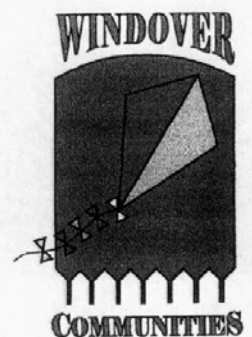


KANSAS WATER OFFICE						
WATER USE STATISTICS FOR LARGE PUBLIC WATER SUPPLIERS ^{a/}						
REGION 8						
2001						
		Regional	Percent	Cost per	Percent	Percent
		Average	Difference	10,000	Metered	Unacc.
Public Water Supplier	GPCD ^{b/}	GPCD		gal/month ^{c/}	Free	Ford/
Kansas City BPU	211	130	62	\$37.25	35	6
WaterOne, Johnson Co.	164	130	26	\$32.55	13	9
Atchison	129	130	-1	\$40.22	2	9
Lawrence	128	130	-2	\$29.60	12	4
Pittsburg	121	130	-7	\$32.54	3	3
Leavenworth	116	130	-11	\$38.72	<1	13
Gardner	112	130	-14	\$48.10	3	22
Parsons	110	130	-15	\$47.82	2	11
Olathe	106	130	-18	\$28.74	<1	10
Ottawa	101	130	-22	\$27.57	1	10
Average	130	130	--	\$36.31	7	10

a/ Includes public water suppliers in Region 8 that serve 10,000 people or more.

b/ The figures for gallons per capita per day do not include water supplied for industry, bulk sales, stockwatering, or farmsteads using more than 200,000 gallons per year.

c/ Cost for water according to rates in effect during 2001, or as recently as rates provided.



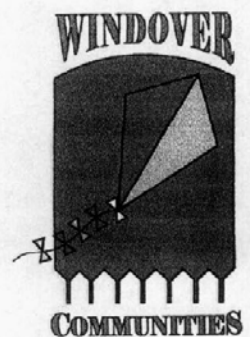
WATER DEMANDS FOR WINDOVER COMMUNITIES

<u>Demand</u>	<u>Projected Conditions</u>
Average Day	107,520 gpd or 75 gpm
Maximum Day	268,800 gpd or 187 gpm
Peak Hour	430,080 gpd or 299 gpm
Minimum	35,840 gpd or 25 gpm
Fire Flows	500 gpm for 2 hours

Projected conditions are based on the assumptions that there will be 240 units with an average of 3.5 persons per unit using 128 gallons per capita day. We used the same 2.5 times the average daily demand for the maximum day demand and 4 times the average daily demand for the Peak Hour demand. Although we list the Peak Hour in a gallon per day figure, we assume the Peak Hour condition to last for only 4 hours. After our discussions with the city staff, this might be a conservative estimate. However, to present a worst-case scenario, we will still use a 4 hour Peak Hour time period. The peak hour demand of 299 gpm in the 1650 foot extension of the 12 inch water line will create a pressure head loss of 0.25 psi. Extending the 12" line will provide adequate capacity to the Windover Communities Development and follow the Lawrence master plan for Municipal water development.

FIRE PROTECTION

Fire Protection for the new development will fall within the two minute response time requirement when Fire Station #4 is brought online in 2005. This Fire Station located on Wakarusa Drive at 20th Street will be able to include Windover Communities in it's two minute response time criteria.



SANITARY SEWER ANALYSIS:

Estimated sanitary flows are based on a slightly higher schedule than Kansas Department of Health and Environments Standard of design. We assume:

100 gpcd, with peak flow of 3.5x Average Dry weather Flow

Single family units will have 3 people per unit

Demand

Average Day

Peak Hour

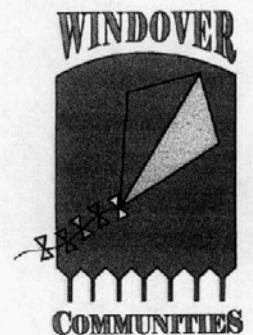
Projected Conditions

72,000 gpd or 50 gpm

252,000 gpd or 175 gpm

SUMMARY OF EXISTING SANITARY SEWER LINE						PEAK HOUR FLOW	
						ESTIMATED EXISTING FLOW IN LINE Q gpm	ESTIMATED FLOW WITH HOMETOWN DEV. Q gpm
MH	FLOWLINE IN ft	FLOWLINE OUT ft	LENGTH ft	SIZE in.	CAPACITY OF LINE Q gpm		
41	938.2	938.2	425	8	566.0	0	150.0
40	931.8	931.6	385	8	786.6	0	150.0
39	920.4	917.0	400	8	618.8	2.5	152.5
38	909.8	909.8	400	8	618.8	6.3	156.3
37	902.6	902.6	393	8	816.9	8.8	158.8
28	890.2	890.0	402	15	2179.0	33.8	183.8
27	886.9	886.8	390	15	2247.2	40.0	190.0

This shows that the lowest capacity section of the existing sanitary sewer is between manhole 41 and 42 with a capacity of 566 gallons per minute. At the present time there are no service connections into this line so the peak hour conditions of 150 gpm from Windover Communities would be insignificant.



CONCLUSION

Moderate Priced Single Family housing can be provided to the City of Lawrence area with this 240 unit Windover Communities development.

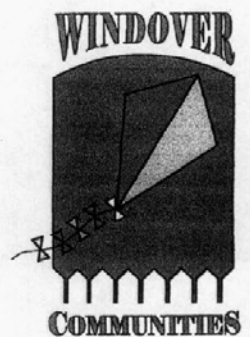
This development follows the City of Lawrence Master Plan recommendations for the development of municipal water and sanitary service distribution.

Water service for this development will be delivered by extending the existing 12" line running along the north side of Clinton Parkway approximately 1300 feet within the South Lawrence Traffic way right of way.

The Sanitary sewage will be accomplished initially by placing a sanitary lift station at the south west corner of the site where the grade naturally is lower. The lift station have a 4" force main which will connect into the City of Lawrence Yankee Tank sanitary sewer lines approximately 2200 feet North of the Windover Communities site. The Lawrence Master plan for the sanitary sewer system describes a proposed lift station (#YCT4PS1) near the Windover Communities site. When this lift station is built the lift station on the Windover Communities site will be abandoned and gravity feed into the new lift station. This will allow the sanitary system to operate without adding an extra lift station over the master plan recommendations.

All services within the new subdivision would be the responsibility of Windover Communities and would be designed in accordance with The City of Lawrence standards.

The utility improvements required for the development of Windover Communities would require the permission of the State of Kansas, Douglas County, and the City of Lawrence to place the sanitary and water lines within their right of way.



Appendix:

Head loss in this proposed section of water line was determined using the Darcy Weisbach Equation:

Darcy Weisbach Equation

$$h_f = f \frac{L V^2}{D 2g}$$

h_f = friction loss (ft)

f = Darcy Weisbach friction factor

L = pipe Length (ft)

D = pipe Diameter (ft)

V = mean Velocity (fps)

Reynold's Number

$$Re = \frac{VD}{\nu}$$

D = pipe Diameter (ft)

V = mean Velocity (fps)

ν = Kinematic Viscosity (ft²/s)

<i>Flow</i>	<i>Re</i>
Laminar	< 2000
Transition	2000 - 4000
Turbulent	> 4000

The friction factor depends on the state of flow, classified by the Reynolds number.

